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URRUSTI FRENK, LUZ MARIA SINAIA

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The Political Economy of Media and Violence in Mexico

by

Luz Maria Sinaia Urrusti Frenk

A dissertation submitted in partial satisfaction of the
requirements for the degree of
Doctor of Philosophy

in

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in the

Graduate Division
of the
University of California, Berkeley

Committee in charge:

Professor Frederico S. Finan, Chair
Professor Ernesto Dal Bo
Professor Edward Miguel

Summer 2015

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Luz Maria Sinaia Urrusti Frenk

Abstract

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University of California, Berkeley

Professor Frederico S. Finan, Chair

The chapters in this dissertation study political economy and development economics topics related to the decline of the Mexican Institutional Revolutionary Party (PRI), one of the longest-lasting authoritarian governments of the twentieth century. Chapter 1 provides an introduction linking the main topics, hypotheses, and results. Chapters 2 and 3 focus on the role of mass media diversity and unsustainable media capture, respectively, in the Mexican democratic transition. Chapter 4 examines how fractured political power across levels of government as a result of the collapse of the PRI centralized state, led to higher violence levels from the war against organized crime launched by the National Action Party (PAN) in 2007. Chapter 5 concludes with a summary of the most important findings and contributions.

Using a unique panel dataset that provides local broadcast media coverage and ownership data for each of the 1,556 radio and broadcast television outlets in the country from 1990 to 2012, Chapter 2 studies the effect of media diversity on the PRI and opposition parties' electoral performance as well as on turnout, and shows how local media diversity, particularly in the radio market, contributed to the Mexican PRI authoritarian regime's radical municipal electoral decline. Conditional on time-varying observables and controlling for municipal and year fixed effects, the chapter develops three main sets of results. First, I show that increases in local media diversity, particularly from the local radio market, had a large significant negative effect on mayor municipal voting outcomes for the PRI and a significant positive effect on the electoral performance of the left of center opposition Party of the Democratic Revolution (PRD). Second, I show that both local radio and broadcast television plurality had a positive effect on turnout, that local broadcast television ownership diversity had a negative effect on turnout, and that media exposure matters more for electoral participation than ideological diversity. Third, my analysis shows that the most popular measure of media diversity used in the literature, media plurality, is an incomplete measure of diversity and/or competition. Ownership is of central importance when studying media's effects on voting behavior. Results hold after controlling for overall media exposure, democratization trends, and turnout and are

robust to different measures of media diversity, PRI electoral outcomes, as well as an alternative ownership concentration measure.

Chapter 3 develops an extension of Besley and Prat's (2006) canonical media capture framework with a three-period political agency retrospective voting model to understand how new media licenses are granted, when media capture occurs, and the effects it has on political outcomes and voters' welfare. The model shows that it is more costly to capture media when media have a higher commercial motive, when there are regulatory structures that make bribing harder, when the initial number of free media is higher, when there is lower expected media loyalty, and when the cost of rebribing media is higher. It also shows that transparency and efficient news production influence the cost of media capture indirectly, and that media independence, initial media plurality, and media concentration have an ambiguous effect on the cost of capture. Moreover, the optimal number of new licenses and of outlets bribed in period 1 are both functions of the cost of bribing in period 1 relative to the cost of bribing in period 2. The optimal number of outlets captured in the second period is ambiguous, and suggests that the extent of capture when license-granting is possible may be context-specific and needs to be evaluated empirically. In addition, the theoretical results show that the equilibrium with unsuccessful media capture in period 2 yields higher audience-related revenues, turnover, and voter welfare than successful media capture in both periods and lower audience-related revenues, turnover, and voter welfare than without media capture in both periods. The model provides an adequate framework to study license-granting as a additional means of media capture and suggests that media freedom regulatory frameworks, market incentives, and limited direct government ownership, may not be enough to contain capture.

Chapter 4 investigates one of the many consequences of the Mexican democratic transition studied in Chapters 2 and 3: institutional coordination failures. The collapse of a centralized state meant that the federal government was no longer able to ensure cooperation from local governments, a key factor to ensure the correct implementation and effectiveness of the war against organized crime launched by the PAN administration at the start of 2007. The chapter studies the role of coordination between federal and state governments in containing violence from the war against organized crime. Within a municipal and year fixed effects framework and controlling for various socioeconomic and demographic characteristics, the empirical analysis exploits an exhaustive dataset from 2006 to 2011, and finds that the lack of coordination among levels of government, measured with party alignment, had a significant positive effect on violence. The chapter also surveys various theories that help explain the increase in violence related to organized crime in Mexico, it studies the reasons why political coordination is decisive in the effectiveness of the fight against organized crime, and discusses public policy implications.

To my family.
Alejandro,
My Mom and Dad,
Juanra, Eto, and both Marías,
My Grandparents,
The Urrusti,
The Frenk,
The Virchez,
The Azuara,
And the rest of my big and inspiring family.
In memory of Abuela Dora, Abuelo Juan, and Maritere.

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¹This chapter, with minor modifications, was published in Spanish as: “Sinaia Urrusti Frenk. La violencia como consecuencia de la falta de coordinación política. *Las bases sociales del crimen organizado y la violencia en México*. Ed. José Antonio Aguilar Rivera. México: Centro de Investigación y Estudios en Seguridad, Publicaciones de la Secretaría de Seguridad Pública, 337-369, 2012.” The work was published in 2012, when the PAN still held the presidency. In the federal elections of 2012, the PAN lost against the Institutional Revolutionary Party (*Partido Revolucionario Institucional*, PRI). I thank José Ernesto Urrusti Frenk for invaluable help translating this chapter.

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Preface

The process of researching and writing this dissertation was guided by three main ideas.

First, the argument that formal and informal institutions are deep determinants of economic development across the world. This perspective has been one of the most significant changes within the field of economic development over the last two decades. The three chapters in this dissertation are related to institutional changes brought about by the Mexican democratic transition and some of the consequences that they had.

Second, the belief that the quest to find historical political and economic data, particularly in developing countries, is indispensable. Although many data sources exist and new ones are becoming increasingly accessible, there are still areas about which we know very little and where reliable statistics are hard to find. Two examples are data related to illegal activities, like corruption and organized crime, and data concerning vested interests, like mass media. The two empirical chapters in this dissertation are a contribution in this front and have a large potential for further research.

Third, the premise that it is through robust empirical evidence and strong analytical foundations that governance and economic outcomes can be improved. Public policies that stem from objective theory and evidence can not only correct institutional weaknesses, but they are also better equipped to outlast them.

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Chapter 1

A Brief Introduction

A fundamental question in political economy is how *de facto* and *de jure* economic and political forces interact to consolidate democracies. The institutional environment moulded by these forces determines, among other outcomes, economic policies and the effectiveness of political reforms (e.g., Acemoglu and Robinson, 2008). This dissertation sheds light on some of these interactions in the context of Mexico’s democratic transition process, focusing on the period between 1990 and 2012. Chapters 2 and 3 study the relationship between mass media, government, and voters, highlighting the importance of both media diversity and freedom for democratization. Chapter 4 investigates the interaction between different levels of government and the impact of their lack of coordination on drug-trafficking-related violence.

One of the most important *de facto* powers, which acts as an intermediary between governments and citizens and potentially helps keep power in check, is mass media. The information it provides determines, to a large extent, the nature of the relationship between those who govern, or aspire to govern, interest groups, and citizens. Chapter 2 contributes to the understanding of which economic and political institutions contribute to the decline of authoritarian regimes and under what circumstances, by showing how, during the 1990s, local media and opposition political forces helped bring down one of the most enduring authoritarian regimes of the last century: the Mexican Institutional Revolutionary Party (PRI). Increased local media diversity improved political accountability and led to greater electoral competition by giving, for the first time, voice to the opposition. Taking advantage of a unique media coverage and ownership dataset of the 1,556 broadcast radio and television outlets in the country,¹ the empirical analysis conducted in Chapter 2 shows how local media diversity, particularly in the radio market, spurred the democratization process by which the PRI’s hegemonic position began being contested by opposition parties at the local level, and eventually led to the descent of the PRI from the presidency, which the party had held for 71 years.

The empirical findings from Chapter 2 present an interesting paradox because the PRI itself was responsible for the granting of broadcast licenses and the delimitation of their reach. The PRI’s hegemony was partly perpetuated by the co-optation of key regime allies (e.g., Magaloni 2006; Camp 2014). One such critical ally was mass media which, for most of the PRI’s rule, remained captured by the government (e.g., Lawson 2002; Hughes 2006, 2012; Guerrero 2010). If greater media diversity was partially a result of an increased number of broadcast licenses or of existing outlets’ reach by the PRI government, why did the PRI contribute in this way to greater media diversity, thereby diminishing its media capture capacity and potentially fostering ideological diversity? Clearly, authoritarian regimes have no incentives to foster ideological diversity. Rather, they will allow it when they either perceive no real threat of losing power or when they have no other choice. Chapter 3 derives a political agency theoretical framework, based on Besley and Prat (2006) canonical media capture theory, that models how governments with incentives to

¹This figure corresponds to the number of total radio and broadcast television outlets in Mexico as of 2012.

control media determine the allocation of media licenses and the extent of media capture, as well as the effects these have on political outcomes. The model explains why creating new outlets was a means for the PRI to ensure reelection in the short-run, while, at the same time, it unintendedly lead to its decline.

The democratic transition and the consequent collapse of the centralized corporatist PRI state studied in Chapters 2 and 3, created voids of power that have been filled by both new and renewed *de jure* and *de facto* powers. Interestingly, some of the actors that contributed to the democratization process have gained an insurmountable amount of power. Mass media and local politicians are a case in point. While Chapters 2 and 3 show how local media helped consolidate democracy in Mexico, the national duopolistic television market has now accumulated unprecedented political power at a national level, making it one of the most important *de facto* powers in the country (Guerrero 2010; Dresser 2012; Bartra 2013; Buscaglia 2013; Meyer 2013; Aguayo 2014). Similarly, local opposition political actors led the way towards democratization, which, as I explain in Chapter 2 was a process that began locally. Today, many state governors have become political actors with enormous power, governing states in an authoritarian manner (Aguayo 2010; Meyer 2013), with no political will to advance democratic goals and no need to comply with national policies led by the federal government, the topic studied in Chapter 4. Drug-trafficking organizations are yet another example of *de facto* political and economic powers (Buscaglia 2013; Meyer 2013; Aguayo 2014), which have gained even greater influence and have had a vastly detrimental social and political effect in the country. In other words, as the PRI's centralized and effective management of diverse interest groups collapsed, so did the government's capacity to maintain control and authority over key political players.

The National Action Party (PAN) won the presidency in 2000 and secured it for 12 years. In 2007, PAN President Felipe Calderón launched a war against organized crime that has had far-reaching social, political, and economic consequences for the country. Perhaps most importantly among them, is the soaring violence levels across the country. Chapter 4 studies the escalating levels of violence as one of the negative consequences of the decentralization of power and the resulting lack of political coordination among levels of government with different party affiliations. Clearly, the fight on war against organized crime required political collaboration between federal, state, and municipal powers. Using a comprehensive and reliable dataset compiled from confidential sources of the federal government, the empirical analysis shows that, when local government parties were not aligned with the party heading the federal government and thus the war strategy against organized crime (i.e., the PAN), violence levels rose significantly.² The chapter thus exemplifies the role that the cohesion within groups involved in a conflict plays in containing violence. Scholars had previously underscored the role that the collapse of a centralized,

²This chapter, written by the author, was part of an edited book published in Spanish in 2012. The book was not targeted at readers with deep technical knowledge, but the empirical results nevertheless provide strong support for this hypothesis.

controlling PRI state had on the strengthening of organized crime (e.g., O’Neal 2009; Astorga and Shirk 2010). They had not, however, underscored the importance of political coordination across levels of government within the new political opening of the country. After my hypothesis presented in Chapter 4 was originally published in 2012, other authors have, since then, confirmed it (e.g., Buscaglia 2013; Rios *forthcoming*).

The goal of this dissertation is to contribute to our still imperfect understanding of how actors with *de facto* and *de jure* political power shape institutional development and how informal political institutions affect economic and social outcomes. The Mexican democratic transition, which transformed many aspects of the country’s institutional framework, is an ideal setting to study these questions from a political economy perspective. Chapter 5 briefly reviews the main topics studied in Chapters 2, 3, and 4 and concludes with a summary of the most important contributions of this work.

Chapter 2

The Political Economics of Mass Media in Mexico: How Local Radio Helped Topple the PRI

2.1 Introduction

The Institutional Revolutionary Party (PRI) was founded in 1929¹ after the Mexican Revolution and the political turmoil that ensued ended. The PRI dominated the country nationally and locally throughout the following six decades uncontestedly, in spite of regular multi-party elections. In the 1976 presidential elections, the PRI faced no opposition candidates. From 1976 to 1988, the PRI continuously controlled between 73% and 82.3% of Congress as well as 100% of Senate seats (Woldenberg, 2012). Beginning in the 1990s, the PRI's power declined dramatically. From 1991 to 2000, its presence in Congress fell by 33% and in the Senate by over 50%.² The percentage of the Mexican population living in municipalities not governed by the PRI increased from only 1.84% in 1988 to a shocking 46.46% by 1999 (Lujambio, 2000), and in 2000, for the first time in seventy-one years, the PRI lost the presidency of the country. What explains this radical electoral decline?

Several researchers of the Mexican transition have argued that media played a crucial role in Mexico's democratization process whereby the PRI lost its hegemonic stronghold in the country (e.g., Lawson 2002; Trejo Delarbre 2004; Hughes 2006, 2012; Palavaccini 2011). The PRI's local electoral decline from 1990 to 2006 coincided with a dramatic increase in local broadcast media diversity and independence from the PRI regime, particularly in the radio industry. While there is an extensive literature on the effect of mass media on electoral outcomes in both strong and weak democracies, there is little empirical evidence linking mass media to democratic transitions. Unfortunately, the lack of comprehensive reliable data has made it impossible to provide robust empirical evidence directly testing this link.

In this chapter, I investigate the aggregate effects of local media diversity on municipal electoral results and argue that differences in the PRI's dramatic electoral decline across municipalities are partly explained by voters' access to more diverse media markets. During the PRI's local electoral decline from 1990 to 2006, the average municipal PRI vote share fell from 0.75 to 0.36, while the three measures of media diversity used in this study increased dramatically: the average number of local media outlets per municipality in Mexico increased from 15.5 to 31.5, the average number of distinct media majority owners increased from 3.8 to 11.8, and average local media ownership concentration, a proxy for local media market competition, fell from 4.3 to 3.1 stations per majority owner.³ Moreover, during the PRI's local electoral recovery from 2006 to 2012, the growth in media diversity reached a plateau. Figures 2.1, 2.2, and 2.3 show the relationship between PRI vote share and these three measures of media diversity over the period 1990–2012 and present preliminary evidence of this chapter's hypothesis.

Using a unique panel dataset that provides local broadcast media coverage and own-

¹The party was founded as the National Revolutionary Party (PNR), which later became the Party of the Mexican Revolution (PRM). It acquired its current name in 1946.

²My own calculations based on Woldenberg (2012).

³The precise definitions of media diversity are explained in Section 2.4.1.

ership data for all 1,556 outlets in the country from 1990 to 2012, I focus on within-municipality variation using a municipal and year fixed effects framework and estimate the effect of local media diversity on the PRI's municipal electoral performance and on electoral participation.⁴ A key assumption for my identification strategy is that there are no time-varying unobserved characteristics of municipalities correlated with the demand for more diverse political news that could drive the observed differences in voting behavior. Although I cannot test this assumption directly, I include controls for a number of socioeconomic and demographic characteristics, as well as for the share of local non-commercial outlets, turnout and, in some specifications, for the number of total outlets. In addition, I show that all main results are robust to different measures of media diversity, PRI electoral outcomes, as well as an alternative concentration measure.⁵ I note, however, that potential correlations between local media diversity and democratization trends that are not captured by these controls, may be upwardly biasing my estimates. On the other hand, there are also reasons why my estimates could be biased downwards. If voters' increased access to information improved political accountability (e.g., Adsera, Boix, and Payne 2003; Ferraz and Finan 2008; Chang, Golden, and Hill 2010; Costas, Solé-Ollé, Sorribas-Navarro 2011; Larreguy, Marshall, and Snyder 2014a; Chong *et al.* 2015), disciplined incumbents (e.g., Ferraz and Finan, 2011), or contributed to better governance (e.g., Egorov, Guriev, and Sonin 2009; Lorentzen 2014), then my estimates could be downwardly biased.⁶

My main hypothesis is that increases in local media diversity, particularly from the local radio market, had a significant negative effect on mayor municipal voting outcomes for the PRI and a significant positive effect on the electoral performance of the opposition. As I have no information on voters' priors or political affiliation, my prediction about the effect of local media diversity on voting outcomes for specific opposition parties is ambiguous. My predictions regarding the effect of local radio and television diversity on voter participation also are, as in other studies, ambiguous. On the one hand, increases in local media diversity may have increased negative advertising and thus decreased turnout (e.g., Ansolabehere and Iyengar 1995; Ansolabehere, Iyengar, and Simon 1999; Chong *et al.* 2015). On the other hand, increases in local media diversity may have convinced new, uninformed, or undecided voters (e.g., Prat and Strömberg 2005; Durante and Knight 2012; Larreguy, Marshall, and Snyder 2014b), leading to an increase in voter participation.

⁴Turnout data is only available from 1992 onwards.

⁵A number of qualitative studies also support the notion that political liberalization was, to a greater or lesser extent, a product of media opening (e.g., Lawson 2002; Trejo Delarbre 2004; Hughes 2006, 2012; Palavaccini 2011).

⁶In future versions of this work, I will provide additional causal evidence by exploring alternative identification strategies such as instrumenting coverage variation with signal quality (e.g., Besley and Burgess 2002; Strömberg 2004b; Olken 2009; Enikolopov, Petrova and Zhuravskaya 2011), exploiting variation in media coverage across boundaries (e.g., Ansolabehere, Snowberg and Snyder 2006; Fergusson 2014; Larreguy *et al.* 2014a), and exploring other econometric approaches such as regression-discontinuity (e.g., Gentzkow *et al.*, 2015).

I first derive two sets of results. First, depending on the diversity measure used, I find that, conditional on time-varying observables and controlling for municipal and year fixed effects, each one unit increase in total local media diversity resulted in the PRI losing 0.5 to 2.5 percentage points, with most of this effect coming from local radio: each one unit increase in local radio diversity yielded 0.3 to 3.2 percentage points decreases in PRI vote shares. For local broadcast television diversity, I find mixed results. When measuring television diversity with outlet and ownership plurality, I find that each one unit increase in local broadcast television diversity yielded 0.9 to 2.2 percentage points *decreases* in the predicted PRI vote share, and when measuring television diversity with ownership concentration, I find that each one unit increase in local broadcast television diversity yielded a 2.2 percentage point *increase* in the predicted PRI vote share. This result is explained by the fact that, in the Mexican context, declines in local television ownership concentration actually translated into higher pro-PRI exposure because such increased diversity was a result of higher coverage of (mostly) PRI local government stations.⁷ Second, I find that while measures of media diversity and competition that do not incorporate ownership information (i.e., media plurality) suggest a predominant effect of local broadcast television over local radio, media diversity measures that do incorporate ownership information (i.e., ownership plurality and concentration) reveal the opposite, that local radio diversity had a predominant effect.⁸

These initial results yield two important conclusions. First, they highlight the importance of ownership data when studying media effects. The qualitatively different results from different measures of media diversity show that measuring a medium's predominance with the number of outlets would have produced, at best, an incomplete diagnosis and, at worst, misleading conclusions. Once ownership is accounted for, local radio diversity has an unambiguously predominant effect over local broadcast television on the PRI's electoral decline. Second, ownership concentration, which incorporates both outlet and ownership plurality variation, is a richer and more consistent measure of media diversity and competition across alternative PRI electoral outcome variables. Taken together, these findings provide a strong argument for using local ownership concentration as the preferred measure of media diversity and for focusing on local radio effects.

As predicted, conditional on time-varying observables and controlling for municipal and year fixed effects, I find a statistically and economically significant negative effect of local radio ownership concentration on the PRI's voting outcomes. I find that for each 1 unit decrease in the number of local radio stations per local majority owner, the

⁷As opposition party local victories increased, some of these local government stations became pro-opposition. However, most local government stations remained under the control of PRI-governed states. Hughes and Lawson (2004) confirm that local state government stations were systematically used to advance partisan goals.

⁸Standardized estimates that reveal a predominant effect of local radio diversity over local broadcast television diversity suggest that a 1 standard deviation increase in local radio diversity yields 0.14 to 0.33 standard deviation decreases in PRI vote shares, while a 1 standard deviation increase in local broadcast television diversity yields 0.03 to 0.18 standard deviation decreases in PRI vote shares.

PRI loses 3 to 4 percentage points, depending on the specification used. The effects are considerable and imply that decreases in local radio ownership concentration can explain between 13.9% and 18.5% of the overall PRI municipal electoral decline between 1990 and 2012. In addition, I find a statistically and economically significant positive effect of local radio ownership concentration on the voting outcomes of the left of center opposition party, the Party of the Democratic Revolution (PRD), suggesting that at least part of the PRI's lost votes as a result of decreases in local radio concentration went to the PRD. Each unit decrease in the number of local radio stations per local majority owner is correlated with a 0.9 to 1.8 percentage points increase in the PRD's electoral performance. I also find that overall local media plurality, a proxy for media exposure, has a negative effect and turnout has no significant effect on the PRD's vote shares, plausibly suggesting that the positive effect on the PRD's performance came from previously "misinformed" voters exposed to pro-PRI biases and not from new voters heading to the ballots for the first time. In contrast, I find no significant effects on the other main political party, the right of center National Action Party (PAN). My results hold after controlling for overall media exposure (proxied by the total number of local media outlets), democratization trends (proxied by the share of local non-commercial outlets), and electoral participation. I also find similar results for party vote share changes and for party reelection probabilities as alternative dependent variables.

As a robustness check, I replicate the analysis using an alternative measure of local radio ownership concentration based on the market power of the predominant local owner in each municipality. Both the positive effects on PRI vote shares and the negative effects on PRD vote shares are confirmed, with even larger magnitudes. Moreover, this alternative measure of local ownership concentration, reveals that PRD vote share effects are around two times larger than PRI effects, providing suggestive evidence that the most dominant radio owners are particularly biased against the left of center PRD, a hypothesis that has previously been suggested in the context of television (e.g., Lawson, 2002). Once again, all results hold after controlling for overall media exposure, democratization trends, and electoral participation. In sum, my analysis of local radio ownership concentration effects on the PRI's and main opposition parties' electoral performance, provides convincing evidence that radio diversity had a negative effect on the PRI's electoral performance and a positive effect on the PRD opposition party's performance, and that these effects are not driven by overall local media exposure, local democratization trends, or turnout. In other words, increases in radio diversity contributed significantly to the toppling of the PRI.

Regarding turnout results from 1992 to 2012, conditional on time-varying observables and controlling for municipal and year fixed effects, I derive three sets of results that are robust to the inclusion of democratization trends and, in the case of ownership diversity measures, to the inclusion of overall media exposure. First, I find that both local radio and broadcast television plurality have a positive effect on turnout. Each additional local radio outlet increases turnout by 0.28 percentage points and each additional local broadcast television outlet increases turnout by 0.64 percentage points. Moreover, stan-

standardized coefficient estimates reveal that local radio plurality has almost four times the effect of local television plurality on electoral participation.⁹ Second, I find that local broadcast television ownership diversity has a negative effect on turnout, suggesting a positive correlation between ownership diversity and negative advertising. Each additional local television majority owner decreases electoral participation by 0.9 percentage points, and an additional local broadcast television outlet per local television majority owner increases voter turnout by 1.75 percentage points. For local radio, I find no significant effects of ownership plurality and a marginally significant negative effect of radio ownership concentration on turnout (suggesting a positive effect of radio diversity on turnout), which disappears once medium heterogeneity effects are considered. As in the case of PRI electoral outcome estimates, the contrasting results from media diversity and competition measures that do not take into account ownership information as opposed to those that do, highlight the importance of considering ownership diversity measures when studying media's effects on political and economic development outcomes. Third, I find that overall media exposure has a larger effect on voter turnout than media ownership diversity measures. Standardized coefficients show that overall media exposure has 1.6 times the effect of local broadcast television concentration and 6.7 times the effect of local broadcast television ownership plurality.¹⁰

I next address four potential limitations of my findings. First, I do not have measures of media content, so I am unable to confirm that greater media diversity translated into higher and/or more balanced political coverage. However, given the dramatic increase in media plurality and the large variation in ownership patterns, it is very likely that these changes led to a substantial increase in media content diversity. In addition, anecdotal evidence and a number of qualitative studies of media content analysis in Mexico also support this conjecture (e.g., Lawson 2002; Hughes and Lawson 2004; Hughes 2006, 2012).

Second, I ignore print, online, and subscription television media. However, given the low levels of education and literacy, and the limited penetration of these types of media, it is unlikely that ignoring these potential information sources will introduce significant biases in my results. Qualitative studies also suggest that, in Mexico, consumers of these types of media are mainly already politically knowledgeable voters (Lawson 2002; Hughes 2006, 2012). In fact, by focusing on radio and television, which have a much larger reach, my estimates may reduce the pro-urban bias of these other types of media (e.g., Reinikka and Svensson 2005; Strömberg 2004b; Keefer and Khemani 2011; Prat and Strömberg

⁹A 1 standard deviation increase in local radio plurality yields a 0.22 standard deviation increase in turnout, while a 1 standard deviation increase in local broadcast television plurality only yields a 0.06 standard deviation increase in turnout.

¹⁰A 1 standard deviation increase in the number of local broadcast television majority owners yields a 0.07 standard deviation decrease in turnout, while a 1 standard deviation increase in the number of total outlets yields a surprisingly high 0.47 standard deviation increase in turnout. Similarly, a 1 standard deviation increase in local broadcast television concentration yields a 0.1 standard deviation increase in turnout, while a 1 standard deviation increase in the number of total local outlets yields a 0.16 standard deviation increase in turnout.

2013).

Third, I am not able to identify the precise mechanism through which increased media diversity led to the PRI's electoral weakening. One possibility further explored in Chapter 3, is that increased audience-related revenues and competition in the media market led to more balanced electoral coverage, greater ideological diversity, and increased media independence from the government. This explanation is supported by scholars of the Mexican democratization process (e.g., Lawson 2002; Hughes 2006, 2009) and is consistent with studies in the political economy literature (e.g., Gentzkow, Glaeser, and Goldin 2006; Gentzkow and Shapiro 2006; Petrova 2011; Gehlbach and Sonin 2014; Gentzkow, Shapiro, and Sinkinson 2014). Another possibility is that, as the number of broadcast media licenses grew, voters' access to information increased, leading to an increase in the share of informed voters (e.g., Neuman, Just, and Crigler 1992; Delli Carpini and Keeter 1996; Strömberg 2001, 2004a; Norris and Sanders 2003; Prat and Strömberg 2005, 2013; Snyder and Strömberg 2010; Casey 2015) and an increase in voters' responsiveness to the perceived competence of politicians (e.g., Iyengar and Kinder 1987; Strömberg 2001, 2004a; Prat and Strömberg 2005, 2013; Ferraz and Finan 2008). However, many other mechanisms such as higher scrutiny of public officials and accountability as a result of improved journalistic norms (Lawson, 2002; Hughes 2006, 2012), may also explain the negative impact on the PRI's electoral outcomes.

Fourth is the question of the generalizability of my results. Clearly, the Mexican mass media political context has a number of specific features that may not extend to other weak democratic environments. However, the fact that many authoritarian regimes, such as Russia and Venezuela, rely on government-controlled media¹¹ and that many other democratic transitions, such as in Brazil, Hungary, and Spain, have also witnessed a dramatic increase in media opening, suggests that this chapter's main finding, that mass media played a critical role in Mexico's democratic transition, may apply to many other settings.

This chapter makes several contributions to the literature. First, to the best of my knowledge, it is the first study to empirically document mass media's effect in democratic transitions. Although several qualitative studies have documented its role (e.g., McNair 1994; Bennet 1998; Waisbord 2000; Lawson 2002; Hughes 2006, 2012), there has been no robust empirical evidence so far supporting the link between mass media diversity and independence, and democratization. Conditional on municipal-year fixed effects and time-varying observables, my estimates are the first to suggest a strong link between increased local media diversity, particularly in the radio market, and the authoritarian Mexican PRI regime's downfall. I also show that these estimates are robust to controlling for overall media exposure, democratization trends, as well as turnout.

Second, owing to the rich and unique dataset, it is, to the best of my knowledge, the first study to systematically contrast different measures of media diversity and competition

¹¹It is worth pointing out, however, that there is also evidence of authoritarian governments allowing free media (e.g., Egorov, Guriev, and Sonin 2009; Lorentzen 2014)

and, in doing so, to show and highlight the importance of ownership data when studying media's effects on voting behavior. My analysis shows that the most popular measure of media diversity and competition used in the literature, media plurality, is an incomplete measure of diversity. In my context, media plurality suggests a predominant effect of local broadcast television over local radio. However, once ownership is accounted for, local radio diversity has an unambiguously predominant effect over local broadcast television on the PRI's electoral decline. I find similar results regarding media diversity's effect on electoral participation.

Third, the chapter contributes to current debates about the relationship between competition and diversity and the role of television on electoral participation, which has received mixed support in the literature, as I discuss in the next section. Regarding the relationship between competition and diversity, although I do not have access to product variety or content data, my estimates suggest there is a positive correlation between media market competition, proxied by ownership concentration, and media diversity. Except for broadcast television effects, which are explained to be different within the specific Mexican context, all specifications show that media plurality estimates go in the opposite direction as media ownership concentration estimates. Regarding turnout results, I present evidence that television plurality has a large *positive* effect on turnout, while television ownership diversity measures have an overall *negative* effect. These results are robust to controlling for municipal-year fixed effects, a number of demographic and socioeconomic variables, democratization trends, and overall media exposure. My results suggest that one additional reason why television effects on turnout may differ across studies is because ideological diversity is not always adequately captured.

The rest of the paper is organized as follows. Section 2 briefly surveys the literature related to this paper's research question and findings. Section 3 discusses background information on Mexico's political context and broadcast media industry from 1990 to 2012. Section 4 discusses the data and main variables. Section 5 formulates the empirical approach and specifications. Section 6 presents results and section 7 concludes.

2.2 Literature Review

That media affects the political environment is old news. There is now ample theoretical and empirical evidence of media's numerous effects on political outcomes beyond electoral performance, from voter knowledge and preferences, to politicians' quality, and policy. Many open questions remain, however. One such question is the magnitude of media's effects on electoral outcomes and how it may differ between democratic and non-democratic contexts. This issue is intrinsically related to the role of mass media in democratic transitions. Although several qualitative studies have documented its impact,¹² there is surprisingly little robust empirical evidence of media's role in democratizations.

¹²See, for instance, Seaton and Pimlott (1980), Sussman (1991), McNair (1994), Bennet (1998), Gunther, Montero, and Wert (2000), Waisbord (2000), Lawson (2002), and Hughes (2006, 2012).

The evidence so far has concentrated on media’s effects on electoral performance, where most studies have found large effects on party vote shares, particularly in weaker democracies. For example, Della Vigna and Kaplan (2007) find that the introduction of Fox News in 2000 increased Republican vote shares by 0.4 to 0.7 percentage points, while Enikolopov, Petrova, and Zhuravskaya (2011) find that the introduction of commercial television in Russia, which competed with the pro-government monopoly network, decreased the government’s vote share by 8.9 percentage points and increased the main opposition parties’ vote share by 6.3 percentage points. Thus, the effects found in the Russian case are more than an order of magnitude larger than those found in the U.S. setting, suggesting that media effects can indeed be much larger in less democratic and less competitive environments. My results confirm large effects of mass media on voting behavior in Mexico, a country with a media and institutional setting comparable to Russia’s. In contrast to my finding that ownership diversity has a strong effect on party vote shares, Gerber, Karlan, and Bergan (2009) find that both conservative and liberal newspapers increased the Democratic vote share, suggesting a predominant effect of media exposure over ideological diversity. Studies focusing on the effect of mass media on incumbency advantage have found mixed results; some studies show no effect (e.g., Ansolabehere, Snowberg, and Snyder 2006; Gentzkow, Shapiro, and Sinkinson 2011), while others find positive effects (e.g., Prior, 2006). Nevertheless, none of these studies look at ownership. There is also evidence that increasing “objective” or more precise information increases vote shares for better qualified candidates and reduces party attachment (Banerjee *et al.* 2011; Fujiwara and Wantchekon 2013; Casey 2015). Relatedly, and further discussed below, several studies that have found no effect of partisan media on party vote shares have explained their findings with the existence of bias filtering by voters (Gerber, Karlan, and Bergan 2009; Gentzkow, Shapiro, and Sinkinson, 2011).

Several studies have also documented strong media effects on voting outcomes in Mexico (e.g., Dresser 1996; Poiré 1999; Lawson 2002; Hughes and Lawson 2004; Lawson and McCann 2005; Hughes 2006, 2012; Lawson 2006; Bruhn 2009; Greene 2011, 2014), although most of these are qualitative studies or empirical studies that focus on a single (usually national) election (Baker, 2014).¹³ Two recent studies by Larreguy, Marshall, and Snyder also document strong media effects in Mexico. Larreguy, Marshall, and Snyder (2014a) find a strong effect of local media on the political accountability of Mexican mayors, and Larreguy, Marshall, and Snyder (2014b) find a significant effect of political advertising on opposition parties’ electoral outcomes. Consistent with my results, they find stronger radio effects, with radio advertising having no effect on PRI vote shares and a positive effect on opposition parties’ electoral performance. Chong *et al.* (2015) also provide evidence of important media effects in Mexico. They find that corruption information has an overall negative effect on electoral outcomes for both incumbent and opposition parties, as well as on turnout.

¹³In addition, most of the studies focus on broadcast television and/or print media, and ignore the potentially relevant role of radio, especially for local elections.

My findings contribute to a large body of research that has documented significant effects of supply-driven media bias on voting behavior, where outlets' preferences, determined by media owners, individual journalists, or elites, influence content (e.g., Glasser, Allen, and Banks 1989; Bennet 1991; Petrocik 1996; Gilens and Hertzman 2000; Gentzkow and Shapiro 2004; Baron 2006; Bennet, Lawrence, and Livingston 2006; Puglisi and Snyder 2008; Balan, DeGraba, and Wickelgren 2009; Duggan and Martinelli 2011; Larcinese, Puglisi, and Snyder 2011; Puglisi 2011; Anderson and McLaren 2012; Durante and Knight 2012).¹⁴ Relatedly, Gentzkow and Shapiro (2004) find that overall media use may not be as important in shaping viewers' beliefs as the particular media source providing information. In other words, *who* provides the information matters. Research focused on Mexico has also shown that ownership influence on media content is particularly salient (e.g., Lawson 2002; Hughes and Lawson 2004; Hughes 2006, 2012; Guerrero 2010). These studies are consistent with my finding that both ownership plurality and concentration affected party vote shares.

Relatedly, previous literature has identified key factors that determine the *extent* of media's influence on voting outcomes (Prat and Strömberg, 2013). Scholars have shown that voters may filter out biases (e.g., Erikson 1976; Gerber, Karlan, and Bergan 2009; Chiang and Knight 2011; Gentzkow, Shapiro, and Sinkinson 2011) and select media outlets based on political ideology (e.g., Durante and Knight 2012). Both of these phenomena critically depend on the degree of competition in the media industry. In places where there is less competition among outlets, voter's ability to filter out biases and to select outlets akin to their political ideology may be hindered.¹⁵ In addition, market competition may also affect electoral outcomes through the amount of political news provided (e.g., Arnold 2004), the ideological diversity of political content (Gentzkow, Shapiro, and Sinkinson 2014), and by enhancing media freedom from governments or interest groups (e.g., Besley and Prat 2006; Corneo 2006).

Given the importance of market competition for media's effects and the strong evidence of supply-driven media bias, some studies have focused on the role of media ownership concentration.¹⁶ Consistent with Chan and Suen's (2008) theoretical framework, Berry and Waldfogel (2001) and George (2007) find that increases in ownership concentration may actually increase media product variety. Similarly, Baron (2006) shows that

¹⁴There is also ample evidence of demand-driven media bias (e.g., Hamilton 2004; Mullainathan and Shleifer 2005; Gentzkow and Shapiro 2006; Chan and Suen 2008). Gentzkow and Shapiro (2010) find that supply-driven media bias is less pervasive than demand-driven media bias. However, ownership may matter more in contexts such as Mexico's, where it is plausible that owners, rather than voters, benefit most from biased content (Gilens and Hertzman 2000; Lawson 2002; Hughes and Lawson 2004; Hughes 2006; Puglisi 2006; Guerrero 2010; Prat and Strömberg 2013). The origin of media bias may also depend on whether the information covered relates to local *vs.* non-local issues (Puglisi and Snyder 2011).

¹⁵In fact, the literature has shown that the effect of market competition on media bias is theoretically ambiguous (e.g., Mullainathan and Shleifer 2005; Baron 2006; Gentzkow, Glaeser, and Goldin 2006; Gentzkow and Shapiro 2006; Chan and Suen 2008).

¹⁶The correct definition of media concentration is still largely debated. See Just (2009) for a discussion of the most common measurements and issues.

increases in competition can sometimes lead to higher, rather than lower, media bias. To the extent that media plurality is positively correlated with product variety and ideological diversity, my finding that the effect of media plurality and ownership concentration on PRI vote shares have opposite signs, provides suggestive evidence of a positive correlation between market competition and media diversity, contradicting these previous studies. The contrasting results may be explained by our differing degrees of baseline market competitiveness, with Berry and Waldfogel (2001) and George (2007) studying an already competitive environment with some degree of media diversity (U.S.), in contrast to the Mexican setting, which has much lower levels of competition. Relatedly, Balan, DeGraba, and Wickelgren (2009) present a model where higher ownership concentration may lead to increases or decreases on the degree of voters' persuasion, depending on the ideological alignment of the outlets merging. This model is consistent with my findings on local broadcast television, where decreases in ownership concentration actually increased pro-PRI bias, thus lowering ideological diversity. Similarly, Corneo (2006) derives a model where higher ownership concentration increases media bias and Anderson and McLaren's (2012) theoretical framework shows that higher ownership concentration can lead to reductions in the amount of media information transmission. Both models are aligned with this study's radio ownership concentration results, as reductions in ownership concentration plausibly translated into higher information transmission and/or lower media bias. Finally, and also consistent with this paper's main hypothesis, Besley and Prat (2006) provide suggestive cross-country evidence of higher ownership concentration leading to longer political tenures as well as higher corruption levels.

Regarding electoral participation, previous literature has found mixed effects of media exposure on turnout. Some studies that find small or negative effects focus on contexts where the medium carries less political information (e.g., Hess 1991; Vinson 2003; Arnold 2004; Gentzkow 2006; Snyder and Strömberg 2010; Gentzkow, Shapiro, and Sinkinson 2011), while others focus on settings where there is a predominant effect of negative campaigning (e.g., Ansolabehere and Iyengar 1995; Ansolabehere, Iyengar, and Simon 1999; Enikolopov, Petrova, and Zhuravskaya 2011; Chong *et al.* 2015).¹⁷ Some studies have also found smaller turnout effects in contexts where media bias matters less, perhaps as a result of voters' ability to filter out these biases (e.g., Gerber, Karlan, and Bergan 2009; Gentzkow, Shapiro, and Sinkinson 2011). In contrast, and as one would expect, positive effects of mass media on turnout are usually found where political stakes are higher, such as in closely competed elections (e.g., Strömberg 2004b; Della Vigna and Kaplan 2007), or when the political information provided is either more relevant (e.g., Oberholzer-Gee and Waldfogel 2009; Banerjee *et al.* 2011) or reaches previously uninformed voters (e.g., Feddersen and Pesendorfer 1996; Strömberg 2004b; Prat and Strömberg 2005; Gentzkow, Shapiro, and Sinkinson 2011). Consistent with my findings that media exposure (outlet plurality) has a positive effect on turnout while ideological diversity (ownership diversity,

¹⁷Olken (2009), who also finds a negative effect of television on turnout, provides a different explanation based on television's negative impact on social capital.

i.e., ownership plurality and concentration) does not, Gentzkow, Shapiro, and Sinkinson (2011) find that initial media exposure has a positive effect on turnout, but media competition does not affect turnout.

2.3 Background

2.3.1 Political Context

In Mexico, there are three dominant parties, the centrist Institutional Revolutionary Party (*Partido Revolucionario Institucional*, PRI), the right of center National Action Party (*Partido Acción Nacional*, PAN), and the left of center Party of the Democratic Revolution (*Partido de la Revolución Democrática*, PRD). Except for the period 2000–2012, the predominant Institutional Revolutionary Party has held Mexico’s presidency for all of its post-revolutionary history. Locally, however, there are much higher levels of electoral competition among these three parties.

Mayors in Mexico head the approximately 2,450 municipalities in the country.¹⁸ They are elected every three or four years (depending on the state), so municipal elections are staggered across the federal electoral cycle. I consider party electoral outcomes as there is no reelection of incumbent mayors during the period of this study.¹⁹ I focus on mayors’ municipal elections because Mexico’s democratic transition began as a subnational, local phenomenon (e.g., Woldenberg 2012; Camp 2014; Eisenstadt 2004).

During the 1980s a series of events contributed to the PRI’s gradual loss of legitimacy: a prolonged economic crisis in the 1980s, the 1985 earthquake in Mexico city which exposed corruption and inadequate government response, and the contested 1988 elections which were largely viewed as a fraud. However, the PRI’s electoral decline began until 1989–1990 (Eisenstadt, 2004; Woldenberg, 2012).²⁰ Throughout the 1990s, the PRI gradually lost municipal and state elections, culminating in the 2000 presidential defeat that brought the main opposition party, PAN, to power.

The PAN held Mexico’s presidency from 2000 to 2012, a period that witnessed both the continuing decline of the PRI locally up to around 2006, as well as the PRI’s partial²¹ local electoral recovery from 2006 to 2012. In 2007, PAN president Felipe Calderon launched a “war” against organized crime (further studied in Chapter 4) that claimed over 120,000 lives during the period 2007–2012, led to increased popular discontent across the country, and may have contributed to the PRI’s electoral recovery. Nevertheless, although the

¹⁸These include the Federal District’s *delegaciones*, which are technically different from state’s municipalities. The number of municipalities increased by about 50 from 1990 to 2012.

¹⁹Reelection of mayors will become possible beginning in 2015.

²⁰For instance, in 1988, only 39 municipalities were governed by a party other than the PRI (Lujambio, 2000).

²¹At the national level, the recovery was hardly a partial one: in 2012, the PRI won back the presidency.

PRI maintains its position as the dominant political force in the country, it is no longer considered a hegemonic party.

2.3.2 Media Context

In contrast to many developed countries like the United States, radio and television outlets are the most important source of political news in Mexico (Lawson 2002; Camp 2014; Larreguy, Marshall, and Snyder 2014a;). The print media, which diversified somewhat earlier (Lawson 2002; Eisenstadt 2004; Hughes 2006), remains a relatively weak source of political information for most citizens.

I focus on local stations emitted within the municipality's state, as these outlets are more likely to focus on municipal political news.²² However, my results are robust to other measures of media locality. There is important variation in the number of local radio stations across municipalities in Mexico, less so across local broadcast television stations. Indeed, Mexico has an interesting media market where on the one hand, the commercial broadcast television market has remained under the control of a powerful duopoly headed by the firms *Televisa* and *Televisión Azteca* and, on the other hand, the radio market has undergone increasing levels of competition.

During the PRI's hegemonic rule, media coverage was mostly pro-PRI with almost no electoral coverage of opposition parties or criticism of the regime (Lawson 2002; Hughes 2006, 2012). The party did not need to rely on frequent repressive methods to control outlets, as it was in the best interest of owners and reporters to be allies of the regime (Riva Palacio 1997; Fernandez and Paxman 2000; Lawson 2002; Hughes 2006; Guerrero 2010).²³ The granting of broadcast media licenses was always politically motivated and, with very few exceptions, most outlets remained captured (Lawson 2002; Hughes 2006). In exchange, the government provided them with profitable businesses, including bribes, subsidized inputs, political advertisements, little or no competition, as well as the prospect of future media licenses (Lawson 2002; Hughes 2006).

During the 1990s, although mass media remained largely under PRI control, media diversity and competition grew significantly, particularly within the radio market. The number of radio stations increased²⁴ and outlets became gradually more independent (Lawson 2002; Hughes 2006, 2012; Guerrero, 2010). In addition, and partly as a result of government expenditure cuts, the PRI regime was increasingly unable to continue its co-optation of key regime allies, including mass media (Lawson, 2002). Indeed, one of the leading explanations for the PRI's downfall is the regime's inability to maintain a corporatist regime (e.g., Magaloni, 2006). This growing independent and diverse media gave greater coverage to the opposition and non-governmental organizations, and scrutinized

²²Ansolabehere, Snowberg, and Snyder (2006) use the same approach.

²³Many occurrences of repression did occur, however (Lawson, 2002).

²⁴In Chapter 3, I study the causes of this increase in more detail. One plausible reason why the government increased (initially friendly) broadcast licenses was to boost support locally.

government actions more frequently (Lawson 2002; Hughes 2006, 2012).

Because broadcast media licenses are determined and regulated by the executive branch, the coming of a PAN presidency in 2000 constituted a significant change in the relationship between media and government. As the single party-media relationship disappeared, media's power *vis-à-vis* the government increased substantially and Mexico's political elite became more and more dependent on favorable relationships with the major media companies (Trejo Delarbre 2004; Camp 2014). Nevertheless, although media diversity continued to increase, many traits of the old regime including a concentrated media market and a discretionary license-granting system, continued throughout the two PAN presidencies from 2000 to 2012 (Trejo Delarbre, 2004).

Television

Before the 1990s, competition in Mexico's broadcast television market was close to non-existent. In many municipalities, all major television outlets were controlled by the commercial television monopoly, *Televisa*. Historically, *Televisa* was a major ally of the PRI, helping the party maintain legitimacy and boost popularity. In the 1990s, the government began a process of structural adjustment that led to the privatization of several government firms, including the state television network that became *Televisa's* commercial competitor in 1993, *Televisión Azteca*. As a result of increased competition and an ownership and management change that occurred in 1997, *Televisa's* national political coverage became relatively more balanced (Lawson 2002; Hughes 2006, 2012; Aguayo 2010; Guerrero 2010). However, strong pro-PRI bias remained in local news coverage (Hughes and Lawson, 2004; Hughes 2006).

Televisión Azteca's political coverage did not differ much from *Televisa's* (Lawson, 2002). In fact, its privatization process made *Televisión Azteca's* pro-PRI bias evident from the start, as a major partner in this process was the president's elder brother. Thus, during the 1990s, limited competition and diversity in Mexico's television market continued as the *Televisa* and *Televisión Azteca* pro-PRI biased duopoly shared control of 96% of Mexico's broadcast channels. The only other broadcast competition they faced came from local channels, which increased during the 1990s. However, most of these local television outlets were state government stations often under PRI control and were thus even more biased than commercial outlets (Hughes and Lawson, 2004).²⁵

Radio

Although television is the most important source of political news in Mexico, radio had a higher penetration in the country throughout the 1990s and until 2004 (INEGI, 2013). Both commercial and non-commercial radio stations grew significantly during the 1990s: the number of non-commercial radio stations increased from 90 in 1989 to 223

²⁵A very small minority of local, non-commercial, television channels belong to universities and cultural organizations.

in 1999, while commercial stations increased from 898 in 1989 to 1,146 in 1999 (Trejo Delarbre, 2004). Compared to television, there are many more non-commercial local radio stations.²⁶ As in the case of television, most of these non-commercial licenses were awarded to PRI-led state governments during the 1990s, although a significant number also belongs to universities, cultural institutions, NGOs, and indigenous organizations.

The number of radio stations continued to increase through the 2000s. Today, there are 445 non-commercial radio stations and 1,317 commercial radio stations in the country (IFT, 2014a). Although the radio market is also relatively concentrated, compared to broadcast television, it is much more competitive locally and has a larger number of players. Partly as a result of the growing number of stations and increased competition, radio political coverage gradually became more balanced and independent (Lawson 2002; Trejo Delarbre 2004; Guerrero 2010), and radio diversity increased substantially throughout the 1990s and 2000s.

2.4 Data

2.4.1 Media Data

The empirical analysis of this chapter is conducted using a unique broadcast media dataset that includes municipal coverage and ownership information of each of the 1,556 radio and broadcast television outlets in Mexico from 1990 to 2012. The data was compiled by the author and comes from the archives of the former Federal Telecommunications Commission (*Comisión Federal de Telecomunicaciones*, COFETEL), now the Federal Telecommunications Institute (*Instituto Federal de Telecomunicaciones*, IFT), which is the Mexican federal government’s telecommunications regulatory body.

Media coverage

I used technical information of each outlet in the country to calculate yearly signal coverage data. For AM radii coverage calculations, I relied on the following Friis transmission equation for isotropic antennas with unit gain:

$$R_i = \frac{\sqrt{\frac{Z_0 P_i}{4\pi}}}{E}$$

where R_i is outlet i ’s coverage radius, Z_0 is the impedance of free space, approximately equal to 377Ω , P_i is transmission power, and E is field strength using a $60dB\mu$ threshold. This threshold is the standard required by IFT in Mexico to determine good quality signals (IFT, 2014b). Although the Friis formula gives imprecise coverage distances, my focus on local media outlets emitting from within the municipality’s states (explained below)

²⁶In addition, there is a small number of non-authorized stations scattered throughout the country for which there is no available data.

helps to mitigate this imprecision.²⁷ For FM radio and broadcast television coverage calculations, I relied on the $F(50, 50)$ propagation curves recommended by the International Telecommunications Union (ITU), Recommendation 370 (ITU, 1994). This coverage calculation method is also approved by the IFT in Mexico (IFT, 2014b). Propagation curves were calculated using each outlet’s frequency, power, and antenna height, and a $60dB\mu$ field strength threshold.

Once I obtained coverage radii for all radio and broadcast television outlets in Mexico for each year from 1990 to 2012,²⁸ I mapped this coverage using the exact location of transmitting antennas. I was then able to use municipal borders data from the *Marco Geoestadístico Nacional* for 1995, 2000, and 2010 of the National Institute of Statistics and Geography (*Instituto Nacional de Estadística y Geografía*, INEGI) to obtain media coverage for each municipality in the country. I defined a municipality as “covered” by an outlet if at least 30% of its area was covered by this outlet.²⁹ Finally, I calculated all outlet intersections in order to obtain the total number of radio and broadcast television outlets each municipality receives.

Figures 2.4, 2.5, and 2.6 provide images of media coverage in 1990 and 2012 for all AM, FM, and broadcast television outlets in the country, respectively. As is clear from these figures, both radio and television outlets’ coverage increased substantially between 1990 and 2012.

Local media

In line with many studies that highlight the role of local media coverage for local political outcomes (e.g., Ferraz and Finan 2008; Oberholzer-Gee and Waldfogel 2009; Casey 2015; Fergusson 2014; Larreguy *et al.* 2014a), I assume that voters receive political news about their local candidates mainly from local media outlets. In this analysis, local outlets are defined as outlets emitting from within the municipality’s state, an approach similar to Fergusson (2014). Radio FM and broadcast television outlets have relatively small coverage radii, so almost all are, by definition, local. For AM outlets, which have a much larger coverage radius, this definition imposes a binding restriction. As explained above, however, this restriction is desirable as the Friis formula used for AM coverage calculations is relatively imprecise. Other, more restrictive definitions of local media, such as outlets emitting from the same municipality or from neighboring municipalities

²⁷The Irregular Terrain Model (Hufford, 2002), which is based on the the Longley-Rice method (Longley and Rice, 1968), is considered the most precise method to calculate radio and broadcast television coverage. A next step for future research is to calculate municipal media coverage using this method, following an approach similar to Olken (2009) and Enikolopov *et al.* (2011).

²⁸Outlet frequency, power, and antenna height may vary yearly (a source of variation exploited in the empirical analysis of this chapter), so I ran coverage calculations for every year from 1990 to 2012.

²⁹To confirm the robustness of the empirical results, I also defined other thresholds to determine whether a municipality was covered by an outlet: 100%, 50%, 20%, 15%, and 10% of the municipality’s area.

are possible. However, it is not clear that only outlets transmitting from within the municipality itself or from neighboring municipalities are concerned with the municipality’s political context, especially given the high levels of intrastate migration in Mexico. Moreover, focusing on outlets emitting from within municipalities will most likely introduce a pro-urban bias in the estimations. For these reasons, the preferred measures of media coverage focus on outlets transmitting from within the municipality’s state.

Media diversity

I use three measures of local media diversity: local outlet plurality, local ownership plurality, and local ownership concentration, which is a proxy for local media market competition. Local outlet plurality is simply defined as the number of local media outlets in the municipality, i.e., the number of outlets emitting from within the municipality’s state. Total local outlet plurality is divided into local radio plurality and local broadcast television plurality. I next explain local ownership plurality and concentration measures in more detail.

Ownership plurality

The COFETEL archives contained detailed shareholder information for each outlet that allowed me to construct a rich and novel media ownership dataset. Within each medium (radio and broadcast television), I created a unique identifier for every owner³⁰ and used two sources of shareholder data to construct the principal ownership variables used for the empirical analysis of this chapter: the three highest majority shareholders of each outlet (i.e., with the largest percentage of shares) and the number of outlets owned by each majority shareholder. Using the municipality-level coverage data explained in the previous subsection and the location of each outlet’s antenna, I was then able to construct the main media ownership variables used in this study: the number of distinct principal local majority shareholders present in each municipality (using the main shareholder only)³¹ and the number of outlets owned by the most prevalent local shareholder in a given municipality (i.e., owning the largest number of outlets, independent of the number of shares he owns of each outlet).

Ownership concentration

Ownership data allows me to consider the effects of competition, proxied by my measures of media ownership concentration, on voting outcomes. The main local media concentration measure used in this analysis is the number of local outlets divided by the

³⁰In the case of non-commercial stations, “owners” are defined as the license holders.

³¹When there were two or more principal shareholders owning an equal number of shares, one was chosen at random.

number of distinct local majority owners.³² As for outlet and ownership plurality, I constructed a concentration measure for total outlets, and for radio and broadcast television outlets separately. For some of the regressions, I also used the number of local outlets owned by the predominant owner (the second ownership variable explained above) divided by the number of local outlets, as an alternative measure of concentration.

2.4.2 Political Data

Data on the main party's political outcomes for 1990–2003 and turnout for 1992–2003 are from the *Base de datos México Electoral: Estadísticas Federales y Locales* dataset compiled by BANAMEX. Data for 2003–2012 was compiled by the author using data from the State Electoral Institutes (*Institutos Electorales Estatales*). These data contain municipal vote shares for each party as well as voter turnout. In this chapter, I focus on one main PRI electoral outcome as the dependent variable: PRI vote share in elections for mayors. However, Appendix A replicates results from all main tables using PRI vote share change and the probability of PRI reelection,³³ constructed from data on vote shares, as alternative dependent variables.

2.4.3 Municipal Characteristics Data

I used five additional data sources to account for time-varying municipal characteristics. Most socioeconomic and demographic variables such as the percentage of poor population earning less than twice the minimum wage (*% Poor population*), population without access to piped water (*% Population no water*), population without electricity (*% Population no electricity*), population without a drainage system (*% Population no drainage*), population living in overcrowded households (*% Population overcrowded*), population living in households with dirt floor (*% Population dirt floor*), and the percentage of the population between the ages of 15 and 24 that is literate (*% Literate population*) are from the *Índice de Marginación* for 1990, 1995, 2000, 2005, and 2010 of the National Population Council (*Consejo Nacional de Población*, CONAPO). Data on the percentage of urban population, i.e. living in localities with less than 2,500 inhabitants (*% Urban population*), comes from the *Censos de Población y Vivienda* of 1990, 1995, 2000, 2005, and 2010 of the INEGI. Infant mortality rates for 1990–2012 were calculated using mortality data from the *Estadística de defunciones generales* of the *Sistema Estatal y Municipal de Base de Datos* of INEGI. Population density was calculated using municipal border and area data in 1995, 2000, 2005, and 2010 from the *Marco Geoestadístico Nacional* of the INEGI and population data 1990–2012 from the *Proyecciones de la Población en México* of CONAPO. Finally, data on murders for 1990–2010 was compiled by the author

³²Both of these numbers were calculated using a 30% coverage area threshold, but all results are robust to using other thresholds.

³³I focus on PRI reelection since, for the period of analysis, there is no reelection of mayors.

based on the *Estadísticas de Defunciones Generales* dataset by INEGI and for 2010–2012 on the *Proyecciones de la Población en México* data by CONAPO.

2.4.4 Summary Statistics

Table 2.1 provides descriptive statistics of the data used in this chapter. These statistics correspond to yearly observations of the 2,428–2,456 municipalities existing between 1990 and 2012. Panel A shows summary statistics for the main media variables used in this study. As the table shows, the average municipality in this period received a signal from 29 local outlets, 28 local radio outlets, and 1 local broadcast television outlet. There is, however, substantial variation across municipalities. The number of total local outlets received by a municipality ranges from 2 to 79, with the majority of them corresponding to local radio outlets. Recall from Section 2.3.2 that Mexico’s television market is dominated by the *Televisa* and *Televisión Azteca* duopoly, while the number of radio licenses is much higher. The average municipality also receives transmissions from approximately 1 non-commercial outlet with a large variation across municipalities, ranging between 0 and 11.

In terms of media ownership, the average municipality has approximately 11 distinct majority shareholders,³⁴ with the majority, approximately 10, corresponding to radio outlets and 1 to broadcast television outlets.³⁵ Once again, the range is large: the number of total majority shareholders ranges from 1 to 37, with radio shareholders ranging between 1 and 36 and broadcast television between 0 and 7.

The main ownership concentration measure appears to be much higher (three times higher) for radio than for the broadcast television industry. However, these numbers may be misleading due to the small number of broadcast television outlets received by the average municipality. Indeed, the range values of radio concentration compared to broadcast television concentration are not so different – between 1 and 12 for radio and between 0 and 9 for broadcast television. The statistics for the alternative concentration measure 2 confirms that concentration in the television industry is not negligible and, in fact, may be higher than in the radio industry depending on how it is measured. For the second concentration measure, the average municipality has a level of 0.07 for total outlets, 0.08 for radio outlets and 0.21 for broadcast television outlets – around 2.5 times higher than radio concentration. Its range is also much larger for the broadcast television industry, with 0 to 0.5 for total outlets, 0 to 0.67 for radio outlets, and 0 to 3 for television outlets.

Panels B and C document descriptive statistics for political outcomes and municipal characteristics, respectively. The average mayor is elected with 55% of votes and the

³⁴Shareholders may be individuals, firms, or organizations such as governments (usually state governments), universities, and NGOs. A next step for future research is to disaggregate ownership even further by uncovering individual ownership of these organizations.

³⁵Aside from ownership of the main broadcast television companies *Televisa* and *Televisión Azteca*, there is a (small) number of channels owned by local governments and other organizations.

average PRI mayor with 51%. On average, the PRI has suffered a vote share decrease of 4% over the period 1990 to 2012, with a large variation between a 72% decrease and a 70% increase in PRI vote shares across municipalities. The average municipality reelects a PRI mayor with a probability of 0.5 and kicks an incumbent out of office with a probability of 0.38. The average mayor wins by a margin of 23%. Average municipal turnout over the period 1990 to 2012 is 60%, which is a surprisingly high number.

As Panel C shows, the average municipality over the period 1990 – 2012 is densely populated and poor, with relatively high literacy levels and low infant mortality rates, but also a high percentage of households without a drainage system or access to electricity and drinkable water, and living in overcrowded households or households with dirt floor. About 43% of the average municipality’s population lives in urban areas and the average municipalities has around 11 murders per 100,000 inhabitants every year.

2.5 Estimation Strategy

2.5.1 PRI Electoral Performance

In order to examine this chapter’s main hypothesis, that increases in local media diversity driven by the radio industry contributed to the PRI’s electoral decline at the municipality level from 1990 to 2012, I estimate the following model:

$$PRI_{mt} = \beta_0 + \beta_1 md_{mt} + \beta_2' \mathbf{X}_{mt} + \delta_m + \vartheta_t + \varepsilon_{mt} \quad (2.1)$$

where PRI_{mt} is PRI mayors’ electoral outcomes in municipality m and election year t , md is local media diversity, X is a vector of time-varying demographic and socioeconomic municipal characteristics from Panel C of Table 2.1, δ_m are municipal fixed effects, ϑ_t are year fixed effects, and ε_{mt} is an idiosyncratic error term clustered at the municipality level to account for serial autocorrelation. The main dependent variable throughout this chapter is PRI vote share, but Appendix A replicates all results for two other PRI electoral outcomes: PRI vote share change and the probability of PRI reelection. I measure local media diversity in three ways: local outlet plurality, local ownership plurality, and the degree of local ownership concentration. This last variable is, arguably, a richer measure of media diversity, as it takes into account both outlet and ownership plurality (see Section 2.4.1).

The main coefficient of interest is β_1 , which identifies the effect of local media diversity on PRI electoral outcomes from 1990 to 2012, controlling for municipal and time fixed effects, as well as for municipal socioeconomic and demographic trends. Since media concentration is, conceptually, the flip-side of outlet and ownership plurality, the coefficients of media concentration and media plurality should be of opposite sign. Thus, if the main hypothesis of this paper is true, we expect β_1 to be negative when measuring media diversity as outlet or ownership plurality and positive when measuring diversity as ownership concentration.

In order to estimate broadcasting heterogeneous effects and establish the predominance of radio diversity over television diversity in the PRI's electoral weakening at the local level, I estimate the following model:

$$PRI_{mt} = \beta_0 + \beta_1 rd_{mt} + \beta_2 td_{mt} + \beta_3' \mathbf{X}_{mt} + \delta_m + \vartheta_t + \varepsilon_{mt} \quad (2.2)$$

where rd_{mt} is diversity in municipality's m local radio market in year t , td_{mt} is diversity in municipality's m local broadcast television market in year t , and PRI , X , δ , ϑ , and ε are defined and indexed as in specification (2.1). A predominance of radio effects over broadcast television would imply a larger coefficient on rd than on td .

One of the main innovations of this study is incorporating ownership plurality variables in the estimation of media diversity measures. A natural question to ask is whether measures of media diversity that incorporate ownership plurality remain relevant, once the effect of overall outlet plurality, i.e., overall local media exposure, is controlled for. Another potentially interesting question concerns the differential party effect of media diversity. If, consistent with our main hypothesis, radio diversity had a negative effect on PRI's electoral outcomes, did it have an accompanying positive effect on the electoral outcomes of opposition parties? Finally, following Della Vigna and Kaplan (2007), I investigate whether effects on party vote shares are a result of higher voter participation or of voters switching parties. In order to test these questions, I estimate the following model:

$$vote_{mt}^j = \beta_0 + \beta_1 rc_{mt} + \beta_2 op_{mt} + \beta_3 to_{mt} + \beta_4' \mathbf{X}_{mt} + \delta_m + \vartheta_t + \varepsilon_{mt}^j \quad (2.3)$$

where j equals one of the three main political parties (PRI, PAN, and PRD), $vote_{mt}^j$ is party j 's electoral outcomes in municipality m and election year t , rc is ownership concentration in the local radio industry, op is total local outlets (overall local outlet plurality), to is turnout in municipal mayor elections, X , δ , and ϑ are defined and indexed as in specification (2.1), and ε_{mt}^j is the idiosyncratic error term by party clustered at the municipality level.

My fundamental empirical challenge is separating the causal impact on PRI vote share from changes in the preferences of voters that affect both election outcomes and the demand for more diverse political news. One potential concern is local democratization trends that affect both media diversity and PRI political outcomes. We expect that exogenous democratization shocks in a municipality will induce a positive correlation between $vote_{mt}^{PRI}$ and rc_{mt} , resulting in an overestimation of the main effects.³⁶ I try to mitigate this problem by adding a control for the share of non-commercial local media outlets in specification (2.3). Local non-commercial media outlets are run by NGOs, universities, indigenous organizations, or public institutions, and are thus conceivably correlated with local democratization trends. However, I cannot rule out the possibility that there are aspects of democratization trends not captured by this proxy, so I view these

³⁶As discussed in the introduction, there are also plausible reasons why my estimates may be downwardly biased if media diversity disciplines PRI incumbents and/or improves PRI governance.

fixed effects estimates as plausible upper bounds on the impact of local media diversity on PRI mayors' voting outcomes.³⁷

2.5.2 Electoral Participation

I then study local media diversity effects on electoral participation. I first follow an approach similar to specification (2.1) and estimate the impact of increased media diversity on turnout with the following model:

$$to_{mt} = \beta_0 + \beta_1 md_{mt} + \beta_2' \mathbf{X}_{mt} + \delta_m + \vartheta_t + \varepsilon_{mt} \quad (2.4)$$

where to_{mt} is voter turnout in municipality m mayor elections in year t , and md , X , δ , ϑ , and ε are defined and indexed as in specification (2.1). Following specification (2.3), I control for the share of non-commercial local media outlets, and when measuring md as ownership plurality and ownership concentration, I also control for overall outlet plurality, op . Once again, the prediction about the effect of local media diversity on turnout for municipal mayor elections is ambiguous, as negative advertising could cause a negative effect on voter participation, while increased access to information could have attracted new voters to the ballot.

Finally, I study broadcasting diversity heterogeneous effects on turnout in order to evaluate the differential impact of local radio and television diversity. I run the following specification:

$$to_{mt} = \beta_0 + \beta_1 rd_{mt} + \beta_2 td_{mt} + \beta_3' \mathbf{X}_{mt} + \delta_m + \vartheta_t + \varepsilon_{mt} \quad (2.5)$$

where to_{mt} , rd , td , X , δ , ϑ , and ε are as previously defined and indexed. As in specification (2.4), I also control for the share of non-commercial local media outlets and for overall outlet plurality, op , when measuring diversity as ownership plurality and concentration. Once again, the prediction about the effect of local radio diversity *vis-à-vis* local television diversity on electoral participation is ambiguous.

2.6 Results

2.6.1 Media Diversity, Medium Heterogeneity, and PRI Vote Share

Before discussing the regression output, Figures 2.7, 2.8, and 2.9 graph the relationship between municipal PRI vote share and the three measures of media diversity – outlet plurality, ownership plurality, and ownership concentration, respectively. Panels (a) show

³⁷Future research will investigate instrumental variable strategies to account for changing voter preferences.

the overall panel scatterplot relationship and Panels (b) show the within variation scatterplots. As predicted, both panels in Figures 2.7 and 2.8 reveal a downward sloping trend, while the panels in Figure 2.9 reveal the expected positive relationship. Appendix Figures A.1–A.3 repeat this exercise for PRI vote share change and Appendix Figures A.4–A.6 for the probability of PRI reelection as alternative dependent variables. Fitted linear predictions for all PRI electoral outcomes is as expected.

All specifications include municipal and year fixed effects and show robust standard errors clustered by municipality and accompanying p -values for all political outcome estimates. Columns (1) through (6) in Tables 2.2–2.4 present results for specification (2.1), with PRI vote share as the dependent variable and outlet plurality, ownership plurality, and ownership concentration measures as the media diversity regressors, respectively. For each media diversity measure in Tables 2.2–2.4, Columns (7) and (8) present results for medium heterogeneity effects in specification (2.2). Columns (2), (4), (6), and (8) are the preferred specifications as they include demographic and socioeconomic controls for the municipal characteristics listed in Table 2.1.

In all three Tables 2.2–2.4, even though coefficient estimates drop significantly after controlling for socioeconomic and demographic trends, estimates for the effect of media diversity on PRI vote share in the 1990–2012 period remain large and highly significant. Column (2) in Table 2.2 shows that an additional local media outlet (i.e., emitting from within the municipality’s state) yields a 0.5 percentage point decrease in the predicted PRI vote share. Column (4) shows that an additional local radio station decreases PRI vote share by 0.3 percentage points, while column (6) shows that an additional local broadcast television outlet decreases PRI vote share by 2.2 percentage points. Column (8) suggests that both radio and broadcast television outlet plurality negatively affect PRI vote share, with television having a greater effect than radio. In terms of standardized coefficients (not shown), a 1 standard deviation increase in local radio plurality yields a 0.14 standard deviation decrease in PRI vote share, while a 1 standard deviation increase in local broadcast television plurality yields a 0.18 standard deviation decrease in PRI vote share.

Table 2.3 performs the same exercise as Table 2.2, using ownership plurality instead of outlet plurality as the media diversity measure. Results reveal that ownership plurality has a large effect on PRI vote shares: column (2) shows that an additional local majority owner decreases PRI vote share by 1 percentage point; column (4) shows that an additional local radio majority owner decreases PRI vote share by 1.2 percentage points; and column (6) shows that an additional local broadcast television majority owner decreases PRI vote share by 0.9 percentage points. In contrast to outlet plurality, column (8) in Table 2.3 shows that, although both local radio and broadcast ownership plurality remain highly significant, local radio ownership has a substantially larger effect than local broadcast television ownership. Standardized coefficients (not shown) reveal that a 1 standard deviation increase in the number of local radio owners implies a 0.33 standard deviation decrease in PRI vote share, while a 1 standard deviation increase in the number of local

broadcast television owners only yields a 0.03 standard deviation decrease in PRI vote share.

Table 2.4 replicates the analysis, this time using ownership concentration, which incorporates both outlet and ownership plurality, as the main independent variable. As predicted, total ownership concentration and radio ownership concentration have a large and positive effect on the PRI's electoral performance. Results suggest that an additional owner per local station yields a 2.5 percentage points increase in the predicted PRI vote share and an additional owner per local radio station yields a 3.2 percentage points increase in the predicted PRI vote share. Interestingly, broadcast television ownership concentration has the opposite effect: the coefficient on broadcast television is negative, and suggests that an additional owner per local broadcast television outlet decreases the predicted PRI vote share by 2.2 percentage points. This result confirms the hypothesis that, in contrast to local radio diversity, local broadcast television diversity had a positive effect on PRI electoral outcomes. In addition, Table 2.4 confirms findings from Table 2.3, that local radio diversity has a greater impact on PRI vote shares than local television diversity. In terms of standardized coefficients (not shown), results from Column (8) of Table 2.4 imply that a 1 standard deviation increase in local radio ownership concentration yields a 0.19 standard deviation increase in PRI vote share, while a 1 standard deviation increase in local television ownership concentration only yields a 0.09 standard deviation decrease in PRI vote share.

Appendix A Tables A.1–A.3 respectively replicate Tables 2.2–2.4 using PRI vote share change as an alternative dependent variable, and Appendix A Tables A.4–A.6 perform the same exercise with the probability of PRI reelection as a second alternative dependent variable. Although the effects of outlet and ownership plurality on PRI vote share change in Tables A.1–A.3 are either much weaker or insignificant, the effects of ownership concentration remain large and highly significant, confirming previous findings. Moreover, two important results still hold: a) the finding that local broadcast television diversity has a more significant effect than local radio diversity is reversed once ownership is taken into account, and b) when measuring media diversity as ownership concentration, local broadcast television has the opposite effect of local radio on PRI vote share. Tables A.4–A.6 confirm a predominant effect of local radio diversity over local broadcast television diversity, as well as a reverse effect of local television concentration on the probability of PRI reelection.

In the case of radio, the fact that the effect of media plurality and ownership concentration have opposite signs, provides suggestive evidence of a *positive* correlation between market competition and media diversity, a result that contradicts previous studies (e.g., Berry and Waldfogel 2001; George 2007; Chan and Suen 2008).³⁸ In the case of television, however, the fact that the effect of media plurality and ownership concentration have

³⁸Note that the setting in Berry and Waldfogel (2001) and George (2007) corresponds to an already competitive environment with some degree of media diversity (U.S.), so this may explain our contrasting results.

equal signs, should not be interpreted as evidence of a *negative* correlation between market competition and media diversity. The reason is that, in this context, increases in television ownership concentration should actually be interpreted as decreases in ideological diversity – the competition that the pro-PRI commercial television duopoly received was mainly from local state television channels under PRI control. Thus, if anything, increases in local television competition should have led to higher pro-PRI bias and, therefore, to lower political ideology diversity. This interpretation is consistent with Balan, DeGraba, and Wickelgren’s (2009) theoretical framework where media concentration increases voter persuasion when owners have identical political ideologies. Overall, radio diversity effects are consistent with Corneo (2006), as decreases in ownership concentration plausibly translated into lower media bias.

The contrasting results obtained from different measures of media diversity yield two important conclusions. First, these findings highlight the importance of ownership data when studying media effects. The qualitatively different results from Tables 2.2 and 2.3 compared to Table 2.4 and from Appendix Tables A.1 and A.2 compared to A.3, show that measuring a medium’s predominance with the number of outlets would have produced, at best, an incomplete diagnosis and, at worst, misleading conclusions. Once ownership is accounted for, local radio diversity has an unambiguously predominant effect over local broadcast television on the PRI’s electoral decline. Second, ownership concentration, which incorporates both outlet and ownership plurality variation, seems to be a richer and more consistent measure of media diversity across alternative PRI electoral outcome variables. Taken together, these findings provide a strong argument for using local ownership concentration as the preferred measure of media diversity and for focusing on local radio effects throughout the remainder of this analysis.

2.6.2 Main Effects: How Local Radio Ownership Concentration Toppled the PRI

I now turn to local radio ownership concentration effects on the PRI’s and main opposition parties’ electoral performance. Results from specification (2.3) for municipal party vote shares are presented in Table 2.5 and, for the alternative municipal electoral outcomes, in Appendix A Tables A.7 and A.8. Column (1) in Table 2.5 presents baseline regression results of the effect of radio ownership concentration on PRI vote shares, controlling for socioeconomic and demographic trends. Column (2) adds a control for the number of total local outlets, as in specification (2.3) and column (3) includes an additional control for the share of local non-commercial outlets that may partially absorb the effect of democratization trends, as explained in Section 2.5.1. Finally, column (4) adds a control for electoral participation from 1992 to 2012 in order to establish whether the effect on PRI vote shares is a result of higher turnout or of voters switching to a different party. Although overall local media exposure, local democratization trends, and turnout, had a significant negative effect on PRI vote share, results show that the effect of local

radio concentration on PRI vote share are robust to the inclusion of these controls. The coefficients for all four specifications remain large, highly significant, and consistent and imply that, for each 1 unit decrease in the number of local radio stations per local majority owner, the PRI loses 3 to 4 percentage points. In terms of standardized coefficients (not shown), a 1 standard deviation decrease in local radio concentration yields 0.18 to 0.24 standard deviation decreases in PRI vote shares. These effects imply that decreases in local radio ownership concentration can explain between 13.9% and 18.5% of the overall PRI municipal electoral decline between 1990 and 2012.

Next, I investigate whether the PRI's lost votes went to the right of center opposition party PAN or the left of center opposition party PRD. Columns (5) through (8) in Table 2.5 perform the same specifications as Columns (1) through (4), respectively, but for PAN municipal vote shares. Results show an expected positive effect of local media exposure, local non-commercial outlets, and turnout on the PAN's electoral performance, but no significant effect of local radio concentration. In contrast, Columns (9) through (12), which replicate results for PRD municipal vote shares, show a significant *negative* effect of radio concentration on the PRD's local electoral outcomes. This suggests that at least part of the PRI's lost votes as a result of decreases in local radio concentration went to the PRD. In particular, each unit decrease in the number of local radio stations per local majority owner is correlated with a 0.9 to 1.8 percentage points increase in the PRD's electoral performance. Equivalently, a 1 standard deviation decrease in local radio concentration yields 0.06 to 0.12 standard deviation increases in PRD vote shares (standardized coefficients not shown). Thus, the effect of radio concentration on PRI vote shares is two to three times larger than the homologous effect on PRD vote shares. Interestingly, overall local media plurality/exposure has a negative effect and turnout has no significant effect on the PRD's vote shares. This may suggest that the positive effect on the PRD's performance came from previously "misinformed" voters exposed to pro-PRI biases and not from new voters heading to the ballots for the first time. Appendix A Table A.7 shows similar results for PRI, PAN, and PRD vote share changes, confirming my findings from Table 2.5. Appendix A Table A.8 shows even larger effects of local radio ownership concentration on PRI reelection rates, but no significant effects on the probability of PRD reelection. This may be due to imprecise estimates resulting from the extremely low PRD reelection rates; the average PRD reelection probability over the 1990–2012 period is only 5%. Thus, overall, there is consistent evidence of a strong negative effect of local radio diversity, measured by ownership concentration, on the PRI's electoral outcomes and an accompanying positive effect of radio ownership concentration on the electoral outcomes of the PRD opposition party.

As a robustness check, Table 2.6 replicates Table 2.5 for an alternative measure of radio ownership concentration, given by the number of local radio outlets owned by the predominant owner divided by the total number of local radio outlets (see Section 2.4.1). Both the positive effects on PRI vote share and the negative effects on PRD vote share are confirmed with even larger magnitudes. Note that with this alternative measure of

concentration, which focuses on *main* media players' power at the municipal level, PRD vote share effects are around two times larger than PRI effects. This may suggest that the most dominant radio owners (which in many cases are *Televisa* or its affiliates) are particularly biased against the left of center PRD. Table 2.6 shows that an additional local radio outlet owned by the predominant owner per local radio outlet results in 19 to 25 percentage points increases in PRI vote shares and 45 to 49 percentage points decreases in PRD vote shares. In terms of standardized coefficients (not shown), a 1 standard deviation increase in the power of the main radio owner in a municipality yields between 0.06 and 0.07 standard deviation increases in the PRI's municipal vote share and between 0.14 and 0.16 standard deviation decreases in the PRD's municipal vote share, depending on the specification used. Table 2.6 also shows that, once the effect of turnout is accounted for, there is a marginally significant *positive* effect of local radio ownership concentration on the right of center PAN opposition party. The possibility that *Televisa's* local radio outlets or its affiliates were particularly biased against leftist opposition and not so against the rightist PAN would be consistent with Lawson's (2002) Mexican broadcast television findings.

In sum, Tables 2.2–2.6 and A.1–A.8 provide convincing evidence that radio diversity had a negative effect on the PRI's electoral performance and a positive effect on the PRD opposition party's performance, and that these effects are not driven by overall local media exposure, local democratization trends, or turnout. In other words, increases in radio diversity toppled the PRI.

2.6.3 Media Diversity, Medium Heterogeneity, and Turnout

Next, I study media diversity's effects on electoral participation. All specifications include municipal and year fixed effects, municipal demographic and socioeconomic controls listed in Table 2.1, and show robust standard errors clustered by municipality and accompanying *p*-values for all turnout estimates. Columns (1) through (6) in Tables 2.7–2.9 present results for specification (2.4), with turnout as the dependent variable and outlet plurality, ownership plurality, and ownership concentration measures as the media diversity regressors, respectively. For each media diversity measure in Tables 2.7–2.9, Columns (7) and (8) present results for medium heterogeneity effects in specification (2.5). As before, Columns (2), (4), (6), and (8) are the preferred specifications as they include controls for the share of non-commercial outlets and, in the case of ownership plurality and concentration regressions, for overall local media exposure (i.e., local outlet plurality).

Table 2.7 shows that both radio and television plurality increase turnout, even after controlling for democratization trends (proxied by the share of non-commercial local outlets): each additional local radio outlet increases turnout by 0.28 percentage points (column (4)) and each additional local broadcast television outlet increases turnout by 0.64 percentage points (column (6)). Standardized coefficient estimates of the specification in column (8) reveal that local radio plurality has almost four times the effect of

local television plurality on electoral participation: a 1 standard deviation increase in local radio plurality yields a 0.22 standard deviation increase in turnout, while a 1 standard deviation increase in local broadcast television plurality only yields a 0.06 standard deviation increase in turnout.

Results for the effect of ownership plurality on voter turnout are presented in Table 2.8. While local radio ownership plurality has no significant effect on electoral participation (column (4)), local television ownership plurality has a substantial and significant *negative* effect on turnout (column (6)). Each additional local broadcast television majority owner decreases electoral participation by 0.9 percentage points. This result may suggest a positive correlation between media diversity and negative advertising (e.g., Ansolabehere and Iyengar 1995; Ansolabehere, Iyengar, and Simon 1999; Chong *et al.* 2015). Standardized coefficients of the specification in column (8) once again reveal an interesting result, that overall local media exposure matters much more than television ownership plurality for turnout: a 1 standard deviation increase in the number of local broadcast television majority owners yields a 0.07 standard deviation decrease in turnout, while a 1 standard deviation increase in the number of total local outlets yields a surprisingly high 0.47 standard deviation increase in turnout.

Finally, Table 2.9 presents results for the effect of local ownership concentration on turnout. Interestingly, as with the effect on PRI electoral outcomes, radio ownership concentration has the opposite effect of broadcast television concentration. An additional local radio outlet per local radio majority owner *decreases* voter turnout by 0.48 percentage points (column (4)) and an additional local broadcast television outlet per local television majority owner *increases* voter turnout by 1.75 percentage points (column (6)). Since increases in ownership concentration actually signify increases in media diversity, broadcast television results in Table 2.9 are consistent with a negative effect of ownership diversity on turnout (confirming findings from Table 2.8), while radio results are not. However, when considering broadcast medium heterogeneity in columns (7) and (8), radio ownership concentration is no longer significant. Standardized coefficients of the estimation from column (8) (not shown) further confirms a predominant effect of overall local media exposure over local television ownership concentration: a 1 standard deviation increase in local broadcast television concentration yields a 0.1 standard deviation increase in turnout, while a 1 standard deviation increase in the number of total local outlets yields a 0.16 standard deviation increase in turnout. Thus, estimates suggest an overall negative effect of local television ownership diversity on turnout and no consistent evidence of local radio ownership effects.

In sum, my findings from Tables 2.7–2.9 show that both local radio and broadcast television plurality have a positive effect on turnout, that broadcast television ownership plurality has a negative effect on turnout, that broadcast television ownership concentration has a positive effect on turnout, and that overall media exposure has a larger effect on voter turnout than media ownership diversity measures. Once again, the contrasting results from media diversity measures that do not take into account ownership information

(Table 2.7) as opposed to those that do (Tables 2.8 and 2.9), highlight the importance of considering ownership diversity measures when studying media's effects on political and economic development outcomes.

2.7 Conclusion

This chapter examines how local media diversity, particularly in the radio market, contributed to the Mexican PRI authoritarian regime's radical municipal electoral decline. In doing so, this constitutes the first study to empirically document mass media's effect in democratic transitions. The study also contributes to debates regarding what constitutes media diversity, the relationship between competition and diversity, and the role of television on electoral participation, which has received mixed support in the literature.

Using a unique panel dataset that provides local broadcast media coverage and ownership data from 1990 to 2012, I study the effect of media diversity on the PRI and opposition parties' electoral performance as well as on turnout. I focus on within-municipality variation using a municipal and year fixed effects framework and estimate the effect of local media diversity on the PRI's municipal electoral performance and on electoral participation. A key assumption for my identification strategy is that there are no time-varying unobserved characteristics of municipalities correlated with the demand for more diverse political news that could drive the observed differences in voting behavior. Although I cannot test this assumption directly, I include controls for a number of socioeconomic and demographic characteristics, as well as for the share of local non-commercial outlets, turnout and, in some specifications, for the number of total outlets. In addition, I show that all main results are robust to different measures of media diversity, PRI electoral outcomes, as well as an alternative concentration measure.

I develop three main sets of results. First, I show that increases in local media diversity, particularly from the local radio market, had a significant negative effect on mayor municipal voting outcomes for the PRI and a significant positive effect on the electoral performance of the left of center opposition party PRD. I find that for each 1 unit decrease in the number of local radio stations per local majority owner, the PRI loses 3 to 4 percentage points, depending on the specification used. The effects are considerable and imply that decreases in local radio ownership concentration can explain between 13.9% and 18.5% of the overall PRI municipal electoral decline between 1990 and 2012. For the PRD, I find that each unit decrease in the number of local radio stations per local majority owner is correlated with a 0.9 to 1.8 percentage points increase in the PRD's electoral performance.

Second, I show that each additional local radio outlet increases turnout by 0.28 percentage points and each additional local broadcast television outlet increases turnout by 0.64 percentage points. I also find that local broadcast television ownership diversity had a negative effect on turnout. Each additional local television majority owner decreases electoral participation by 0.9 percentage points, and an additional local broadcast

television outlet per local television majority owner increases voter turnout by 1.75 percentage points. Moreover, I show that overall media exposure matters more for electoral participation than ideological diversity.

Third, my analysis shows that the most popular measure of media diversity used in the literature, media plurality, is an incomplete measure of diversity and/or competition. By systematically contrasting different measures of media diversity, I show and highlight the importance of ownership data when studying media's effects on voting behavior. This last result has important implications for the still contentious debate, critical to regulation policy, about what constitutes media diversity, how it can be measured, and the role of media ownership in competition policy (Just 2009; Prat and Strömberg 2013).

A puzzling fact behind the findings of this chapter is that, from 1990 to 2012, the PRI itself determined broadcast media plurality. Throughout this period, the executive government was in charge of granting radio and broadcast television licenses and of determining their reach and initial ownership. The real mystery then, is why the PRI allowed media plurality and, with it, media diversity to grow, eventually leading to its own defeat as this chapter shows. Did the PRI not comprehend the implications of increasing media diversity? Did the regime allow such diversity because they perceived no real threat or chance of losing? Or was increasing the number of stations their only strategy to maintain popularity and win elections in the short-run? The model derived in the next chapter provides a plausible framework to understand why increasing media plurality may have been the right strategy to ensure reelection in the short-run. In the long-run, however, this higher number of outlets proved impossible to keep under control.

Figure 2.1: Average Number of Local Media Outlets and PRI Mayor Elections Municipal Vote Share

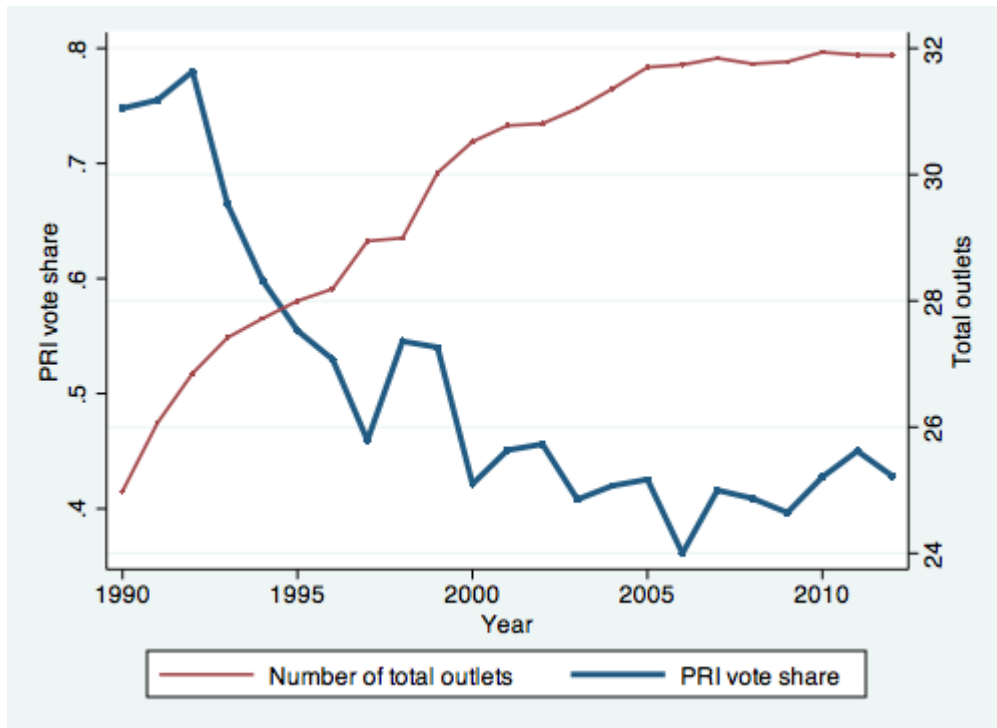


Figure 2.2: Average Number of Local Media Owners and PRI Mayor Elections Municipal Vote Share

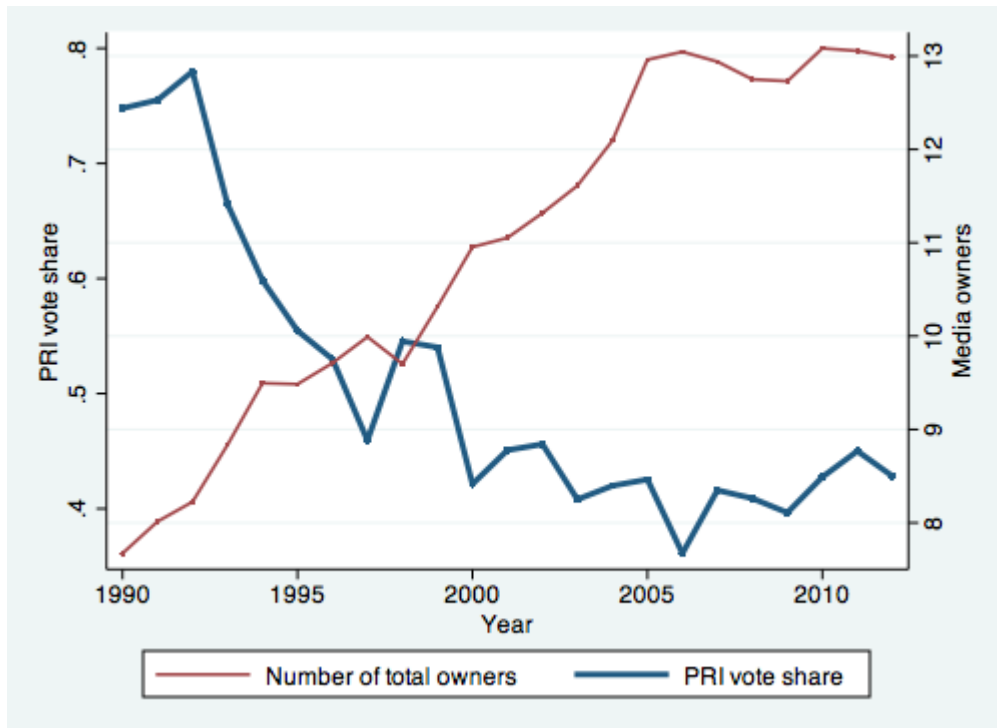


Figure 2.3: Average Local Ownership Concentration and PRI Mayor Elections Municipal Vote Share

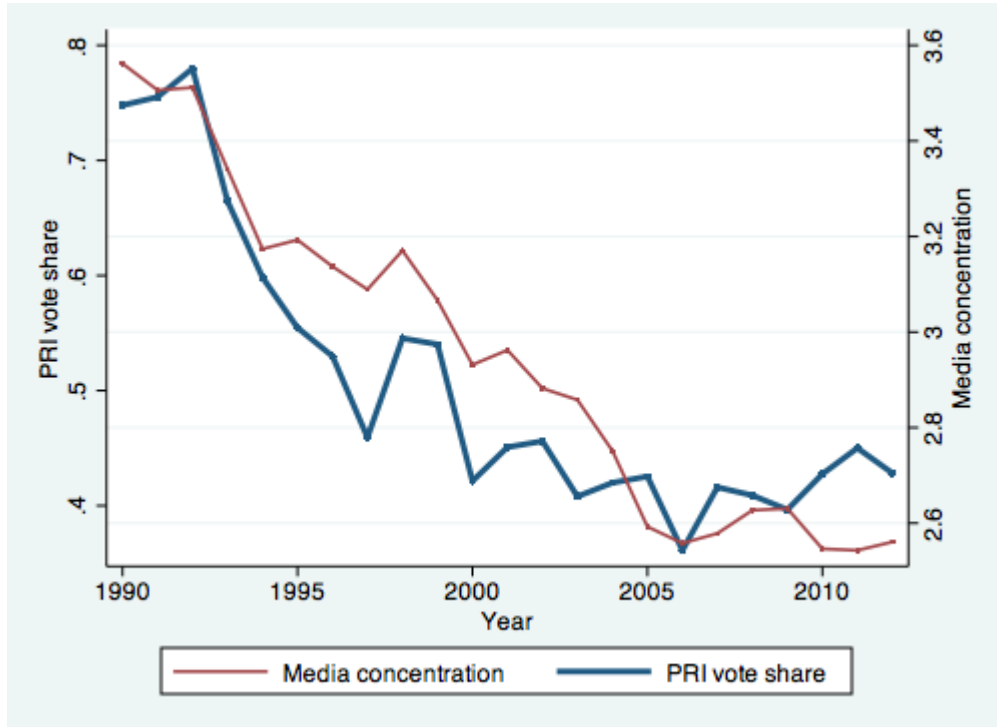


Figure 2.4: Evolution of AM Coverage: 1990 and 2012

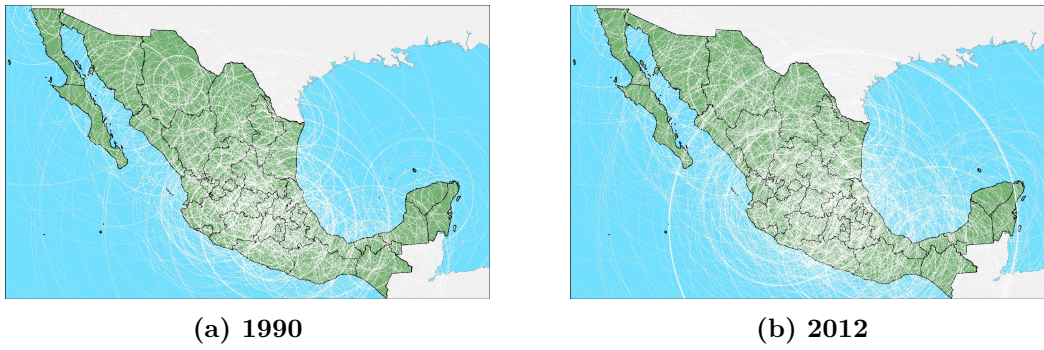


Figure 2.5: Evolution of FM Coverage: 1990 and 2012

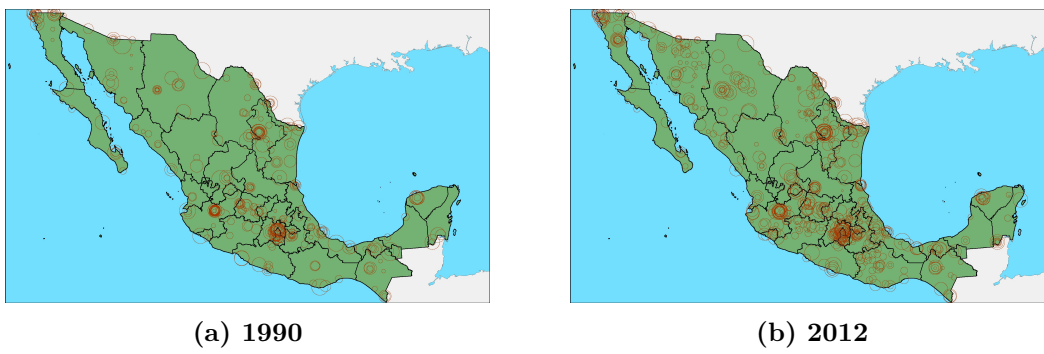


Figure 2.6: Evolution of TV Coverage: 1990 and 2012

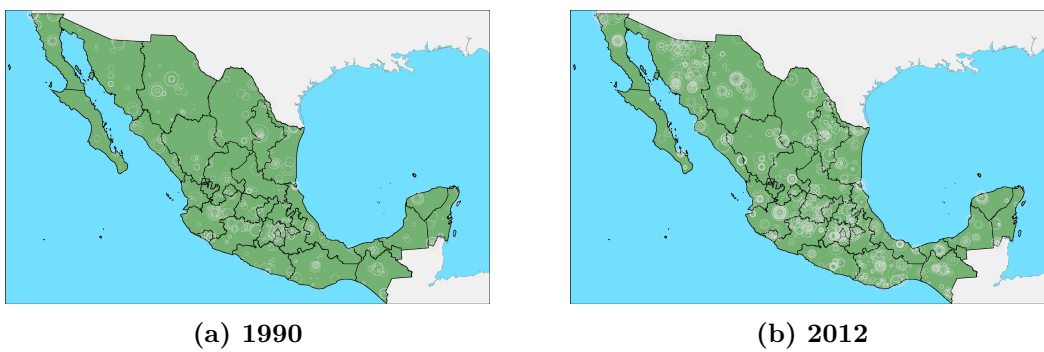


Figure 2.7: Variation of PRI Vote Share vs. Media Outlet Plurality

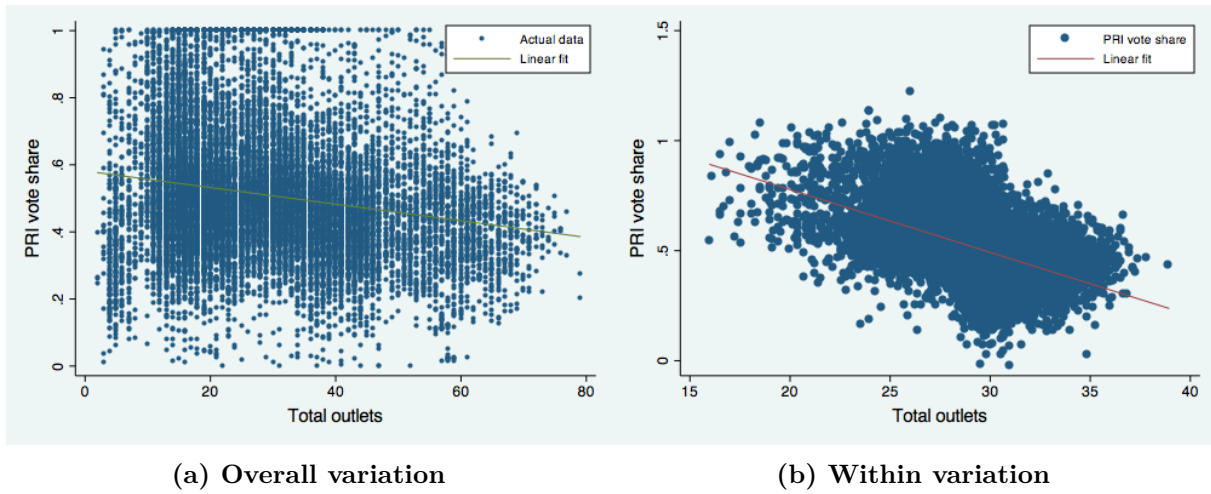


Figure 2.8: Variation of PRI Vote Share vs. Media Ownership Plurality

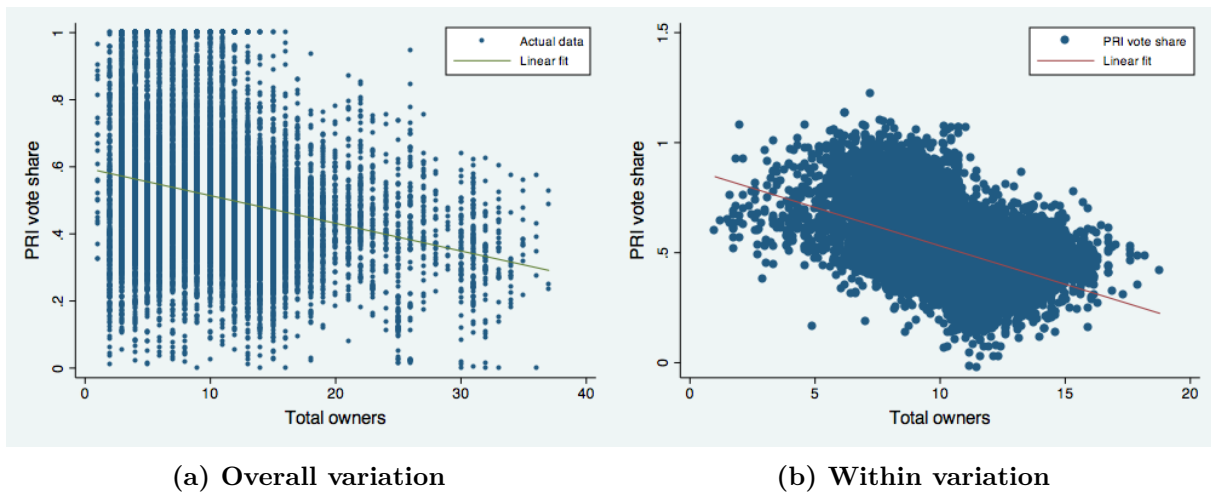
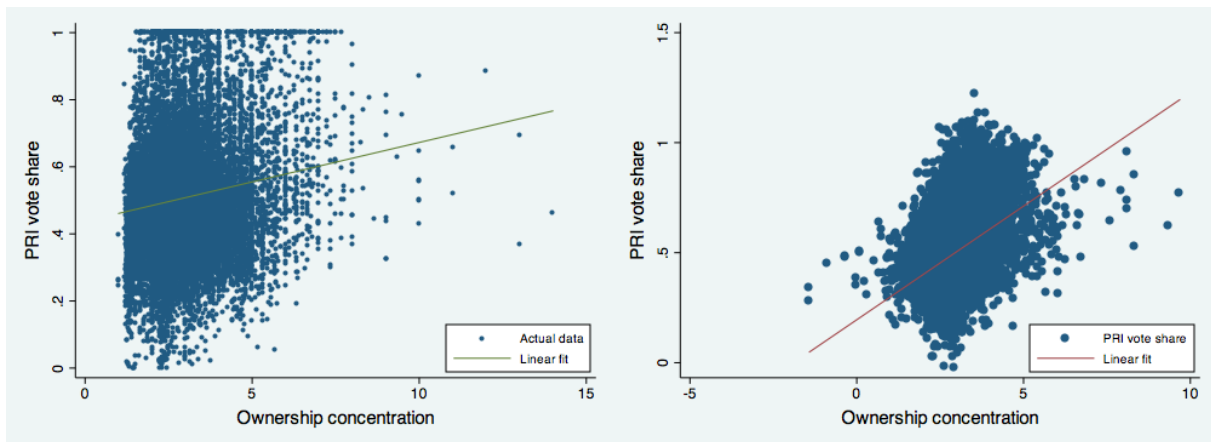


Figure 2.9: Variation of PRI Vote Share vs. Media Ownership Concentration



(a) Overall variation

(b) Within variation

Table 2.1: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Panel A: Media Variables					
Total outlets	29.42	14.38	2	79	15426
Radio outlets	28.23	13.97	2	73	15426
TV outlets	1.23	1.61	0	14	15426
Non-commercial outlets	1.28	1.7	0	11	15426
Total owners	10.63	5.76	1	37	15426
Radio owners	10.17	5.53	1	36	15426
TV owners	0.93	1.12	0	7	15426
Total concentration	3.04	1.16	1	14	15426
Radio concentration	3.04	1.18	1	12	15426
TV concentration	0.77	0.88	0	9	15426
Total concentration 2	0.07	0.05	0	0.5	15426
Radio concentration 2	0.08	0.06	0	0.67	15426
TV concentration 2	0.21	0.35	0	3	15426
Panel B: Political Variables					
Winner vote share	0.55	0.17	0.17	1	15426
PRI vote share	0.51	0.19	0	1	15408
PRI vote share change	-0.04	0.15	-0.72	0.70	12948
Pr(PRI reelection)	0.5	0.5	0	1	15426
PAN vote share	0.28	0.18	0	1	13210
PAN vote share change	0.02	0.16	-1	0.99	10817
Pr(PAN reelection)	0.06	0.24	0	1	15426
PRD vote share	0.23	0.18	0	1	13025
PRD vote share change	0.01	0.17	-0.9	0.69	10507
Pr(PRD reelection)	0.05	0.21	0	1	15426
Victory margin	0.23	0.26	0	1	15426
Turnover	0.38	0.49	0	1	15426
Turnout	60.08	15.06	0.4	99.99	9444
Panel C: Municipal Variables					
Population density	265.79	1135.33	0.11	20325.57	15422
% Urban population	43.39	35.01	0	100	15409
% Poor population	69.51	16.72	6.4	100	15363
% Literate population	94.95	5.35	26.5	100	15409
% Population no electricity	11.45	15.88	0	100	15409
% Population no water	21.34	21.67	0	100	15409
% Population no drainage	27.58	26.18	0	100	15409
% Population dirt floor	27.44	23.86	0	100	15363
% Population overcrowded	57.23	14.85	8.19	100	15363
Infant mortality rate	13.92	14.07	0	333.33	14366
Murder rate	11.3	25.85	0	870.45	15426

Notes: Media data was compiled by the author with data from the former Federal Telecommunications Commission (COFETEL) archives and the National Institute of Statistics and Geography (INEGI) for coverage. Political and turnout data are from the *Base de datos México Electoral: Estadísticas Federales y Locales* dataset compiled by BANAMEX and from the State Electoral Institutes. Municipal characteristics variables are from the National Population Council (CONAPO) and INEGI. Population density, infant mortality, and murder rates were calculated using data from INEGI and CONAPO.

Table 2.2: Effects of Outlet Plurality and Broadcast Heterogeneity on PRI Vote Share

	Dependent variable: PRI vote share							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total outlets	-0.029*** (0.001)	-0.005*** (0.001)						
Radio outlets			-0.031*** (0.001)	-0.003*** (0.001)			-0.027*** (0.001)	-0.002** (0.001)
TV outlets					-0.077*** (0.003)	-0.022*** (0.002)	-0.042*** (0.003)	-0.021*** (0.002)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15408	14293	15408	14293	15408	14293	15408	14293
F	1967.596	216.707	1762.731	217.275	885.526	222.544	1009.048	204.366

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentage of total vote. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2.3: Effects of Ownership Plurality and Broadcast Heterogeneity on PRI Vote Share

	Dependent variable: PRI vote share							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total owners	-0.035*** (0.001)	-0.010*** (0.001)						
Radio owners			-0.039*** (0.001)	-0.012*** (0.001)			-0.036*** (0.001)	-0.011*** (0.001)
TV owners					-0.086*** (0.003)	-0.009*** (0.003)	-0.026*** (0.003)	-0.006*** (0.003)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15408	14293	15408	14293	15408	14293	15408	14293
F	2098.901	223.328	2252.472	224.700	654.137	220.074	1115.203	207.576

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentage of total vote. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2.4: Effects of Ownership Concentration and Broadcast Heterogeneity on PRI Vote Share

	Dependent variable: PRI vote share							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total concentration	0.103*** (0.004)	0.025*** (0.003)						
Radio concentration			0.113*** (0.004)	0.032*** (0.003)			0.105*** (0.004)	0.031*** (0.003)
TV concentration					-0.073*** (0.003)	-0.022*** (0.003)	-0.048*** (0.003)	-0.021*** (0.003)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15408	14293	15408	14293	15408	14293	15408	14293
F	694.887	224.929	1017.235	226.611	467.893	224.622	720.121	213.741

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentage of total vote. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2.5: The Effect of Radio Ownership Concentration on PRI, PAN, and PRD Vote Shares - Preferred Concentration Measure

	PRI vote share			PAN vote share			PRD vote share					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration	0.032*** (0.003)	0.031*** (0.003)	0.030*** (0.003)	0.040*** (0.003)	-0.001 (0.003)	-0.000 (0.003)	0.000 (0.003)	0.001 (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.018*** (0.005)
Total outlets		-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.003** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.006*** (0.001)
Share non-commercial			-0.247*** (0.022)	-0.197*** (0.026)			0.083*** (0.029)	0.227*** (0.037)			0.088*** (0.027)	0.114*** (0.034)
Turnout				-0.003*** (0.000)				0.002*** (0.000)				-0.000 (0.000)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14293	14293	14293	8354	12612	12612	12612	7039	12419	12419	12419	6959
F	226.611	206.334	201.954	167.376	78.246	73.169	70.277	41.701	10.905	12.212	12.138	8.573

Note: All specifications include municipal and year fixed effects. All dependent variables are measured in percentages of total vote. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table 2.6: Robustness: The Effect of Radio Ownership Concentration on PRI, PAN, and PRD Vote Shares - Alternative Concentration Measure

	PRI vote share			PAN vote share			PRD vote share					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration 2	0.219*** (0.060)	0.188*** (0.061)	0.189*** (0.060)	0.250*** (0.069)	-0.093* (0.056)	-0.073 (0.056)	-0.070 (0.056)	0.131* (0.073)	-0.453*** (0.061)	-0.494*** (0.062)	-0.492*** (0.062)	-0.462*** (0.075)
Total outlets		-0.004*** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)		0.003*** (0.001)	0.002** (0.001)	0.003** (0.001)	-0.005*** (0.001)	-0.006*** (0.001)	-0.007*** (0.001)	
Share non-commercial			-0.258*** (0.022)	-0.233*** (0.026)			0.082*** (0.029)	0.224*** (0.037)		0.089*** (0.026)	0.132*** (0.033)	
Turnout				-0.003*** (0.000)				0.002*** (0.000)				-0.000 (0.000)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14293	14293	14293	8354	12612	12612	12612	7039	12419	12419	12419	6959
F	223.041	203.499	199.300	159.389	78.442	73.272	70.345	42.052	14.767	16.151	16.004	10.570

Note: All specifications include municipal and year fixed effects. All dependent variables are measured in percentages of total vote. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table 2.7: Effects of Outlet Plurality and Broadcast Heterogeneity on Turnout

	Dependent variable: Turnout							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total outlets		0.259*** (0.089)	0.307*** (0.091)					
Radio outlets			0.229** (0.100)	0.278*** (0.103)			0.188* (0.101)	0.236** (0.104)
TV outlets					0.574** (0.266)	0.642** (0.266)	0.490* (0.268)	0.548** (0.268)
Share non-commercial		-7.850*** (1.914)		-7.234*** (1.940)		-6.702*** (1.833)		-7.859*** (1.912)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8361	8361	8361	8361	8361	8361	8361	8361
F	23.734	22.398	23.352	21.897	24.108	22.794	22.381	21.348

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentage of total registered voters. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2.8: Effects of Ownership Plurality and Broadcast Heterogeneity on Turnout

	Dependent variable: Turnout							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total owners	-0.102 (0.092)	-0.393*** (0.110)						
Radio owners			0.038 (0.101)	-0.168 (0.115)			0.060 (0.102)	-0.185 (0.115)
TV owners					-0.353 (0.296)	-0.904*** (0.315)	-0.385 (0.299)	-0.933*** (0.314)
Total outlets						0.410*** (0.098)		0.492*** (0.108)
Share non-commercial							-7.705*** (1.908)	-7.719*** (1.907)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8361	8361	8361	8361	8361	8361	8361	8361
F	23.401	22.124	23.209	21.346	23.027	20.835	21.359	20.025

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentage of total registered voters. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table 2.9: Effects of Ownership Concentration and Broadcast Heterogeneity on Turnout

	Dependent variable: Turnout							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total concentration	-0.074 (0.233)	0.000 (0.237)						
Radio concentration			-0.543** (0.262)	-0.478* (0.263)			-0.284 (0.255)	-0.297 (0.258)
TV concentration					1.845*** (0.255)	1.746*** (0.251)	1.806*** (0.258)	1.715*** (0.253)
Total outlets		0.307*** (0.092)		0.287*** (0.091)		0.181** (0.089)		0.171* (0.090)
Share non-commercial		-7.850*** (1.950)		-8.225*** (1.950)		-8.037*** (1.916)		-8.266*** (1.949)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8361	8361	8361	8361	8361	8361	8361	8361
F	23.124	20.796	23.583	21.057	27.755	24.641	25.747	23.088

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentage of total registered voters. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Chapter 3

Accidental Political Suicide? A Model of Media Capture with Endogenous License Granting

3.1 Introduction

Media’s inability or unwillingness to serve the purpose of “truthful” information provision is a major threat to well-functioning democracies. Insofar as voters primarily rely on media to obtain information about political players and policies, media will play a crucial role in the type and quality of the information provided, as well as on the way such information is interpreted by voters. A crucial determinant of media’s behavior is the degree of media’s dependence on special interest and, in particular, the extent to which it functions independently from governments.

Theoretical research on state media capture in the context of political economics has relied on the number of media stations or outlets as an exogenous determinant, from the government’s perspective, of the extent to which governments can sustain capture (Besley and Prat, 2006; Prat and Strömberg, 2013). The logic in these models is contingent on governments’ inability to arbitrarily determine the number of licenses and the nature of their ownership. In many countries, however, governments are, to a greater or lesser extent, free to choose the allocation of licenses in an discretionary manner, making the number of media outlets endogenous in the government’s media capture decision. For example, according to 2014 data from the United Nations International Telecommunications Union (ITU), 27% of countries do not have autonomous regulators of broadcast media and 18% do not allow appeals to regulatory decisions. Moreover, even when such formal regulatory autonomy and independence exists, it may not be followed in practice, as there are usually several channels through which governments may still be able to influence such agencies.

This chapter derives an extension of Besley and Prat’s (2006) canonical political agency framework of media capture by modeling endogenous media entry as a government decision through the allocation of new media licenses by incumbents. In Besley and Prat’s (2006) setup of endogenous media entry, outlets’ decision to enter the media market is independent of government policy; media entry is as a function of media’s profit-maximizing incentives and outlets enter the market by paying a fixed industry entry cost. From the government’s perspective, the number of media outlets is exogenously given by the media market’s equilibrium. In contrast, the model presented in this chapter incorporates the governments’ role directly, thus providing a more realistic setup of media entry for many contexts, including that of Mexico.

I develop a three-period political agency retrospective voting model to understand how new media licenses are granted, when media capture occurs, and the effects it has on political outcomes and voters’ welfare. Voters use the information provided by media to decide whether to vote for the incumbent or for a challenger of unknown type. Media outlets have two income sources: audience-related revenues (e.g., advertising, sales, etc.) and government-provided revenues (e.g., bribes, input subsidies, tax exemptions, external business benefits, etc.). The former represent media capture profits.¹ Media pluralism

¹For simplicity, we assume all government income is media capture income. However, some government

and capture are both endogenous in the model, and determine voters' information, which in turn determines voting behavior, political outcomes, and voters' welfare.

I first show that it is more costly to capture media when media have a higher commercial motive, when there are regulatory structures that make bribing harder, when the initial number of free media is higher, when there is lower expected media loyalty, and when the cost of rebribing media is higher.² I also find that political accountability in the form of transparency and efficient news production does not directly influence the cost of media capture, though it does affect media capture indirectly. Most of these results are consistent with Besley and Prat's (2006) original framework. A few results, however, no longer hold in this setup: media independence, initial media plurality, and media concentration have an ambiguous effect on the cost of capture.

I then derive three main sets of equilibrium results. First, I show that the optimal number of new licenses the incumbent grants in period 1 is a function of the difference between the cost of bribing in period 1 relative to the cost of bribing in period 2, and of the number of existing outlets. The intertemporal choice decision implies that the more costly it is to bribe, the more incentives the incumbent has to create new outlets in period 1 in order to ensure his reelection. However, the incumbent knows that creating more outlets also raises the costs in period 2, as he will have to bribe some of the newly-created outlets from period 1 that will not remain loyal to him.

Second, I show that the optimal number of outlets bribed in the first period depends on the cost of bribing outlets in period 1 relative to the cost of bribing outlets in period 2. The cheaper it is to bribe in period 1 relative to period 2, the more outlets he will chose to bribe in period 1. Similarly, if the incumbent expects more media loyalty, he will chose to bribe more outlets in period 1, knowing that his cost in period 2 will not be as high because he will have to rebribe a smaller number of outlets that betray him. The higher the relative cost of bribing in period 1 compared to the expected number of loyal outlets, the fewer outlets the incumbent will have to bribe in the first period in order to ensure reelection in period 2.

Third, I show that the optimal number of outlets captured in the second period is ambiguous, and suggests that the extent of capture when license-granting is possible may be context-specific and needs to be evaluated empirically. The reason is that, from the perspective of period 1, the incumbent is unable to predict with certainty the total cost of capture in the second period that he will need to cover in order to ensure reelection. It is entirely possible that, when period 2 arrives, the incumbent finds himself unable to secure a high enough number of outlets that suppress their signal, causing him to lose the elections. Thus, while it may be rational to create new outlets in period 1 in order to increase reelection chances, it is precisely these additional outlets that may make it prohibitively expensive to ensure media silence in period 2, causing the incumbent to lose

income, such as government advertising, is legal and is not necessarily a media capture income source.

²The need to "rebribe" media occurs because media outlets may turn against the incumbent and thus not fulfill their commitment to collude with the government.

the elections. This is at the core of the empirical findings of Chapter 2, as I explain below.

In addition, I provide a number of media and political outcome predictions consistent with Besley and Prat's (2006) original framework. I show that audience-related revenues, turnover, and voter welfare are lower with media capture. However, in my model, there is an "intermediate" level of media capture, one where the government captures media in period 1 but is unable to secure it in period 2. Not surprisingly, I find that the equilibrium with unsuccessful media capture in period 2 (i.e., with media capture only in period 1) yields higher audience-related revenues, turnover, and voter welfare than successful media capture in both periods and lower audience-related revenues, turnover, and voter welfare than without media capture in both periods.

The third equilibrium result described above, provides an explanation of why, in the short-run, creating new radio stations might have been a reasonable policy for the PRI to ensure reelection. Recall that the previous chapter showed that increasing local media diversity, particularly in the radio market, played a crucial role in the Mexican PRI's local electoral downfall. For example, I find that reductions in local radio ownership concentration can account for between 13.9% and 18.5% of this downfall in mayor municipal elections over the period 1990 to 2012. The PRI had long relied on media control for the legitimacy and popularity of its authoritarian regime. Interestingly, from 1990 to 2000, when the PRI still headed the presidency, the executive branch itself was responsible for giving out broadcast licenses and for determining their coverage and (initial) ownership. During this period, while the PRI's average mayor municipal elections vote share fell by 44%, the average number of local broadcast media outlets per municipality increased by 141%. Given that media plurality constrains the government's ability to capture media (e.g., Besley and Prat 2006; Prat and Strömberg 2013), this model helps explain the seemingly paradoxical decision by the PRI to increase the number of outlets (or the existing outlets' reach), thus fostering ideological diversity in the media and, with it, opening way for opposition parties' views.³ Consistent with the results in this model and with the empirical findings from Chapter 2, this policy may have backfired in the long-run, causing the PRI's unintended local electoral downfall. In other words, the PRI committed accidental political suicide and led itself out of power while trying to ensure its local dominance.

There is evidence that supports the model's underlying logic that media capture through the control of license allocation is a substitute for cash transfers or other economic incentives when these become unaffordable. As I explain in Chapter 2, media capture through direct cash transfers to journalists was widespread in Mexico throughout most of the PRI's rule (e.g., Lawson 2002, Hughes 2006, 2012).⁴ However, changes in

³One implication of the model is that media plurality has two negative effects for authoritarian regimes. First, as discussed in Chapter 2, media plurality may foster ideological diversity. Second, media plurality increases capture costs, thus constraining government media control. At the same time, while media plurality can be an effective defense against capture, to the extent that government's are able to manipulate media entry through the arbitrary allocation of licenses, media capture may continue to be widespread.

⁴The "cooperative" relationship between media and government was also dependent on government

Mexico's socioeconomic and media environments starting in the 1990s, such as higher profits from non-governmental advertising sources and government budget cuts, made this means of capture increasingly difficult and costly.⁵ Higher traditional capture costs might have been one of the main reasons why the PRI gave out new broadcast licenses to political allies and supporters (e.g., Lawson 2002; Hughes 2006) as an alternative means of capture. At the same time, this increase in media outlets further encouraged competition and audience-focused business formats (e.g., Lawson 2002, Hughes 2006, 2012; Guerrero 2010), which made media independence more profitable.⁶ Although only suggestive, I also provide some evidence in Section 3.4.1 of the PRI's systematic use of media license-granting for political ends. Boas and Hidalgo (2011) also find that license-granting is used for political goals in Brazil. They show that radio licenses are granted to incumbents and that the acquisition of a radio station has a large positive effect on candidates' vote share and probability of winning elections.

Other cross-country and within-country evidence is also consistent with the models' predictions. In the cross-country literature, for instance, Brunetti and Weder (2003) and Ahrend (2004) find that there is a strong negative correlation between press freedom and corruption across countries. Besley and Prat (2006) also provide suggestive cross-country evidence of higher ownership concentration leading to longer political tenures as well as higher corruption levels. Bhattacharyya and Hodler (2015) show theoretically and empirically the complementarity between democracy and media freedom in fighting corruption across countries. Similarly, Djankov *et al.* (2003) find that state ownership is significantly correlated with poor government performance. In studies exploiting within-country variation, there is evidence that market profitability increases media independence from governments and political parties (Gabszewicz, Laussel, and Sonnac 2001; Hamilton 2004; Gentzkow, Glaeser, and Goldin 2006; Petrova 2011; Gentzkow *et al.* 2015). Di Tella and Franceschelli (2011) find a strong negative correlation between revenues from government advertising and media coverage of political corruption scandals in Argentina from 1998 to 2007. McMillan and Zoido (2004) provide evidence of media capture during Alberto Fujimori's presidency and show that media cash transfers were the most expensive bribes the regime had to pay and that each television channel in Peru had hold-up power.⁷

subsidies such as advertising and production inputs (Hughes 2006). And, there were other means of capture, such as repression through violent means, but their occurrence was less frequent (Lawson, 2002).

⁵My approach is consistent with the argument put forth by other scholars of the Mexican democratic transition that the PRI's inability to continue its co-optation of key regime allies is one of the principal explanations for the PRI's demise (Magaloni 2006; Camp 2014).

⁶Revoking licenses was a rare occurrence in Mexico. Moreover, although the government determined the original license grantee and shareholders, it did not determine ownership changes. Once a license was granted, stations were free to change shareholders (although they were required to report these changes to the government).

⁷Note that the model's approach differs from other political economy theories that explain how free media can coexist with authoritarian regimes (Egorov, Guriev, and Sonin, 2009; Lorentzen 2014). In these approaches, the government views media as a tool to improve governance, rather than as a medium

Corrales *et al.* (2009) document that authoritarian regimes have adapted to more indirect methods of media control. Consistent with their analysis, license-granting may be another example of subtle media capture mechanisms.

This extension of Besley and Prat's (2006) model implies that media capture may be more pervasive where the government can control media entry. Thus, the license-granting media capture mechanism of this model may not apply to the press, where government does not affect entry in the same way.⁸ This may explain why in Mexico, for instance, greater media diversity and independence occurred in the press first, years before the broadcast market (Lawson 2002; Hughes 2006, 2012).⁹ Similarly, Gentzkow *et al.* (2015) find no evidence of media capture of U.S. newspapers from 1869 to 1928, except in the Reconstruction South, where the market was particularly weak and the political incentives were especially strong.

The model extension adds to a growing political economy literature that has shown media control and capture to be pervasive phenomena (Brunetti and Weder 2003; Djankov *et al.* 2003; Ahrend 2004; McMillan and Zoido 2004; Besley and Prat 2006; Corrales *et al.* 2009; Gehlbach 2010; Boas and Hidalgo 2011; Di Tella and Franceschelli 2011; Durante and Knight 2012; Gehlbach and Sonin 2014). Even in democratic regimes, there is evidence of some degree of government influence of media content (Thomas 2006; Bennett, Lawrence, and Livingston 2007; Gentzkow and Shapiro 2008; Qian and Yanagizawa-Drott 2013). More generally, it also contributes to other studies that have found that media capture can be undertaken by actors other than the government, such as political and economic elites (e.g., Corneo 2006; Petrova 2008) or other interest groups.¹⁰

The main contribution of this chapter is that it fills an important gap in the still limited theoretical literature by considering the government's decision of media license allocation as an additional media capture measure. To the best of my knowledge, this paper is the first attempt to model media capture and license allocation by governments jointly. In doing so, it provides a new framework to study media capture and discuss the role of media capture in politics, the tradeoffs governments face with the different ways of influencing voters' information, and the effect these issues have on political outcomes. For example, this approach solves the puzzle of why authoritarian governments, like the PRI in Mexico, may increase the number of licenses or stations beyond the optimal level of media diversity for them to retain media capture, eventually undermining their power and leading to their descent. As discussed above, the model also helps explain some empirical literature findings, such as the lack of partisan effects in newspapers (in contrast to broadcast media) and the rise of an independent press preceding broadcast media independence. Finally, the

to manipulate voters' beliefs.

⁸Nevertheless, there may still be ways through which governments affect entry, such as controlling input supplies. This occurred in Mexico under the PRI, with the supply of paper for newspaper publications (Aceves González 2000; Guerrero 2010).

⁹This may also be a result of lower incentives to capture media in the press, which has a much smaller consumer reach.

¹⁰As discussed briefly in Chapter 1, Mexico's drug-trafficking organizations are a point in case.

model shows that media capture can coexist with media freedom institutional frameworks and even with strong market incentives. Media freedom regulations and commercial incentives can limit media capture by governments (e.g., Besley and Prat 2006; Prat and Strömberg 2013; Gentzkow *et al.* 2015), but as long as media licenses depend on governments, media capture can persist.

The rest of the chapter is organized as follows. Section 2 explains the model’s extension setup. Section 3 derives the analytical framework. Section 4 discusses the model’s media and political outcome predictions. Finally, Section 5 concludes.

3.2 Setup

To understand the interaction between incumbents and media outlets, I use a three-period political agency retrospective voting model.¹¹

At the beginning of time, an incumbent is exogenously in power. There are two possible types $\theta \in \{b, g\}$ with $P(\theta = g) = \gamma$, where g stands for “good” and b for “bad”. As in Besley and Prat (2006), this type is interpreted broadly, either as an intrinsic ability to produce public goods or as honesty, where a dishonest or corrupt politician takes resources away from voters. Voters’ payoff is 1 if $\theta = g$ and 0 if $\theta = b$. I also assume that at least some of the incumbent’s policies have long-term consequences, and thus voters do not observe their payoffs at the time of the reelection decision.

In the first period, there are $N_0 = N_0^c + N_0^{nc}$ total active broadcast media outlets, such as radio and television stations. A number N_0^c are pro-government and already captured by the incumbent. From the remaining non-captured outlets N_0^{nc} , a fraction f_1 cannot be influenced and are thus not susceptible to bribes. Non-bribable outlets are always “honest” and report the true signal.¹² The fraction $f_1 \in [0, 1]$ is a random variable with CDF F and $E[f_1] = e_1$.

If the incumbent is good, the media observe no verifiable signal ($y_i = 0$). If the incumbent is bad, then with probability $q \in [0, 1]$, they receive a verifiable signal that $\theta = b$ ($y_i = b$). I assume that news cannot be fabricated and therefore only verifiable information can be broadcasted.

All media outlets are identical and their payoff depends on two components: audience-related and policy-related revenues. Viewers and listeners prefer informative news, and I further assume that they divide themselves equally among the media outlets that are reporting news. Moreover, viewers and listeners are “inflexible” and are not willing to switch to a different media source: they have a preferred outlet from which they obtain

¹¹As we shall see later on, there is a third period because media outlets can turn against the incumbent after committing to support him and before elections take place. The possibility of betrayal introduces an additional stage in the interaction between incumbents and media, similar to Besley and Prat’s (2006) approach of adding a prior stage 0 in which media outlets decide whether to enter the market or not.

¹²Outlets may not be susceptible to bribes for a number of reasons, including professional commitment, shareholders’ financial interests, ideology, and political affiliation, among others.

information about the incumbent and they buy this media outlet if and only if it carries informative news. All of these simplifications may be relaxed in further extensions of the model.

The audience-related revenue of an outlet i is given by:

$$\pi_i = \begin{cases} 0 & \text{if it does not report news} \\ \frac{a}{m} & \text{if it reports news} \end{cases}$$

where a is a parameter that represents the maximum potential audience-related benefit and m is the number of outlets that report news.¹³

The incumbent can manipulate voters' information in two ways. First, he can influence media capture by giving away media licenses, thereby creating new outlets. For simplicity, I assume new outlets are initially all captured and that it is politically too costly to take away licenses so, once a license is granted, it cannot be reversed.¹⁴ Second, the incumbent can influence media capture through monetary or non-monetary transfers to existing outlets. For convenience, all of these transfers are referred to as "bribes". The dynamics of media capture is modeled as a bargaining game between the media and the politician. Since news cannot be fabricated, the only strategy available to politicians is to hide bad news. The bargaining game works as follows.

Once the incumbent is in power, he observes the number of existing outlets N_0 , the number of those that are captured N_0^c , the realized value of the fraction of outlets that are non-bribable f_1 , and the signal observed by media y_i . Based on this information, he chooses the fraction s of existing bribable outlets he will bribe and the number of new media outlets he will create $n \in [0, \bar{N} - N_0]$, where \bar{N} is the maximum possible number of outlets in the incumbent's governing territory.¹⁵ He then makes each existing outlet N_0 a nonnegative monetary offer of $t_{i,1} \geq 0$. For simplicity, I assume that there is no immediate cost of creating new outlets and no *initial* transfer is necessary to have new outlets captured. As we shall see, however, creating outlets can become costly in period 2 because a non-negative fraction of these outlets may decide to switch sides and no longer support the incumbent unless they become captured through government bribes.

I further assume that transfer offers are simultaneous and private: the offer made to outlet i is not observed by voters or by the other outlets. A transfer $t_{i,1}$ costs $t_{i,1}$ to the incumbent but yields $t_{i,1}/\tau$ to media outlet i . The parameter $\tau \in [0, \infty)$ measures transaction cost; in the case where $\tau = \infty$, it is impossible for the incumbent to affect media revenues.

¹³As in Besley and Prat (2006), this assumption is not essential for the analysis. The functional form a/m is assumed to get a simple closed-form solution, but the results only depend on the fact that audience-related revenues are decreasing in the number of outlets that report news.

¹⁴This was certainly the case in Mexico. Instances where particular grantees have their licenses revoked are rare, suggesting that removing licenses was politically too costly for the regime. McMillan and Zoido (2004) also document that revoking licenses was politically too costly in Peru.

¹⁵ \bar{N} is determined by the given bandwidth and coverage of other stations.

Each media outlet i observes transfer $t_{i,1}$ and decides to accept or reject it. However, after receiving the media license or transfer and before elections take place, a fraction $\lambda \in [0, 1]$ of captured media turn or “flip” against the incumbent and threaten to report the true signal. The fraction λ is a random variable with CDF G and $E[\lambda] = \mu$. Outlets may turn against the incumbent for a number of reasons, including third-party transfer offers, shareholder decisions, ideological differences, and so on. In this baseline extension of Besley and Prat’s (2006) model, I take λ as given.

The incumbent observes “flipped” outlets λN_1^c as well as the fraction of those who have now become non-bribable, $f_2 \lambda N_1^c$.¹⁶ As before, the fraction $f_2 \in [0, 1]$ is a random variable with CDF F and $E[f_2] = e_2$. Based on this information, the incumbent chooses the fraction of bribable media he will attempt to recapture in period 2. I assume a fraction $1 - f_2$ of “flipped” media can still be bribed by offering them a fixed amount $k \geq 0$.¹⁷ The incumbent then chooses to rebribe a fraction $x \in [0, 1]$ of flipped and still bribable media, offering them a transfer $t_{x,2} \geq 0$, and/or capture a fraction $z \in [0, 1]$ of bribable non-captured media from the first period, offering them a transfer $t_{z,2} \geq 0$.

Each media outlet x and z observes transfer $t_{x,2}$ and $t_{z,2}$, respectively, and decides to accept or reject it. Captured outlets suppress their signal about the politician’s type, report $\tilde{y}_i = 0$, and receive the transfer (either $t_{x,2}$ for previously bribed outlets that flipped or $t_{z,2}$ for outlets bribed for the first time). Non-captured outlets report the true signal $\tilde{y}_i = b$ and receive audience-related revenues. Each voter observes the signal $\tilde{y}_{i,1}$ given by his preferred outlet and casts his vote during elections. Voters vote for the incumbent if $\tilde{y}_i = 0$ or for a challenger of unknown type if $\tilde{y}_i = b$.

To summarize, the timing of the game is as follows:

1. Nature determines N_0 and N_0^c , and an incumbent is exogenously in power. The incumbent’s type, $\theta \in \{b, g\}$ with $P(\theta = g) = \gamma$, and the probability that non-captured media is non-bribable $f_1 \in [0, 1]$, are realized. If $\theta = g$, media observe no verifiable signal ($y_i = 0$). If $\theta = b$, all media observe verifiable signal $y_i = b$ with probability q and a non-verifiable signal $y_i = 0$ otherwise.
2. The incumbent observes media signal y_i and simultaneously selects the fraction of existing outlets he will bribe s , a transfer $t_{i,1} \geq 0$ for each existing outlet i , and the number of new licenses he will allocate n , in order to maximize his chances of reelection.

¹⁶Similar to first-period non-bribable outlets, the idea here is to introduce the possibility of outlets having a “change of heart”. For example, some of the outlets that took the government transfers in the first period may suddenly become concerned about loss of audience credibility and the impact this may have on future revenues, and will thus decide to no longer collude with the government.

¹⁷For simplicity, I take k as given in this baseline case of the model’s extension, but it is likely to be function of transaction costs, other forgone revenues of remaining truthful, as well as commitment, third-party offers attempting to undermine the outlet’s collusion with the government, and other contract enforcement elements.

3. Each media outlet i observes transfer $t_{i,1}$, and decides to accept or reject it.
4. Before elections are held, a fraction $\lambda \in [0, 1]$ of captured media turn against the incumbent and, of these, a fraction $f_2 \in [0, 1]$ become non-bribable, so λ and f_2 are realized. The incumbent chooses the fraction of outlets he will capture (z) and recapture (x) and selects a transfer $t_{x,2}, t_{z,2} \geq 0$ for each one, so that his chances of reelection are once again maximized.
5. Each media outlet x and z observes transfer $t_{x,2}$ and $t_{z,2}$, respectively, and decides to accept or reject it. Captured outlets report $\tilde{y}_i = 0$ and receive the transfer. Non-captured outlets, report $\tilde{y}_i = b$ and receive audience-related revenues.
6. A voter who chooses outlet i , observes signal \tilde{y}_i . Voters vote for the incumbent if $\tilde{y}_i = 0$ or for a challenger of unknown type if $\tilde{y}_i = b$. Elections are held and payoffs realized.

3.3 Analysis

Any subgame perfect equilibrium must include credible threats in the second period and avoid dynamic inconsistency. I follow Besley and Prat (2006) and focus on finding the perfect Bayesian equilibrium (PBE) restricted to pure-strategy equilibria in which voters use undominated strategies and thus always vote for their preferred candidate. I use backward induction to solve for the subgame perfect equilibrium of the game.

3.3.1 The Cost of Media Capture

The incumbent's objective is to minimize the cost he must incur in, in order to ensure reelection. To bribe a media outlet, the incumbent must offer to compensate it for any profits that it forgoes by remaining silent. The minimum cost for a bad politician of buying sufficient media silence to gain re-election is given in the following result:

Proposition 1 *There exists an equilibrium where the minimum cost for a bad incumbent to be re-elected is:*

$$C^* = \min_{s,n} \left\{ \frac{a\tau}{N_1^{nc}} s(1 - f_1)N_0^{nc} + \beta E \left[kx\lambda(1 - f_2)N_1^c + \frac{a\tau}{N_2^{nc}} z(1 - s)(1 - f_1)N_0^{nc} \right] \right\}$$

$$s.t. \quad E \left[\frac{N_2^c}{N_2} \right] \geq \frac{1}{2}$$

$$n \leq \bar{N} - N_0$$

Proof: See Appendix B.

To understand C^* from Proposition 1, note that the equilibrium cost of silencing outlet i equals the additional profit that the outlet would receive if it were to carry informative news instead, namely $\frac{a}{N_1^{nc}}$ in period 1 and $\frac{a}{N_2^{nc}}$ in period 2. The additional term $kx\lambda(1-f_2)N_1^c$ corresponds to “flipped” outlets who are rebribed in period 2 with an amount k . The cost of capture is simply the summation over all outlets that are silenced in equilibrium.

The first constraint in Proposition 1 represents the requirement that at least half of viewers and listeners stay uninformed by the end of the second period. Since in the baseline case all viewers and listeners are assumed to be inflexible, then buying a share $N_2^c = \frac{N_2}{2}$ is sufficient. The second constraint in Proposition 1 simply places an upper bound on the maximum number of licenses that the incumbent can give away. The cap on the maximum number of outlets becomes more relevant with broadcast media, where there is a clear bandwidth limit.

Comparative statics

It is clear from Proposition 1 what factors make capture more costly and thus less likely. It is more costly to capture media when media have a higher commercial motive (higher a), when there are regulatory structures that make bribing harder (higher τ), when the initial number of free media is higher (higher N_0^{nc}), when there is lower expected media loyalty (higher λ), and when the cost of rebribing media is higher (higher k). Interestingly, political accountability in the form of transparency and efficient news production (higher q) does not directly influence the cost of media capture.

Most of these results are consistent with Besley and Prat’s (2006) original framework. A few results, however, no longer hold in this setup. First, the effect of media independence on capture is now ambivalent. On the one hand, media independence is a form of institutional barrier that increases transaction costs (τ), thereby increasing the cost of capture. On the other hand, higher media independence also increases the fraction of outlets that are non-bribable (f_1 in period 1 and f_2 in period 2), thus reducing the number of outlets that can actually be bribed and, with it, the cost of capture.¹⁸

Second, initial media plurality also has an ambiguous effect on the cost of capture. Higher initial plurality (N_0) will result on higher or lower costs, depending on the proportion of those outlets that are captured (N_0^c) versus not captured (N_0^{nc}). In our setting,

¹⁸This setup differs from Besley and Prat (2006) by distinguishing bribable from non-bribable media. This distinction creates an additional effect of media independence through f_1 and f_2 .

what matters is not the initial number of outlets but the proportion of those that are captured versus not captured.

Third, the effect of a decrease in concentration (higher n) is also ambiguous and will depend on the probability that outlets (including new ones) turn against the incumbent or “flip” (λ) and on the probability that “flipped” outlets become completely independent and non-bribeable (f_2). Recall that the incumbent has an incentive to create new (captured) outlets because it is costless for him in the first period and because it can potentially increase his chances of reelection. However, the incumbent faces a tradeoff because, in the second period, a fraction of these newly-created outlets will turn against him and, of these, some will become completely shielded from future government influence. This will present an even higher cost for the incumbent in period 2 as the total number of outlets that the incumbent must rebribe in order to ensure reelection is now higher.¹⁹ Thus, even with inflexible viewers and listeners, increasing the number of outlets (i.e., decreasing concentration) affects the cost of capture by creating a tradeoff between lower costs in period 1 at the expense of higher costs in period 2. This contrasts with Besley and Prat’s (2006) baseline model where even when all viewers and listeners are inflexible, a decrease in concentration does not increase the cost of capture.

Following Besley and Prat (2006), I summarize these results in the following proposition:

Proposition 2 *The cost of capture C^* is an increasing function of the commercial motive a , the initial number of independent media N_0^{nc} , expected media loyalty μ , and the cost of rebribing media k . Media independence has two effects on the cost of capture C^* . The first effect, through transaction costs τ , is positive. The second effect, through the fraction of truthful media f_1 and f_2 , is negative.*

Proof

See Appendix B.

3.3.2 Equilibrium

The equilibrium conditions for the media to be captured are given by:

Proposition 3 Equilibrium can be of two kinds:

- i) If $C^* > r$, there is no media capture
- ii) If $C^* \leq r$, there is media capture with $\frac{N_2^c}{N_2} = \frac{1}{2}$

Proof

¹⁹The total number of outlets in the second period is $N_2 = N_1 = N_0 + n$. The incumbent must capture at least half of total outlets. Also note that the fact that recapturing is now more expensive means that it may become prohibitively expensive for the incumbent to bribe media at all, making it impossible for the incumbent to get reelected.

See Appendix B.

Proposition 3 simply states that bad incumbents will choose to capture media if the expected total cost of capture is low enough compared to the rents the incumbent can extract from office.

The following result gives the incumbent's optimal choices with media capture:

Proposition 4 *Equilibrium choices are as follows:*

(i) The optimal number of new licenses the incumbent will give away in period 1 is given by:

$$n^* = \frac{2a\tau}{k} - N_0$$

(ii) The optimal number of existing outlets the incumbent will bribe in period 1 is given by:

$$s^* = \begin{cases} \frac{1}{1-f_1} \left(1 - \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right) & \text{if } \frac{a\tau}{\beta k} > (1-\mu)N_0^{nc} \\ \frac{1}{1-f_1} \left(1 + \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right) & \text{if } \frac{a\tau}{\beta k} \leq (1-\mu)N_0^{nc} \end{cases}$$

(iii) The optimal number of “flipped” outlets the incumbent will recapture in period 2 is given by:

$$x^*(n^*, s^*) = \frac{k(N_0 + n^*) - 2(1-\lambda)kN_1^c + 2(1-2\lambda)a\tau N_1^c - 2(1-\lambda)[1-s^*(1-f_1)]kN_0^{nc}}{2\lambda(1-f_2)\{N_1^c(k-2a\tau) + [1-s^*(1-f_1)]kN_0^{nc}\}}$$

(iv) The optimal number of previously non-captured outlets the incumbent will capture in period 2 is given by:

$$z^*(n^*, s^*) = \frac{[1-s^*(1-f_1)]k(N_0 + n^*)N_0^{nc} - 2a\tau(N_0 + n^* - N_1^c)}{2(1-f_1)(1-s^*)N_0^{nc}(k\{N_0^{nc}[1-(1-f_1)s^*] + N_1^c\} - 2a\tau)}$$

Proof

See Appendix B.

Proposition 4 states that the intertemporal decision of the optimal number of new outlets the incumbent creates in period 1 is a function of the difference between the cost of bribing in period 1 relative to the cost of bribing in period 2 and the total number of existing outlets. The more costly it is to bribe, the more incentive the incumbent has to create new outlets in period 1 in order to ensure his reelection. However, the incumbent knows that creating more outlets also raises the costs in period 2, as he will have to bribe some of the newly-created outlets from period 1 that will not remain loyal to him. The term N_0 captures this future cost of creating new outlets. Notice that this cost is a function of *total* outlets. The reason is that, from the incumbent's first period perspective of future costs, what matters is not the number of outlets he has captured in period 1, but the number of outlets he expects to have captured in period 2, which is a function of total outlets:

$$E \left[\frac{N_2^c}{N_2} \right] = E \left[\frac{N_2^c}{(N_0 + n)} \right] = \frac{1}{N_0 + n} E [N_2^c] \geq \frac{1}{2}$$

According to Proposition 4, a key ratio in determining the optimal number of outlets the incumbent will bribe in the first period is $\frac{a\tau}{\beta k}$, which is the cost of bribing outlets in period 1 relative to the cost of bribing outlets in period 2. The incumbent compares this ratio to the expected number of initial non-captured loyal outlets, $(1 - \mu)N_0^{nc}$. The cheaper it is to bribe in period 1 relative to period 2, the more outlets he will chose to bribe in period 1 (higher s^*). Similarly, if the incumbent expects more media loyalty, he will chose to bribe more outlets in period 1, knowing that his cost in period 2 will not be as high because he will have to rebribe a smaller number of "flipped" outlets. The higher the relative cost of bribing in period 1 ($\frac{a\tau}{\beta k}$) compared to the expected number of loyal outlets ($(1 - \mu)N_0^{nc}$), the fewer outlets the incumbent will have to bribe in the first period in order to ensure reelection in period 2.

The optimal number of outlets captured in the second period (x^* and z^*) are harder to interpret, and suggest that the extent of capture may be context-specific and needs to be evaluated empirically. Not surprisingly, only the number of recaptured media x^* is a function of media loyalty. The following section discusses the intuition behind these findings in more detail.

3.4 Model Predictions

3.4.1 Media Outcomes

Incumbent's choices

Media predictions based on the incumbent's choices are summarized in the following result:

Proposition 5 *Given the incumbent's choices:*

(a) *The optimal number of new licenses created in the first period n^* is a non-decreasing function of the commercial motive a and transaction costs τ ; a non-increasing function of the cost of rebribing media in the second period k ; and a decreasing function of initial media plurality N_0 .*

(b) *If $\frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc}$, the optimal fraction of media bribed in the first period s^* is an ambiguous function of the fraction of non-bribable media in period 1 f_1 ; a decreasing function of transaction costs τ , the commercial motive a , and the probability that outlets turn against the incumbent μ ; and an increasing function of the cost of rebribing media in the second period k , the initial number of independent media N_0^{nc} , and the discount factor β .*

(c) *If $\frac{a\tau}{\beta k} \leq (1 - \mu)N_0^{nc}$, the optimal fraction of media bribed in the first period s^* is an increasing function of the fraction of non-bribable media in period 1 f_1 , transaction costs τ , the commercial motive a , and the probability that outlets turn against the incumbent μ ; and a decreasing function of the cost of rebribing media in the second period k , the initial number of independent media N_0^{nc} , and the discount factor β .*

(d) *The optimal fraction of media bribed in the second period, z^* and x^* , are ambiguous functions of all model parameters.*

Proof

See Appendix B.

Results in Proposition 5 are intuitive. A higher relative cost of bribing in period 1 makes bribing media outlets more expensive relative to creating new outlets that are initially “costlessly” captured. Thus, n^* is a non-negative function of a and τ and a non-positive function of k . Moreover, the number of existing outlets has two effects on n^* , both negative. First, given the restriction that $n \leq \bar{N} - N_0$, the higher the number of existing outlets N_0 , the lower the maximum number of new outlets the incumbent can create, n^* . Second, the higher the number of total outlets in period 2, which is a function of existing outlets N_0 , the more costly it is to capture them, so the incumbent will have a disincentive to create more outlets.

The way to interpret results (b) and (c) from Proposition 5 is as follows. When $\frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc}$, the incumbent will bribe fewer stations because he can instead create new stations that are costless in the first period. And, because the incumbent expects less media loyalty, it is cheaper for him to save resources from bribing today knowing that he will have to bribe more outlets tomorrow anyway. Thus, s^* will be a decreasing function of the relative cost of capture and an increasing function of expected loyal media and, therefore, a negative function of τ , a , and μ , and a positive function of k , N_0^{nc} , and β . Instead, when $\frac{a\tau}{\beta k} \leq (1 - \mu)N_0^{nc}$, the incumbent will be able to afford bribing more stations

knowing that media loyalty will be relatively higher and he will thus have to recapture fewer outlets. Thus, s^* will be an increasing function of the relative cost of capture and a decreasing function of expected loyal media and, therefore, a positive function of τ , a , and μ , and a negative function of k , N_0^{nc} , and β .

The reasoning behind the result that the effect of the fraction of non-bribable media in period 1 f_1 on first period bribing is ambiguous when $\frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc}$ is a result of the substitution effect between s^* and n^* . As pointed out in the last paragraph, when it is relatively more expensive to bribe, even if expected loyalty is low, it makes sense to create more outlets. This creates two opposite effects of the fraction of non-bribable media. On the one hand, if this fraction is higher, the incumbent is “forced” to bribe less outlets and instead create new ones. This has a negative effect on s^* . On the other hand, having less outlets to bribe in the first period, decreases the expected total cost of bribing. This has a positive effect on s^* . Therefore, the overall effect of non-bribable media on s^* is unclear. Instead, when $\frac{a\tau}{\beta k} \leq (1 - \mu)N_0^{nc}$, the effect of the fraction of non-bribable media on first period bribing is always positive because with more media loyalty the incumbent can substitute the lack of bribable media by creating new outlets. These new outlets will also be less likely to turn against him and will be less expensive because they are costless to bribe in period 1.

Finally, result (d) in Proposition 5 is not surprising and is at the core of the empirical findings of Chapter 2. From the perspective of period 1, the incumbent is unable to predict the total cost of capture in the second period in order to ensure reelection. It is entirely possible that, when period 2 arrives, the incumbent finds himself unable to secure a high enough number of outlets that suppress their signal, causing him to lose the elections. This may happen for two main reasons. First, the incumbent may be unable to bribe a sufficiently high number of outlets as a result of a higher-than-expected realized value of non-bribable media in the second period. Second, even if there are enough bribable outlets, he may be unable to afford capture due to a lower-than-expected realized value of media loyalty or due to having an even higher number of outlets to bribe as a result of creating n^* new ones. This last motive provides an explanation of why, in the short-run, creating new radio stations might have been a reasonable policy for the PRI to ensure reelection. Consistent with the results in this model and with the empirical findings from Chapter 2, this policy may have backfired in the long-run, costing the PRI its reelection at the local level.

Figure 3.1 and Tables 3.1–3.3 (constructed from the data described in Chapter 2) provide further evidence of the use of media license-granting and coverage changes for political ends. Figure 3.1 shows electoral cycles in media coverage, particularly during the PRI’s rule. The average number of new local stations per municipality increases as election years (highlighted with grey vertical lines) approach.²⁰ In addition, Tables 3.1–3.3

²⁰An alternative explanation for this pattern could be that information demand increases close to election years (e.g., Larcinese, 2007). However, the fact that broadcast coverage is not determined by outlets themselves but by the government, makes this possibility less plausible. Hughes and Lawson

present results for specification (2.3) of Chapter 2 for PRI and PAN vote shares, vote share changes, and reelection chances, respectively, during periods of PRI vs. PAN government control. Conditional on time-varying observables and controlling for municipal and year fixed effects, I find a statistically and economically significant negative effect of local radio ownership concentration on the PRI's voting outcomes, but only during the period of PRI's government control from 1990 to 2000. No such results are found for PAN vote shares when the PAN held the presidency and controlled license-granting (2000–2012). Thus, the electoral effects of changes in local media diversity are not driven by incentives to affiliate with the governing party. Rather, consistent with the theoretical framework, results suggest that this was a strategy followed only by the authoritarian PRI regime who systematically engaged in media capture through, among other methods, bribing. Results are robust to the inclusion of controls for overall media exposure (proxied by the total number of local media outlets), democratization trends (proxied by the share of local non-commercial outlets), and electoral participation.

I next discuss the effects of capture on the audience-related revenues of media.

Audience-related revenues

Let A be the sum of expected audience-related revenues for all outlets. If media is not captured, then total expected audience-related revenues is simply the probability that media observe a signal (and is thus able to collect audience-related revenues) times total audience-related revenues, i.e., $A = qa$. This is analogous to the result in Besley and Prat's (2006) baseline model. If media is captured, however, our results differ from the baseline case. The reason is that the *initial* attempt to capture media does not ensure the ability to pay off those outlets that need to be captured (or recaptured) after λN_1^c outlets betray the incumbent and threaten to switch sides. Once some outlets turn against him, the incumbent may not be able to afford new bribes if $r < C_1 + E[C_2]$. In that case, media will not suppress their signal so expected audience-related revenues are equal to μqa . If, however, the incumbent is able to rebribe media, then captured media outlets only produce uninformative news and expected audience-related revenues are equal to zero; media income comes from policy-related revenues (i.e., government transfers). These results are summarized in the following proposition:

Proposition 6 *The sum of expected audience-related revenues, A , is of two kinds:*

i) If there is no media capture:

$$A = qa$$

(2004) and Hughes (2006) also provide evidence that local media stations were systematically used to advance partisan goals.

ii) If there is media capture:

$$A = \begin{cases} \mu qa & \text{if } r < C_1 + E[C_2] \\ 0 & \text{if } r \geq C_1 + E[C_2] \end{cases}$$

Proof

See Appendix B.

The following section discusses the model's political implications.

3.4.2 Political Outcomes

The model implies the following predictions regarding turnover and welfare:

Effects on turnover

As in the case of expected audience-related revenues, if media is not captured, the probability that the incumbent is replaced by a rival (turnover) is analogous to Besley and Prat's (2006) baseline case. Once again, results change if media is captured. Because the incumbent cannot ensure media loyalty, turnover is equal to zero only if the incumbent is able to afford capture after the fraction λ of initially captured outlets has changed sides.²¹ If the incumbent is not able to afford "recapture", then turnover might still be possible, even with initial media capture. With media capture forgone in period 2, turnover becomes a function of expected media loyalty, μ .

I thus have the following result:

Proposition 7 *Expected turnover is of two kinds:*

i) If there is no media capture, expected turnover is:

$$T = (1 - \gamma)q$$

ii) If there is media capture, expected turnover is:

$$T = \begin{cases} (1 - \gamma)\mu q & \text{if } r < C_1 + E[C_2] \\ 0 & \text{if } r \geq C_1 + E[C_2] \end{cases}$$

Proof

See Appendix B.

²¹Recall that if voters receive no signal from media, they are indifferent between reelecting the incumbent or choosing a challenger of unknown type, but I assume they reelect the incumbent.

Thus, not surprisingly, the equilibrium with unsuccessful media capture in period 2 (i.e., with media capture only in period 1) yields a higher expected turnover among politicians than successful media capture in both periods, and a lower expected turnover than without media capture. I now turn to the effects of media capture on voter welfare.

Effects on voter welfare

Without media capture, voters' expected utility in period 1 is given by the probability that the incumbent is good. In the second period, voters' expected utility is given by $\gamma[1 + q(1 - \gamma)]$. With media capture, voters' expected utility in period 1 is, once again, given by the probability that the incumbent is good, γ , as in the case without media capture. There may be two outcomes in period 2 with media capture, however. If capture is ensured even after the incumbent loses some of its media "supporters" ($r \geq C_1 + E[C_2]$), voters are never able to identify bad incumbents and their expected utility is, once again, given by γ . If capture is not ensured ($r < C_1 + E[C_2]$), then voters' expected welfare in period 2 is given by $\gamma[1 + \mu q(1 - \gamma)]$.

I summarize these results as follows:

Proposition 8 *Voters' expected utility is of two kinds:*

- i) If there is no media capture, voter's expected utility in period 1 is:

$$E[U_1] = \gamma$$

And in period 2 it is:

$$E[U_2] = \gamma[1 + q(1 - \gamma)]$$

- ii) If there is media capture, voter's expected utility in period 1 is:

$$E[U_1] = \gamma$$

And in period 2 it is:

$$E[U_2] = \begin{cases} \gamma[1 + \mu q(1 - \gamma)] & \text{if } r < C_1 + E[C_2] \\ \gamma & \text{if } r \geq C_1 + E[C_2] \end{cases}$$

Proof

See Appendix B.

As expected, voter welfare is lower with media capture and the results from our extension with no media capture once again confirm the results in the baseline model by Besley and Prat (2006). With media capture ensured in period 2, our results are also analogous to the baseline case; without media capture ensured, however, the extension derived in this chapter predicts that expected voter welfare will be lower than without media capture, but higher than with successful media capture in both periods.

3.4.3 Underlying Parameters

Results from Propositions 6-8 show that the results from the baseline case in Besley and Prat (2006) extend to this more complex set-up. Total audience-related revenues, turnover of politicians, and voter welfare are increasing functions of the cost of capture and, thus, by Propositions 1 and 3, of μ , N_0 , a , and τ .²² Total audience-related revenues, turnover of politicians, and voter welfare are also increasing functions of media honesty, q .

3.5 Conclusion

The distribution of broadcast media licenses across countries tends to be highly discretionary, resulting in a larger scope for media capture. Though license-granting as a means of media capture is an important phenomenon, it has not received sufficient attention in the political economics literature. The main contribution of this chapter is integrating incumbents' media license allocation decision into a unified media capture model.

This extension of Besley and Prat's (2006) original media capture model follows a three-period political agency retrospective voting model to understand how new media licenses are granted, when media capture occurs, and the effects it has on political outcomes and voters' welfare. In my framework, the number of media stations that the government grants and the number of media stations it bribes are jointly endogenously determined by its goal of maximizing the likelihood of reelection. The model provides a framework to discuss the role of media capture and the tradeoffs that governments face when deciding the optimal number of licenses to allocate.

I first show that it is more costly to capture media when media have a higher commercial motive, when there are regulatory structures that make bribing harder, when the initial number of free media is higher, when there is lower expected media loyalty, and when the cost of rebribing media is higher. I also show that political accountability in the form of transparency and efficient news production influence the cost of media capture indirectly, and that media independence, initial media plurality, and media concentration have an ambiguous effect on the cost of capture.

I also show that the intertemporal choice of the optimal number of new licenses the incumbent grants and the optimal number of outlets he bribes in period 1 are both functions of the cost of bribing in period 1 relative to the cost of bribing in period 2. Moreover, I show that the optimal number of outlets captured in the second period is ambiguous, and suggests that the extent of capture when license-granting is possible may be context-specific and needs to be evaluated empirically. The reason is that, from the perspective of period 1, the incumbent is unable to predict with certainty the total cost of capture in the second period that he will need to cover in order to ensure reelection. This

²²The empirical results from Chapter 2 are consistent with a negative correlation between media plurality and turnover.

is at the core of the empirical findings of Chapter 2, which shows that increasing media plurality contributed to the PRI's electoral decline. A natural question to ask and that this chapter addresses is whether such expansion in local media, perhaps spurred by the government's dire need to increase support in the face of higher costs of media capture (as the model suggests), eventually reached its maximum "capacity" and prevented the government from engaging in such capture, thus leading to a fall in the PRI's popularity.

In addition, I show that the equilibrium with unsuccessful media capture in period 2 (i.e., with media capture only in period 1) yields higher audience-related revenues, turnover, and voter welfare than successful media capture in both periods and lower audience-related revenues, turnover, and voter welfare than without media capture in both periods. The model extension developed in this chapter can be further extended and complemented in a number of ways. For instance, viewers and listeners may not divide themselves equally among the media outlets reporting news, viewers and listeners may be "flexible" and willing to switch to a different media source, transfers may be state-dependent, and media loyalty may be endogenous.

The study of the government's media license allocation decision and the consequences this has on political outcomes highlights the importance of policies that reduce the discretionary power of governments in the granting of media licenses. It also emphasizes that, as long as governments maintain control of broadcast licenses, media freedom regulatory frameworks, market incentives, and limited direct government ownership, may not be enough to contain capture.

Figures and Tables

Figure 3.1: Average New Media Licenses per Municipality



Table 3.1: The Effect of Radio Ownership Concentration on PRI and PAN Vote Shares under PRI vs. PAN Governments

	PRI Vote Share 1990-2000			PRI Vote Share 2000-2012			PAN Vote Share 2000-2012					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration	0.034*** (0.004)	0.036*** (0.004)	0.037*** (0.004)	0.037*** (0.006)	-0.008* (0.005)	-0.008 (0.005)	-0.007 (0.005)	0.008 (0.007)	0.021*** (0.007)	0.021*** (0.007)	0.022*** (0.007)	0.013 (0.010)
Total outlets		-0.011*** (0.001)	-0.011*** (0.001)	-0.012*** (0.002)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.006*** (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.002 (0.002)
Share non-commercial		0.035 (0.035)	0.035 (0.035)	0.140*** (0.052)			-0.076** (0.035)	-0.104** (0.048)			-0.069 (0.046)	0.063 (0.065)
Turnout				-0.004*** (0.000)					-0.001*** (0.000)			0.001* (0.000)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6268	6268	6268	4131	8025	8025	8025	4223	7729	7729	7729	4040
F	95.669	96.101	89.717	48.297	3.654	4.018	4.033	3.113	11.342	10.730	10.102	3.631

Note: All specifications include municipal and year fixed effects. All dependent variables are measured in percentages of total vote. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table 3.2: The Effect of Radio Ownership Concentration on PRI and PAN Vote Share Changes under PRI vs. PAN Governments

	PRI Vote Change 1990-2000			PRI Vote Change 2000-2012			PAN Vote Change 2000-2012					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration	0.025*** (0.004)	0.028*** (0.005)	0.031*** (0.005)	0.008 (0.009)	-0.001 (0.006)	-0.001 (0.006)	-0.003 (0.006)	0.005 (0.008)	0.014** (0.007)	0.014** (0.007)	0.014** (0.007)	0.014** (0.009)
Total outlets		-0.008** (0.004)	-0.011*** (0.004)	-0.028*** (0.007)		-0.001 (0.002)	0.001 (0.002)	0.017*** (0.006)		-0.000 (0.003)	0.001 (0.003)	-0.005 (0.007)
Share non-commercial			0.237*** (0.040)	0.948*** (0.140)			-0.188*** (0.034)	-0.167** (0.071)			-0.057 (0.048)	-0.093 (0.096)
Turnout change				-0.003*** (0.000)				-0.003*** (0.001)				0.002*** (0.001)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4919	4919	4919	2025	8000	8000	8000	2351	7306	7306	7306	2132
F	27.710	26.212	25.590	22.279	33.403	30.831	31.588	4.538	8.842	8.162	7.630	3.501

Note: All specifications include municipal and year fixed effects. The dependent variables are measured in changes of total vote percentage points. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table 3.3: The Effect of Radio Ownership Concentration on the Probability of PRI and PAN Reelection under PRI vs. PAN Governments

	Pr(PRI reelection) 1990-2000			Pr(PRI reelection) 2000-2012			Pr(PAN reelection) 2000-2012					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration	0.061*** (0.012)	0.070*** (0.012)	0.071*** (0.012)	0.103*** (0.018)	0.032 (0.022)	0.031 (0.022)	0.032 (0.022)	-0.012 (0.032)	0.049*** (0.014)	0.048*** (0.014)	0.047*** (0.014)	0.033 (0.021)
Total outlets		-0.034*** (0.004)	-0.035*** (0.004)	-0.024*** (0.007)		-0.008 (0.006)	-0.008 (0.006)	-0.007 (0.008)	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.003)	0.006 (0.006)
Share non-commercial			0.094 (0.097)	-0.195 (0.152)			-0.060 (0.137)	-0.318 (0.215)			0.107 (0.085)	0.429*** (0.139)
Turnout				-0.004*** (0.001)				-0.004*** (0.001)				-0.002*** (0.001)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6275	6275	6275	4134	8034	8034	8034	4227	8034	8034	8034	4227
F	31.951	33.108	30.849	14.863	6.277	5.994	5.611	3.171	4.795	4.448	4.141	4.377

Note: All specifications include municipal and year fixed effects. The dependent variables are measured in percentages. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Chapter 4

The Political Economics of Violence in Mexico: The Role of Government Coordination¹

¹This chapter, with minor modifications, was published in Spanish as: “Sinaia Urrusti Frenk. La violencia como consecuencia de la falta de coordinación política. *Las bases sociales del crimen organizado y la violencia en México*. Ed. José Antonio Aguilar Rivera. México: Centro de Investigación y Estudios en Seguridad, Publicaciones de la Secretaría de Seguridad Pública, 337-369, 2012.” The work was published in 2012, when the PAN still held the presidency. In the federal elections of 2012, the PAN lost against the Institutional Revolutionary Party (*Partido Revolucionario Institucional*, PRI). I thank José Ernesto Urrusti Frenk for invaluable help translating this chapter.

4.1 Introduction

A central and relatively understudied topic in political economy is the causes and consequences of armed conflicts², especially those related to organized crime. One of the biggest gaps in this subject is the study of the role of cohesion within the groups involved in a conflict. This is, precisely, the topic dealt with in this chapter, which focuses on understanding one of the institutional causes of the level of drug trafficking-related violence in Mexico: political coordination measured through party alignment between the federal, state, and municipal levels of government. Thus, by analyzing political coordination as one of the key elements of the federal government’s strategy on the so-called “fight against organized crime”, this study contributes to the debate over the causal relationship between the aforementioned strategy and the rise of violence in Mexico.

In the fight against organized crime, whose protagonists are the federal government and organized crime groups, local and state authorities are crucial actors that impact the strategy’s effectiveness. For example, Guerrero (2011) maintains that the lack of cooperation of local authorities may explain the negative results regarding their combined operations, since state and municipal police forces make up the greater part of the country’s security forces.³ The author highlights that Baja California, strangely enough the only state with combined operations with a *panista* governor⁴ at a large scale, is also the only case of success. The main hypothesis of this study is that the lack of coordination between the federal government and the state governments leads to a greater level of violence.

There are many ways to conceive the level of political coordination. In this study, political coordination is defined as the degree of party alignment between the federal, state, and municipal levels of government. Amongst the various political factors that affect the effectiveness of the government’s strategy against organized crime, the capacity to coordinate actions with local governments is, without a doubt, a very relevant one. In order for actions against organized crime to be effective, they require information about actors, routes, and geography, amongst other elements of the local surroundings. This ability to coordinate actions, which to a large extent depends of the party alignment, is a measure of the level of government cohesion. On the other hand, in this study we define the institutional causes of violence as the “rules of the game” (North, 1990) that directly influence the observed level of violence.

Table 4.1 shows summary statistics for deaths per 100,000 inhabitants occurring in armed conflicts between criminal groups and authorities in 2010 for each state in the

²The study of the causes and consequences of armed conflicts has been thoroughly studied in many disciplines, but less so in the field of political economy. In recent years, this literature has grown. Blattman and Miguel’s (2010) article contains a detailed summary of the most important contributions.

³Municipal and state policemen constitute 90% of the country’s police force, as Guerrero (2011) points out.

⁴*Panista* means belonging to the *PAN*, an acronym for the National Action Party (*Partido Acción Nacional*).

country. The five states with greater death incidence are governed by a different party than that of the federal government, the National Action Party (*Partido Acción Nacional*), henceforth “PAN”; Durango, Nuevo León, Sinaloa, and Tamaulipas are governed by the Institutional Revolutionary Party (*Partido Revolucionario Institucional*), henceforth “PRI”, and Guerrero by the Party of the Democratic Revolution (*Partido de la Revolución Democrática*), henceforth “PRD”. Although it is far from being conclusive, this pattern gives us a first clue about the probable importance of party alignment on the level of violence.⁵ Only deaths related to conflicts with authority were analyzed in this table because it is very likely that this type of violence depends more on the government’s strategy efficiency. However, the empirical analysis of this study uses the number of deaths per 100,000 inhabitants that happened in total armed conflicts, as a more comprehensive measurement of violence.

Finally, it is important that we define what we understand by “effectiveness of the strategy to fight organized crime”. There are many ways to measure the effectiveness of the federal government’s strategy. In this study, we posit that a crucial component of this effectiveness is the ability to contain the violence caused by the federal government’s actions against criminal organizations. Clearly, it is difficult to avoid violence in the short-term. Firstly, because these offensives constitute violent acts in and of themselves. Secondly, because having broken the balance of power, the new balance takes time to reconstitute and, in this transition period, causes greater violence until the belligerent parts cease to take part in more violence and power reaches an equilibrium. In the mid and long-term, however, part of the effectiveness of the strategy against organized crime must be measured by the ability of containing violence. In most instances in Mexico, this mission has not been achieved,⁶ and this study will explore one possible cause of this failure.

The question of the structural causes of violence is very relevant for the strategy of the government’s fight against organized crime. Researchers must focus not only on understanding the immediate causes of violence, but also on the mechanisms that regulate these causes. This is, precisely, the perspective taken in this chapter. Based on Dell’s (2011) findings – that the government’s actions, when launched in municipalities governed by the PAN, cause a rise in violence – I will attempt to understand the mechanism that causes this pattern in the data. Dell (2011) only provides us with indicative mechanisms that may explain the pattern, making it difficult to derive from them both public policy recommendations and clear implications for the implementation of a strategy in the fight against organized crime.⁷

⁵It is a rather inconclusive clue partly because four of the five states with the lowest death incidence rate (excluding those with no incidence) are governed by the PAN.

⁶Even though some authors, like Guerrero, have found that the levels of violence have stabilized, violence has not decreased in most of the affected municipalities. For more information, see Beittel (2012) and Guerrero (2011).

⁷Dell makes a thorough and informative econometric study about the effects of the spread of violence from one municipality to another. However, her findings regarding the mechanisms through which violence

After summarizing various theories about the rise of violence in Mexico in Section 2, my goal is to convince the reader that political coordination between the federal government and local authorities is an important element to achieve the effectiveness of the campaign against organized crime. Section 3 deals with the role of political coordination and the mechanisms through which the federal government's strategy effectiveness – and, with it, the level of violence – are affected. Section 4 focuses on the empirical analysis and research design. To support the hypothesis presented in this chapter, I will provide empirical evidence through an individual and time fixed effects regression analysis. This empirical strategy allows us to measure the impact of political coordination on violence at the municipal level and makes the comparison among very diverse municipalities possible. For the reader who is not familiar with econometric strategies, I will try to explain the procedure in a way that allows the main results to be understood intuitively, without the need to fully comprehend the technical details. Section 5 describes the data. Section 6 presents results and discusses the main findings. The final section presents the conclusions and public policy implications of my results regarding the fight against organized crime.

4.2 Explanations about the Rise of Violence in Mexico

Contrary to common belief, illegal markets are not intrinsically violent. Snyder and Durán-Martínez (2009) posit that violence in illegal markets arises when there are no “state-sponsored protection rackets” or government protection spheres, which they define as “*informal institutions through which public officials refrain from enforcing the law or, alternatively, enforce it selectively against the rivals of a criminal organization, in exchange for a share of the profits generated by the organization*” (Snyder and Duran-Martinez, 2009 p. 254). When such spheres of protection are weakened or disappear, as has been the case in Mexico since the 1980s, violence surfaces.

In Mexico, beginning in the 1980s, the spheres of state protection were weakened due to greater political competition, to reforms of the Procuraduría General de la República (PGR) seeking to reduce corruption, and to changes within the Mexican drug market's industrial organization, such as the increase in the number of dealers (Snyder and Duran-Martinez, 2009 p. 262). In Mexico today, we see a similar phenomenon but at a larger scale. The spheres of protection have weakened even further due, firstly, to the fragmentation of criminal groups which has caused an increase in the number of criminal organizations and, secondly, to the strengthening of policies aimed at fighting corruption of federal, state, and local security forces (Guerrero, 2011). Lessing (2011) goes even further and suggests that the fact that criminal groups react violently when facing govern-

risers in PAN-governed municipalities are not conclusive. Her hypothesis is difficult to prove because there is no data about the government's offensives and her model relies on the assumption that there is a higher probability that the PAN implements attacks in municipalities that are governed by this party.

ment's offensives is, actually, an unusual phenomenon. The reason is that, by definition, such criminal groups do not fight to win a conflict against authorities. In other words, they do not seek to take control of government, but to avoid that the latter interferes with their illicit activities. Seen from this perspective, it seems clear that cartels gain little by fighting against authorities because, given the very definition of criminality and the fact that criminals operate outside the law, they cannot win concessions, at least not officially. Thus, Lessing (2011) holds that criminal groups, to a lesser or greater extent, always face a certain degree of repression and, by reacting to it, they only cause an even greater level of state repression. If this is the case, then, what has caused criminal organizations' violent reaction in Mexico? What are criminal groups' incentives to react violently against government offensives?

4.2.1 The Incentives to React Violently

According to Lessing (2011), there are what he refers to as "logics of violence", i.e., factors that explain criminal groups' incentives to respond violently.⁸ The first and foremost element for the author, which coincides with Dal Bó *et al.* (2006) findings as well as with Snyder and Duran-Martinez (2009) framework, is the use of violence to intimidate authorities and officials with the purpose of decreasing the price of bribes. That is, violence is a strategy used by criminal groups in order to increase profits from criminal activities.

Lessing (2011) holds that the greatest obstacle when facing violence resulting from this mechanism is the lack of "conditionality" in government offensives. The idea, also proposed by Guerrero (2011) and in agreement with the theories exposed by Kleiman (2011), is that the federal government has not undertaken "differential" repression towards more violent criminal organizations and, thus, has not provided incentives for criminal groups to reduce violence. In other words, the Mexican government has not followed a strategy of *conditioned* offensives based on the level of violence inflicted by organized crime groups. The basic idea behind this approach is that what matters is not the punishment's severity, but that the punishment is consistent. Within our context, a consistent punishment would be a conditional punishment linking the violence inflicted by criminals with the degree of government repression or sanctioning. In Lessing's (2011) theoretical framework, the author proves that, when government's offensives are sufficiently conditional, they dissuade criminal groups from following a violent strategy against the state. So the question then is: why has the government not followed a strategy of offensives conditional on the level of violence?⁹

Lessing's (2011) answer is clear: the federal government is unable to apply a conditional strategy for two main reasons. The first reason, closely related to this chapter's hypothesis,

⁸There are few theoretical studies about the incentives behind actors participating in organized crime armed conflicts. Lessing's (2011) study is one of the few works focused on understanding this phenomenon.

⁹There is evidence that the federal government has attempted to follow a more conditional strategy in recent months. This has been suggested, for example, by Guerrero (2011).

is the institutional structure, which is characterized by vertical fragmentation (between levels of government) and horizontal fragmentation (between public security institutions). My hypothesis fully coincides with the idea that the political and institutional fracture of the Mexican security system is an important impediment to the government's strategy. This is because the lack of political coordination between the different levels of government (federal, state, and municipal) is one way of thinking about this institutional fracture. The second reason is the rhetorical commitment that the federal government has to enforce the law equally and without exceptions. The implementation of a conditional strategy would imply an unequal repression policy that "favors" certain criminal groups over others, and the justification of such strategy would be difficult and could entail important political costs.¹⁰

The second "logic of violence" identified by Lessing (2011) is the use of violence by criminal organizations as a strategy to force authorities into negotiations. This mechanism is interesting because it closely relates to an alternative hypothesis of Dell's (2011) findings, which I describe in the following subsection. The third factor that Lessing (2011) identifies as a possible explanation of the rise of violence in Mexico is the multiplicity and volatility of cartels' structure through signaling and reputation building. Examples of such signals are conspicuous murders and the different types of torture that frequently entail a specific message regarding the reason of the torture or murder of the victim. This mechanism of reputation building is, without a doubt, an important one that has been highlighted by a number of experts in the subject, such as Gambetta (1996, 2009) and Varese (2001, 2011). Finally, Lessing (2011) posits that there is a fourth "logic of violence": *calentar la plaza*. This is a mechanism through which criminal groups use violence in order to weaken enemy organizations. They do this by deceiving authorities regarding the authorship of such violent acts and attributing it to rival groups. It is precisely this mechanism that prevents the correct interpretation of the well-known narco-messages' purpose and origin.

4.2.2 The Spiral Effect

Besides the reasons behind organized crime's incentives to resort to violence, there are several hypotheses regarding what causes the escalation in the level of violence. Dell (2011) holds that quarrels among criminal groups to take over territories controlled by other weakened groups are a root cause of the rise in municipal violence in Mexico. When the government strikes against one group, rival groups exploit its weakened position and seek to take control of its territory. An alternative hypothesis to Dell (2011) is that violence increases in municipalities where the PAN wins elections, not because this party introduces

¹⁰Lessing (2011) makes an interesting comparison between Brazil, Colombia and Mexico. He explains that the strategies of Brazil and Colombia were effective in weakening criminal organizations without increasing violence levels due to the implementation of conditional strategies. These conditional strategies were possible because the political environment allowed the government to overcome both institutional fractures as well as rhetorical impediments.

offensives against organized crime groups with a higher probability, but because criminal groups use violence to intimidate recently elected authorities. If criminal groups find it easier to operate without punishment in *panista* municipalities, this alternative hypothesis would also be consistent with the finding that violence only increases in municipalities where the PAN wins elections and not in those where another party is elected.

In contrast, Lessing (2011) sustains that government's offensives cause a wave of violence, but only when they occur within a context of widespread corruption¹¹ and when repressions are "unconditional", as we described in the previous section. In line with this logic, the author also explains that we have witnessed a "spiral effect" of violence as a consequence of the combined effect of organized crime groups' weakening and fragmentation and the decrease in the cost of violence. The logic here is that, the higher the level of violence, the lower the government's ability to control or oppress it. Indeed, the more criminal groups emerge or the greater the level of violence they inflict, the lower the government's capacity to crack them down and, thus, the lower the incentive to act less violently.

The Mexican federal government has suggested an alternative hypothesis that conceives the rise of violence as a cause of the fight against organized crime and not (or not only) as a consequence.¹² Ríos (2011) also supports the notion that violence is not a product of the government's actions and the resulting weakening and division of criminal groups, but the consequence of changes in the criminal industry's organization. The author posits that violence has risen¹³ due to greater competition between drug-trafficking groups and to a diversification of their activities venturing into more violent markets. Ríos (2011) explains that, amongst other reasons, competition among drug-trafficking groups rose when intermediary cells separated from the main organizations to which they belonged. This separation occurred because market conditions reduced the benefit of remaining loyal. Thus, a vicious cycle of increasing violence emerged with more players, more secession battles, greater fragmentation, and so on. There is certain empirical support of this perspective because, as some authors have documented, violence was increasing in Mexico even before the beginning of the fight led by President Felipe Calderón.¹⁴ For example, homicides doubled during President Vicente Fox's administration (Ríos, 2011 and Lessing, 2011)¹⁵ And, clearly, other changes such as the growth of the local drug-consumption market may have also contributed to the rising number of criminal groups.

¹¹The mechanism here has to do with the equilibrium price of bribes.

¹²For example, the Interior Minister, Alejandro Poiré, published on his blog in the Presidency's website the reasoning that "The causes of criminal violence precede this Administration" as evidence against "*The third false myth*: that the presence of authority systematically detonates violence".

¹³Guerrero (2011) also documents that the number of extortions began rising before 2006.

¹⁴Other authors hold that violence decreased since the nineties until Felipe Calderón's six-year Presidential term. For example, Escalante and Aranda (2009) document that the national homicide rate decreased every year from 1992 to 2007.

¹⁵Guerrero (2011) also documents that the number of extortions had been increasing since before 2006.

The majority of the hypotheses laid out in this section predict that when the federal government launches an offensive against organized crime, violence will increase, at least in the short and medium terms. This chapter finds that this is not always the case. The effect of government offensives against organized crime depends on political coordination. When the federal government coordinates its offensives with local authorities, violence decreases in the short and medium terms, even though government offensives constitute in and of themselves an immediate increase in violence. Thus, this study shows that the mechanisms laid out by authors like Dell (2011) and Lessing (2011) depend, to a large extent, on the degree of political coordination between the federal and local levels of government.

4.3 Political Coordination

When the federal government is able to coordinate with local authorities, several mechanisms may make it easier to avoid the escalation of violence. First, coordination facilitates the implementation of a dual strategy in which the government attacks criminal groups while gaining control over their territory. Government territorial control is an essential factor to avoid the escalation of violence because it prevents rival groups from disputing control over the territory previously dominated by the now weakened group.

This mechanism through which violence escalates as a result of competition among criminal groups fighting over the control of land, is precisely the one behind Dell (2011) and other authors' findings. If the government has the ability to secure territories through a greater coordination with local governments, it is harder for rival cartels to secure routes and territories that were previously controlled by the weakened group because the relocation to new areas and the control of new routes is difficult and costly for cartels (Varese 2001, 2011) and local criminal organizations.

This logic clarifies an apparent paradox in the works of Dell (2011) and Rios (2011), who provide evidence that violence rises as a result of new actors fighting for control over the territories of rival, weakened criminal groups once the government takes forceful actions against organized crime. Their argument assumes that the government does not take control of territories once the weakened criminal groups move to other regions. However, there are situations where the government manages to capture and dominate the places in dispute and to undercut cartels' supply chains, thereby increasing the cost for new cartels to claim this territory.

Second, political coordination enables a more efficient deployment of police and military forces. For instance, Guerrero (2011) documents that there is a substitution of state and municipal police forces by the federal police, probably because the government manages to coordinate with local governments in certain territories where a greater presence of federal forces is required. The author also highlights that, although forceful actions have been taken to weaken criminal organizations, the relationship between present security measures and a greater level of public safety is not clear. This coincides with the

hypothesis in this chapter because the state’s ability to control territories and contain violence depends on the level of local coordination. It is very likely that safer areas are also areas with a higher degree of political coordination.

Thirdly, cooperation with local authorities makes information exchange easier. This is clearly explained by Lessing (2011), who posits that one of the reasons why the government is unable to implement a conditional strategy is the political and institutional fragmentation of the security sector. The exchange of information is a critical component for the success of any strategy that requires collaboration between federal and local authorities. Even though it is difficult to establish the relative importance of each of these possible mechanisms through which political coordination would lead to a lower level of violence, it is reasonable to believe that they all have a direct impact on the effectiveness of the strategy to fight organized crime.

4.4 Empirical Analysis

4.4.1 Econometric Design

As we have explained, this chapter’s hypothesis is that a greater degree of coordination with state authorities leads to a lower level of violence, i.e., to a more effective strategy in the fight against organized crime. The empirical analysis employs an individual and time fixed effects regression approach to estimate the impact of political coordination on the level of violence. The purpose of a fixed effects regression is to control for individual characteristics (in this case, the characteristics of the 2456 municipalities in the country) and for time effects (in this case, the years 2006 to 2011) that may have an effect on the relationship of interest. The idea is that, by removing municipal and year effects from the analysis, we will have the “true” effect of political coordination on violence.

In its simplest form, the fixed effects regression of this study is given by the following equation:

$$violence_{i,t} = a_i + d_t + b_1 coord_{1i,t} + b_2 coord_{2i,t} + b_3 coord_{3i,t} + e_{i,t}$$

where $violence_{i,t}$ is the level of violence observed in municipality i and year t , a_i are fixed effects of each municipality i , d_t are year t fixed effects, b_k for $k = 1, 2, 3$ is the effect of political coordination or party alignment ($coord_{ki,t}$ for $k = 1, 2, 3$) on violence, and $e_{i,t}$ is the residual error term.

Given the panel-structured dataset that contains repeated observations for each municipality from 2006 to 2011, the fixed effects model identifies the causal impact of the level of political coordination on violence, provided that we deal with municipal and annual fixed effects (a_i and d_t , respectively) as estimation parameters. It is worth clarifying that, even though the fixed effects model controls for a type of omitted variable, it does account for all omitted variables. Moreover, the fixed effects model does not eliminate the problem of endogeneity because the degree of political coordination is not randomly assigned

across municipalities. On the other hand, a disadvantage of the fixed effects model is that it is very susceptible to attenuation bias, which arises as a result of measurement error. This problem may impose a lower bound on the magnitude of the estimated impact, leading to an underestimation of the effect of coordination on violence. Similarly, a common problem in studies that exploit panel variation is that, by removing individual and time effects, they also remove both noisy variation (that which would seem to be part of the causal effect of political coordination on violence, but in reality is not) and informative variation (that which, in effect, is part of the causal impact). For all these reasons, it is important to interpret the estimation of fixed effects models with some caution.¹⁶

The following section describes the variables in more detail.

4.4.1.1 Independent variable

In the estimation of our hypothesis, the independent variable is an indicator variable of the level of political coordination, $coord_{ki,t}$ for $k = 1, 2, 3$, which takes a value of one when the municipality in question has that level of party alignment and a value of zero when the municipality in question has another level of political coordination. The highest level of coordination ($coord_{1i,t} = 1$) is defined as both state and municipal governments being ruled by the PAN, which governs at a federal level and is the protagonist of the fight against organized crime. The second highest level of coordination ($coord_{2i,t} = 1$) is defined as the state government belonging to the PAN, but the municipal government belonging to another party. The third level of political coordination ($coord_{3i,t} = 1$) occurs when the municipal government is from the PAN, but the state government is not. The last and lowest level of political coordination ($coord_{ki,t} = 0$ for $k = 1, 2, 3$) occurs when both state and municipal governments belong to parties other than the PAN.

It is necessary to make several clarifications at this point. First, party alignment is clearly an imperfect measure of coordination among levels of government. However, insofar as party alignment facilitates coordination among levels of government, it will serve as a good approximation of the degree of coordination. Clearly, many other factors affect the degree of government coordination. A high level of political coordination can be achieved even when the executive powers of the three levels of government belong to different parties. For instance, although the fight against organized crime is mainly a PAN-sponsored policy, there are many political leaders from other parties that celebrate and support it.¹⁷ Similarly, other factors such as the quality of local public security institutions, may prevent political coordination even when there is party alignment. However, simplifications in the analysis are necessary in order to estimate the empirical model.

¹⁶These problems could be attenuated by using complementary empirical strategies such as instrumental variables.

¹⁷For example, two recent cases in which PRI leaders have openly shown their support of the federal government's fight against organized crime are the current governors of Hidalgo, José Francisco Olvera Ruiz, and Chiapas, Juan José Sabines Guerrero. Although their statements cannot be taken as proof of real support, the examples are illustrative.

Second, our measurement of party alignment focuses on the executive powers of the three levels of government: the presidency, state governors, and mayors. Once again, this is a necessary simplification for the empirical analysis. Although this chapter's research does not directly include other relevant local government spheres such as local congresses, the municipal fixed effects term controls for individual variation. Thus, the results presented here are conclusive within the framework of this methodology.

4.4.1.2 Dependent variable

The dependent variable of the empirical analysis is the level of violence ($violence_{i,t}$), measured in two different ways. The first measure is the number of organized crime-related deaths per 100,000 inhabitants, as a result of confrontations with authority. The second measure is the number of organized crime-related deaths per 100,000 inhabitants, resulting from any type of confrontation¹⁸ This last variable includes deaths from confrontations between rival criminal groups, which constitute the largest number of victims. Our preferred dependent variable is the number of deaths from confrontations with authorities and not the number of deaths from overall confrontations because it is precisely this type of violence, between criminal groups and police or military forces, that is more likely to be affected by the federal government's strategy to fight organized crime. The fact that this study distinguishes the type of violence based on the actors involved in the conflict (either the government against criminal groups or rival criminal groups amongst themselves) is a contribution to the existing literature. However, there are other ways to categorize types of violence.

Guerrero (2011) classifies violence according to its driving force. The author distinguishes two types of violence. The first is violence caused by cartels, which is mainly directed against authorities and opponents, and is a result of activities related to drug trafficking. Its main purpose is “[...] to maintain or gain control over drug trafficking routes, points of entry and exit, and distribution markets.” (Guerrero 2011, p. 27). The second type of violence is caused by local organizations or gangs, arises from mafia-like activities, and is “[...] directed towards rivals, authorities or citizens. When it is directed toward citizens, the main purpose is to gain profits given that these DTO's¹⁹ have a

¹⁸Data from the Executive Secretariat of the National Public Security System (*Secretariado Ejecutivo del Sistema Nacional de Seguridad Pública*, SESNSP) classifies events and deaths that occurred as a result of executions, confrontations, or attacks against authorities. This study focuses on deaths that result from confrontations. However, the analysis is robust to the inclusion of other violence measures, such as the number of total confrontations and the number of confrontations between presumed members of organized crime and authorities. On the one hand, the available data allows the distinction between violence from confrontations between the government and criminal groups, and violence from confrontations among rival criminal groups. On the other hand, there are two different measures of violence: the number of deaths and the number of confrontations. The results are similar using these different violence measures. Other measures of violence such as executions, kidnappings and extortions are less adequate for our analysis because it is harder to establish their origin at a municipal level.

¹⁹DTOs stands for drug trafficking organizations (author's note).

marginal role in the drug trafficking business.²⁰ When directed towards rival gangs and authorities, the purpose of this type of violence is to keep or gain control over a limited territory (a few blocks or a neighborhood) in which the organization could run its illegal activities.” (Guerrero 2011, p. 27). Guerrero also clarifies that mafia-ridden violence is a more recent phenomenon than violence as a result from drug trafficking activities.

Although Guerrero’s (2011) violence categorization is insightful, it is difficult to evaluate it empirically. First, because it is not easy to distinguish if a criminal organization is fighting for a drug trafficking route or for a small territory. How can we identify if a cartel, local organization, or gang is fighting for a route, an access or exit point, a distribution market or a limited territory? One could also argue that, frequently, cartels seek to gain control of a limited territory and local organizations and gangs seek to expand their area of control beyond a limited territory. This would lead to the conclusion that cartels are responsible of the violence that arises from drug trafficking activities and not for the violence that arises from mafia-like activities.

What is clear is that a comprehensive analysis of the evolution of violence and its causes would require more detailed data about different types of violence. For example, one of the patterns that has emerged from information compiled by media and agencies like Stratfor is that violence in Mexico has not only been increasing (Guerrero, 2011) but has also become more brutal (Beittel, 2012),²¹ both in terms of the means used, and in terms of its objectives. Lessing (2011) finds that some types of violence, such as torture, mutilation, and narco-propaganda, distinguish Mexico’s violence from that observed in other countries suffering from drug trafficking-related violence, like Brazil and Colombia. To study the causes of this phenomena, more detailed data of the characteristics of violent incidents is needed, such as information about violence by type of victim (organized crime, public security, government, civilian, etc.), the type of violence seen in victims (tortures, mutilation, etc.), the presence of public security forces (federal, state, or municipal police, military forces, etc.), and corruption incidence linked to organized crime in both high and low-ranking security force officers, amongst other data.

4.5 Data

The dataset used for the empirical analysis was compiled by the author from various sources. Information about events and deaths associated to organized crime comes from the “deaths from presumed criminal rivalry” dataset (*Base de datos de fallecimientos ocurridos por presunta rivalidad delincuencia*) from December 2006 to December 2010

²⁰Local organizations play a significant part in the drug *distribution* market, but less so in the drug *trafficking* market (author’s note).

²¹Also, Guerrero (2011) and Lessing (2011) document that there has not only been an increase in the spread of violence, but also an increase in its intensity. Guerrero (2011) also finds that there has been a shift towards a greater incidence of violent events that affect civilians, such as kidnappings, extortions, and car thefts.

and from January to September 2011, compiled by the SESNSP and provided by the Office of the General Prosecutor (*Procuraduría General de la República*, PGR). Data on the presence of the criminal group *Los Zetas* at a municipal level was built by the author based on various confidential sources of the Mexican federal government.²² The data on electoral results at a municipal level (2005 – 2011) comes from the Elections in Mexico (*Elecciones en México*) website, which collects electoral results through a collaborative effort between the Federal Electoral Institute (*Instituto Federal Electoral*, IFE) and the Local Electoral Institutes (*Institutos Electorales Locales*). Data on governorship elections (2006 – 2012) was compiled by the author using IFE’s data.

Before moving on to the discussion of results from the fixed effects model, Table 4.2 presents the data’s summary statistics for each level of political coordination and their difference across municipalities.

As Table 4.2 shows, municipalities with different levels of political coordination vary significantly in a number of important characteristics, and are thus not comparable with each other. This difference among municipalities with different levels of political coordination is precisely what prevents us from making a direct comparison between municipalities that have political coordination or party alignment with those that do not. Instead, we must use a fixed effects model to draw such comparison and calculate effects.

4.6 Results

Table 4.3 shows the results from the municipal and year fixed effects model using deaths taken place in confrontations with authority per 100,000 inhabitants as the dependent variable. Table 4.4 replicates the exercise using deaths occurred in total confrontations, including those among rival criminal groups, as the dependent variable.

The first column of Table 4.3, which presents results of the municipal and year fixed effects model in its simplest form, shows that political coordination between the federal and state governments (*Coord2*) is what matters in containing violence and making the strategy against organized crime more effective. When a municipality changes from not having political alignment with the federal government (i.e., both state and municipal governments belong to parties other than PAN) to having a PAN governor, the number of deaths is reduced by 1,635 deaths per 100,000 inhabitants, compared to the average 1,330 deaths per 100,000 inhabitants in municipalities without political coordination. The effect is significant at the 1% level. This implies that the effect’s magnitude is very considerable – on average, the number of deaths decreases more than 120%. Nevertheless, we must again emphasize that this does not measure a causal impact, because the election of candidates that belong to different political parties is not a random phenomenon and, thus, neither is our measurement of political coordination.

²²Unfortunately, there is no public information about the presence of criminal groups in Mexico, so several authors have had to rely on federal government’s confidential sources (Dell, 2011). The data used in this analysis has been confirmed by various such confidential sources.

According to our analysis results, when there is complete party alignment among the federal government, state government and municipal government ($Coord1 = 1$), municipal violence incidence is lower. However, this result is not statistically significant, so we cannot conclude that complete political coordination is a relevant factor for the containment of violence. The same occurs with party alignment between the federal government and the municipal government, measured with the variable $Coord3$, which does not have a significant impact on the level of violence. It is interesting to notice that the point estimate of $Coord1$ is very similar to the point estimate of the variable $Coord2$, which measures political coordination between federal and state governments. This suggests that the difference between both effects lies in the estimation's precision, where the variable $Coord1$ is being estimated with less precision.

The negative and highly significant effect of party alignment between federal and state governments on the level of municipal violence remains strong throughout the different specifications of the model. The second column replicates column 1, this time including a variable of municipal presence of the criminal group *Los Zetas*, which is considered one of the most violent in Mexico. As the table shows, presence of *Los Zetas* has an important impact on municipal violence with a significance level of 5%. Because the presence of *Los Zetas* has a significant impact, the coefficient of the $Coord2$ variable lowers to 1.192, which implies a reduction of almost 90% in the number of deaths per 100,000, compared to average deaths in municipalities without political coordination.

Column 3 duplicates the second column's model and includes a variable that specifies if the municipality in question is governed by a mayor of the PRI. The data shows that the municipalities that are governed by the PRI tend to be the most violent, but this correlation does not seem to have a significant statistical impact. In other words, once the effect of political coordination on the level of violence is taken into consideration, the identity of the party that is in power at a municipal level does not seem to matter. This finding is also reflected on the coefficient of the $Coord2$ variable, which does not change from column 2 to column 3 and maintains the same significance level.

Columns 1–3 produce another interesting result on the impact of coordination between the federal government and the municipal governments when the state government is run by a party other than the PAN (i.e., when $Coord3 = 1$). Here, our findings indicate that coordination with municipal governments is not only an insignificant statistical variable, but also that its effect can go both ways. A greater coordination with municipal governments may reduce or increase the observed level of violence. It is important to highlight that this does not mean that municipal governments are not relevant actors, but that the part they play in the impact of political coordination does not seem essential.

The result that the presence of *Los Zetas* is an important factor in predicting the level of municipal violence motivates specifications of columns 4 and 5. The model of column 3 is repeated in column 4, now including an interaction term of the variable *Los Zetas presence* with the different levels of political coordination or party alignment. The goal of this exercise is to measure the impact of the presence of *Los Zetas* for each level of political

coordination. The coefficients on the *Zetas * Coord1* and *Zetas * Coord2* variables show that the effect of political coordination on the level of violence varies significantly with respect to the effect of the presence of *Los Zetas*, at a 5% significance level. *Los Zetas* presence further increases the effect of both complete political coordination (*Coord1*) and of greater political coordination between the federal and state governments (*Coord2*) on the level of violence. This effect implies a reduction of around 15.5 and 15 deaths per 100,000 inhabitants, respectively, compared to 22.041 average deaths per 100,000 inhabitants in municipalities with *Los Zetas* presence and without political coordination.

Table 4.4 presents the same analysis using the number of deaths occurred in any type of confrontation as a dependent variable, which is arguably a more complete measure of violence and includes both deaths from confrontations with authority, and deaths from confrontations among rival criminal groups.

This table shows that the effect of party alignment between the federal and state governments on overall municipal violence is still considerable, although lower than the effect on violence resulting from confrontations with authority. Political coordination between the federal and state governments (*Coord2*) prevents between 0.872 and 1.418 deaths per 100,000 inhabitants compared to average deaths in municipalities without political coordination, which is 1.604 deaths per 100,000 inhabitants. This represents a decrease of little more than 88% in the number of deaths. The effect is significant at a 1% level for column 1, 5% for columns 2 and 3, and 10% for columns 4 and 5. The decrease in the effect's magnitude and significance is not surprising. First, the dependent variable is a broader measure of violence that takes into account deaths occurred in confrontations between rival criminal groups, where the federal government does not play a direct role. Second, data on deaths from confrontations among rival groups is, by definition, less available and precise.

4.6.1 Discussion of Results

This chapter's empirical analysis shows that political coordination between federal and state governments is an important factor for the effectiveness of the fight against organized crime. The finding that state governments are key actors, while municipal authorities play a marginal role in the impact on violence through political coordination may seem surprising. However, this result is, in fact, not so strange.

First, actions against organized crime take place in territories that transcend municipal borders. Thus, it is reasonable to assume that the relevant actors in terms of strategy coordination with the federal government are state governments. This rationale is also reflected on the fact that the presence of federal security forces is not measured by municipality, but by state or region.

Second, there is no significant correlation between the number of local police forces (municipal and state) and the level of violence (Guerrero, 2011). This implies that, even though local security forces play an important role in the implementation of operations

and in aiding federal forces on the ground, they do not have a significant impact on the effectiveness of the strategy to fight organized crime.

Third, municipal police forces's role is not to carry out operations, but to provide local information and knowledge in order to increase the effectiveness of such operations (Dell, 2011). Clearly, this is useful for the federal police and army. However, it is precisely because of their role as information providers that municipal police forces are important allies to criminal groups. As such, their local knowledge and "coordination" with federal authorities may actually have the opposite effect on the effectiveness of federal operations. Finally, and related to this third point, local security forces do not have the necessary physical and human resources to undertake actions against criminal groups, nor to maintain control of disputed territories.

This study shows evidence that party alignment between federal and municipal governments is not relevant in containing violence, a finding that seems to contradict Dell's (2011) results. Dell (2011) finds that when a PAN mayor is elected (i.e., when there is a greater level of political coordination or party alignment with municipal authorities), violence rises. However, results from this chapter's analysis do not contradict Dell's (2011) results, as I explain next.

First, Dell (2011) focuses exclusively on party alignment between federal and municipal governments, while this chapter incorporates different levels of coordination among the federal, state, and municipal governments. Although we have not found evidence of a greater level of violence when there is party alignment between the federal government and local authorities, we have also not found evidence that party alignment between the federal government and municipal governments helps to reduce the level of violence. In our analysis, party alignment between the federal government and state governments is what seems to have an important effect on the level of violence.

Second, Dell (2011) studies municipalities in which the PAN won or lost elections for mayors by a small margin using a regression discontinuity approach (RDD), considered adequate to establish causal effects,²³ to measure the effect of a PAN's municipal victory on violence. However, municipalities where a PAN candidate is one of the main contenders are potentially very different from other municipalities. Instead, this study attempts to approximate a causal analysis using a fixed effects method and a larger sample that includes all municipalities classified by the level of party alignment with respect to the *panista* federal government.

Third, Dell's (2011) RDD focuses on the time frame around *municipal* elections, and is therefore measuring the impact on violence in the short-run. On the other hand, this chapter studies the relationship between the level of violence and changes in the degree of political coordination, which occur in the medium-run. Lastly, Dell (2011) measures violence using deaths from confrontations among civilians where one of the actors is

²³Recently, authors like Caughey and Sekhon (2011) have criticized this method and raised doubts about its ability to always establish conclusive causal effects.

presumably linked to organized crime. In contrast, both violence measures include deaths from confrontations between organized crime and authorities.

4.7 Conclusion

The purpose of this study is to show that coordination between federal and state governments is a decisive factor for the effectiveness of the Mexican federal government's fight against organized crime. The results of this analysis reveal that the lack of party alignment leads to higher violence levels. The analysis goes beyond a descriptive approach of drug trafficking-related violence and moves closer to its causal interpretation. Critical in this chapter's examination is the view that the significant increases in violence across Mexico are, at least partly, a result of a broader institutional arrangement. The findings in this study also help to elucidate possible paths to follow in the future.

Snyder and Duran–Martínez (2009) posit that exploring states' capacity to project power as a way to contain violence is a key task for future research. This work is a contribution in this direction as it studies the effect of political coordination, plausibly correlated with political power, on municipal violence. Moreover, the analysis presented in this work is one of very few studies that are able to empirically identify the effect of an institutional factor on the level of violence.

Clearly, many other factors affect Mexico's alarming violence levels. The chapter does not assert that political coordination is the most important or decisive factor in containing violence. Nor does it establish that lack of political coordination is a result of a shortfall of political will from the federal government or from state authorities to cooperate with each other, although both scenarios are entirely possible. Moreover, the results presented in this chapter are not sufficient to derive public policy conclusions about how to end organized crime-related violence, would this even be possible. Nevertheless, this study does suggest that a greater emphasis on cooperation across levels of government by overcoming party differences is an important step to minimize violence. The containment of violence requires logistical, political and institutional support from local governments; it requires policies that are not promoted as party lines.

This work has surveyed various theories that help explain the increase of violence related to organized crime in Mexico. It has also studied the reasons why political coordination is decisive in the effectiveness of the fight against organized crime. For instance, I have suggested that, through political coordination, the Mexican government is perhaps more likely to establish territorial control and, at the same time, be able to weaken criminal groups. Drug trafficking is about production, transportation, transfer, and distribution of drugs, so the level of control over the territory plays an important role.

The expansion and escalation of violence caused by the fight against organized crime is, in and of itself, a threat to the country's future. For this reason, it is essential to conduct more research, studies, and diagnoses that help understand and mitigate the phenomenon,

and that also contribute to the debate over how to modify the government's strategy against organized crime in a way that contains violence and ensures the desired objectives are achieved. There are examples of relative success, such as Brazil and Colombia. In Mexico, we will not be able to succeed in this fight as long as the strategy is not integrated into the present context of institutional and political barriers, such as the lack of political coordination among levels of government.

Table 4.1: Deaths from Confrontations with Authority per 100,000 Inhabitants by State in 2010

	Mean	Min.	Max.	N	State Party
Aguascalientes	0.37	0	4.069	11	PAN, PRI
Baja California	0.077	0	0.385	5	PAN
Baja California Sur	0.084	0	0.419	5	PRD
Campeche	0.041	0	0.452	11	PRI
Coahuila	0.328	0	4.666	38	PRI
Colima	1.338	0	7.097	10	PRI
Chiapas	0.048	0	4.565	118	PRD
Chihuahua	1.439	0	31.162	67	PRI
Distrito Federal	0.09	0	0.52	16	PRD
Durango	7.001	0	76.177	39	PRI
Guanajuato	0.056	0	1.285	46	PAN
Guerrero	2.339	0	28.794	81	PRD
Hidalgo	0.112	0	5.525	84	PRI
Jalisco	1.591	0	82.183	125	PAN
Estado de México	0.086	0	3.031	125	PRI
Michoacán	1.376	0	35.371	113	PRD
Morelos	0.377	0	6.137	33	PAN
Nayarit	1.645	0	17.445	20	PRI
Nuevo León	56.515	0	861.394	51	PRI
Oaxaca	0.007	0	3.852	570	PRI, UPP
Puebla	0.22	0	47.801	217	PRI
Querétaro	0.007	0	0.125	18	PRI
Quintana Roo	0	0	0	8	PRI
San Luis Potosí	1.431	0	49.739	58	PRI
Sinaloa	2.407	0	4.904	18	PRI
Sonora	1.311	0	57.637	71	PAN
Tabasco	0.395	0	4.319	17	PRI
Tamaulipas	61.018	0	1238.975	43	PRI
Tlaxcala	0.019	0	1.114	60	PAN
Veracruz	0.424	0	34.518	212	PRI
Yucatán	0	0	0	106	PRI
Zacatecas	0.177	0	3.402	58	PRD, PRI

Notes: Where there is more than one governor's political party, this is due to political turnover occurring in those states during the 2010 elections. UPP refers to the *Unidos por la Paz y el Progreso* coalition, comprised of PAN, PRD, Convergencia, and PT parties. Data about deaths related to organized crime is from the Office of the General Prosecutor (*Procuraduría General de la República*, PGR) database of presumed criminal rivalry deaths, from December 2006 to December 2010 and from January to September 2011. Data on state (governor) elections from 2006 to 2012 is from the Federal Electoral Institute (*Instituto Federal Electoral*, IFE).

Table 4.2: Summary Statistics by Coordination Level

	Full Sample	Coord 1		Coord 2		Coord 3	
		Mean	Diff	Mean	Diff	Mean	Diff
Deaths total	1.522	1.42	0.106	0.58	1.082	2.03	-0.594
confrontations	(23.67)		(0.14)		(1.79)		(-1.04)
Deaths gov.	1.219	0.39	0.896	0.40	0.935	1.87	-0.760
confrontations	(21.14)		(1.33)		(1.73)		(-1.48)
Deaths gov. conf.	0.00226	0.00	0.00200	0.00	0.000907	0.00	0.001
'06-'07	(0.0786)		(0.80)		(0.45)		(0.50)
Zetas presence	0.0126	0.01	-0.003	0.01	0.001	0.02	-0.005
	(0.112)		(-0.72)		(0.47)		(-1.74)
Avg. homicides	7.818	5.55	2.459***	6.21	1.841***	7.19	0.736*
	(14.90)		(5.18)		(4.84)		(2.04)
Total population	41626	72846.14	-33787***	31456	11619***	43514	-2199
	(1250)		(-8.50)		(3.64)		(-0.73)
Immigrants	331.5	462.76	-142.1***	382.86	-58.73***	274.09	66.81***
	(506.5)		(-8.82)		(-4.54)		(5.44)
Income p.c.	5920.2	7053.63	-1227***	5969.86	-56.73	6489.82	-663.3***
	(2991.6)		(-12.93)		(-0.74)		(-9.17)
Income from p.c.	102.2	149.99	-51.84***	103.07	-0.961	120.46	-21.32***
taxes	(242.9)		(-6.69)		(-0.15)		(-3.59)
% Illiterate	15.92	11.47	4.815***	13.74	2.496***	14.69	1.43***
population	(10.65)		(14.28)		(9.19)		(5.55)
Infant mortality	23.08	22.73	0.386	22.51	0.652**	22.67	0.487*
	(8.099)		(1.49)		(3.15)		(2.48)
% Population no	20.67	12.24	9.123***	17.63	3.477***	19.09	1.85***
water	(20.65)		(13.95)		(6.59)		(3.69)

Table 4.2: Summary Statistics by Coordination Level - *Continued*

	Coord 1		Coord 2		Coord 3	
Full Sample	Mean	Diff	Mean	Diff	Mean	Diff
% Population no electricity	6.607 (7.639)	1.571*** (6.46)	5.15	1.661*** (8.53)	6.46	0.169 (0.91)
HDI	0.753 (0.0669)	-0.0224*** (-10.53)	0.76	-0.007*** (-4.58)	0.76	-0.009*** (-5.76)
Gini	0.497 (0.0318)	0.0227*** (22.79)	0.49	0.007*** (9.62)	0.49	0.004*** (6.31)
No turnover ('76-'06)	0.0138 (0.117)	0.0150*** (4.03)	0.02	-0.00445 (-1.49)	0.00	0.016*** (5.69)
Area (km^2)	794.3 (2118.2)	-266.8*** (-3.96)	510.97	323.7*** (5.98)	1023.02	-266.3*** (-5.19)
Avg. elevation	1368.3 (837.0)	-107.8*** (-4.05)	1505.35	-156.6*** (-7.33)	1186.44	211.8*** (10.47)
Avg. monthly temp.	198.0 (40.45)	3.641** (2.83)	194.77	3.660*** (3.54)	201.56	-4.181*** (-4.26)
Avg. monthly rainfall	89.74 (50.57)	19.95*** (12.46)	79.84	11.30*** (8.77)	95.75	-7.000*** (-5.71)
N	14019	14019	14019	14019	14019	14019

Notes: Mean coefficients. Standard deviation is in parenthesis. * is significant at 10%, ** is significant at 5%, and *** is significant at 1%. "p.c." is per capita.

Deaths in total confrontations, Deaths in confrontations with government, Average homicides, and Immigrants are measured per 100,000 inhabitants. Data on *Total population* and *Immigrants* is from the *Instituto Nacional de Estadística y Geografía* (INEGI) 2005 – 2010. Data about the municipal Gini coefficient, the percentage of housing without access to water or energy, and the illiterate population percentage is from the National Council of Evaluation of the Social Development Policy (CONEVAL), Index of Social Backwardness (2005). Data of homicides (2005–2010) and of land area is from INEGI. Other geographical data like average altitude, temperature and precipitation is from the database of WorldClim, Global Climate Data. Data of infant mortality, municipal Human Development Index, and per capita income is from the United Nations Development Programme (UNDP)–Mexico, 2005. Data on organized crime-related deaths is from the Attorney General's Office of the Republic (PGR), Dec. 2006–Sept. 2011. The database of municipal presence of *Los Zetas* was built by the author based on various confidential sources of the federal government.

Table 4.3: Political Coordination and Violence in Confrontations with Authority

Dependent Variable: Deaths from confrontations with authority per 100,000 inhabitants	(1)	(2)	(3)	(4)	(5)
Coord 1	-1.670** (0.81)	-1.272 (0.80)	-0.987 (0.79)	-1.212 (0.81)	-0.934 (0.79)
Coord 2	-1.635*** (0.438)	-1.192*** (0.390)	-1.192*** (0.391)	-1.059*** (0.389)	-1.058*** (0.389)
Coord 3	-0.272 (0.777)	-0.157 (0.775)	0.133 (0.765)	0.0137 (0.788)	0.296 (0.773)
Zetas*Coord 1				-15.53** (6.269)	-15.51** (6.270)
Zetas*Coord 2				-15.02** (6.24)	-15.04** (6.24)
Zetas*Coord 3				-9.559 (6.94)	-9.530 (6.94)
Zetas presence		9.648** (4.53)	9.640** (4.53)	13.99** (6.27)	13.89** (6.27)
PRI Mayor		0.359 (0.477)	0.359 (0.477)	0.350 (0.339)	0.350 (0.339)
R^2	0.28	0.29	0.29	0.29	0.29
N	14015	14015	14015	14015	14015

Notes: All regressions include municipal and year fixed effects. Robust clustered standard errors in parenthesis. * is significant at 10%, ** is significant at 5%, and *** is significant at 1%.

Table 4.4: Political Coordination and Violence in Total Confrontations

Dependent Variable: Deaths from total confrontations	(1)	(2)	(3)	(4)	(5)
Coord 1	-0.525 (1.43)	-0.149 (1.43)	0.127 (1.41)	-0.0825 (1.43)	0.187 (1.41)
Coord 2	-1.418*** (0.526)	-0.999** (0.495)	-0.999** (0.495)	-0.873* (0.493)	-0.872* (0.493)
Coord 3	-0.881 (0.89)	-0.772 (0.888)	-0.491 (0.886)	-0.619 (0.902)	-0.344 (0.896)
Zetas*Coord 1				-16.94*** (6.49)	-16.93*** (6.50)
Zetas*Coord 2				-14.29** (6.20)	-14.31** (6.20)
Zetas*Coord 3				-8.629 (6.93)	-8.601 (6.94)
Zetas presence		9.109** (4.17)	9.102** (4.12)	13.22** (6.23)	13.20** (6.23)
PRI Mayor			0.348 (0.35)		0.340 (0.35)
R^2	0.27	0.28	0.28	0.28	0.28
N	14015	14015	14015	14015	14015

Notes: All regressions include municipal and year fixed effects. Robust clustered standard errors in parenthesis. * is significant at 10%, ** is significant at 5%, and *** is significant at 1%.

Chapter 5

Final Words

One of the most significant changes in the field of economic development over the last two decades is the focus on institutions as fundamental pillars of economic development. Key in this relatively new approach is understanding how *de facto* and *de jure* powers interact to consolidate democracies and the consequences that these interactions have on economic and political outcomes. This dissertation is a contribution in this direction. The topics dealt with in the three main chapters, mass media diversity, unsustainable media capture, and fractured political power across levels of government, are all linked to the decline of the Mexican PRI, one of the longest-lasting authoritarian governments of the twentieth century. The institutional transformation brought about by this change provides a rich setting to study many political economy and development issues.

Using a unique panel dataset that provides local broadcast media coverage and ownership data for each of the 1,556 radio and broadcast television outlets in the country from 1990 to 2012, Chapter 2 studies the effect of media diversity on the PRI and opposition parties' electoral performance as well as on turnout, and shows how local media diversity, particularly in the radio market, contributed to the Mexican PRI authoritarian regime's radical municipal electoral decline. In doing so, this constitutes the first study to empirically document mass media's effect in democratic transitions. The study also contributes to debates regarding what constitutes media diversity, the relationship between competition and diversity, and the role of television on electoral participation, which has received mixed support in the literature. The chapter develops three main sets of results. First, I show that increases in local media diversity, particularly from the local radio market, had a large significant negative effect on mayor municipal voting outcomes for the PRI and a significant positive effect on the electoral performance of the left of center opposition party, PRD. Second, I show that both local radio and broadcast television plurality had a positive effect on turnout, that local broadcast television ownership diversity had a negative effect on turnout, and that media exposure matters more for electoral participation than ideological diversity. Third, my analysis shows that the most popular measure of media diversity used in the literature, media plurality, is an incomplete measure of diversity and/or competition. Ownership is of central importance when studying media's effects on voting behavior. This last result has important implications for the still contentious debate, critical to regulation policy, about what constitutes media diversity, how it can be measured, and the role of media ownership in competition policy (Just 2009; Prat and Strömberg 2013).

Understanding how and why media fails in its role of revealing information that is in accordance with voters' interests has important implications for democracy. License-granting as a means of media capture is a topic that has not been previously addressed in the political economics literature. Chapter 3 develops an extension of Besley and Prat's (2006) canonical media capture framework with a three-period political agency retrospective voting model to understand how new media licenses are granted, when media capture occurs, and the effects it has on political outcomes and voters' welfare. The main contribution of this chapter is integrating incumbents' media license allocation decision

into a unified media capture model, highlighting the importance of policies that reduce the discretionary power of governments in the granting of media licenses. The model shows that it is more costly to capture media when media have a higher commercial motive, when there are regulatory structures that make bribing harder, when the initial number of free media is higher, when there is lower expected media loyalty, and when the cost of rebribing media is higher. It also shows that transparency and efficient news production influence the cost of media capture indirectly, and that media independence, initial media plurality, and media concentration have an ambiguous effect on the cost of capture. Moreover, the optimal number of new licenses and of outlets bribed in period 1 are both functions of the cost of bribing in period 1 relative to the cost of bribing in period 2. The optimal number of outlets captured in the second period is ambiguous, and suggests that the extent of capture when license-granting is possible may be context-specific and needs to be evaluated empirically. In addition, the theoretical results show that the equilibrium with unsuccessful media capture in period 2 yields higher audience-related revenues, turnover, and voter welfare than successful media capture in both periods and lower audience-related revenues, turnover, and voter welfare than without media capture in both periods. The model provides an adequate framework to explain why increasing media plurality may have been the right strategy for the PRI to ensure reelection in the short-run, even though it eventually prevented the government from engaging in such capture, thus leading to a fall in its electoral performance as the empirical findings of Chapter 2 suggest. It also emphasizes that, as long as governments maintain control of broadcast licenses, media freedom regulatory frameworks, market incentives, and limited direct government ownership, may not be enough to contain capture. In sum, media opening is not enough to ensure media independence and diversity.

Chapter 4 investigates one of the many consequences of the Mexican democratic transition studied in Chapters 2 and 3: institutional coordination failures. The collapse of a centralized state meant that the federal government was no longer able to ensure cooperation from local governments, a key factor to ensure the correct implementation and effectiveness of the war against organized crime launched by the PAN administration in 2007. The chapter studies the role of coordination between federal and state governments in containing violence from the war against organized crime. Clearly, the containment of violence requires logistical, political and institutional support from local governments, as well as policies that are not promoted as party lines. The empirical findings suggest that the lack of coordination among levels of government, measured with party alignment, had a significant positive effect on violence. Thus, Chapter 4 exemplifies how informal political institutional failures can have pernicious effects on economic and social outcomes. Moreover, the analysis presented in this work is one of very few studies that are able to empirically identify the effect of an institutional factor on the level of violence. The chapter also surveys various theories that help explain the increase in violence related to organized crime in Mexico, it studies the reasons why political coordination is decisive in the effectiveness of the fight against organized crime, and discusses public policy impli-

cations. The chapter is an important contribution to our understanding of institutional frameworks and policies that can help contain violence when conflicts arise. The chapters findings also have a more immediate relevance given the high social and political costs that the war against organized crime in Mexico has brought.

I argue that the analyses, results, and contributions presented here fill important literature gaps and help resolve some open debates in the fields of political economy and economic development. Moving forward, much future research on the three main chapters of this dissertation remains. Exploring additional causal evidence, model extensions, and other topics that can be analyzed with the novel and exhaustive datasets that I compiled as part of this dissertation's research project, are only a few of the tasks left to address in my future academic research agenda.

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Appendix A

Appendix to Chapter 2

Figure A.1: Variation of PRI Vote Share Change vs. Media Outlet Plurality

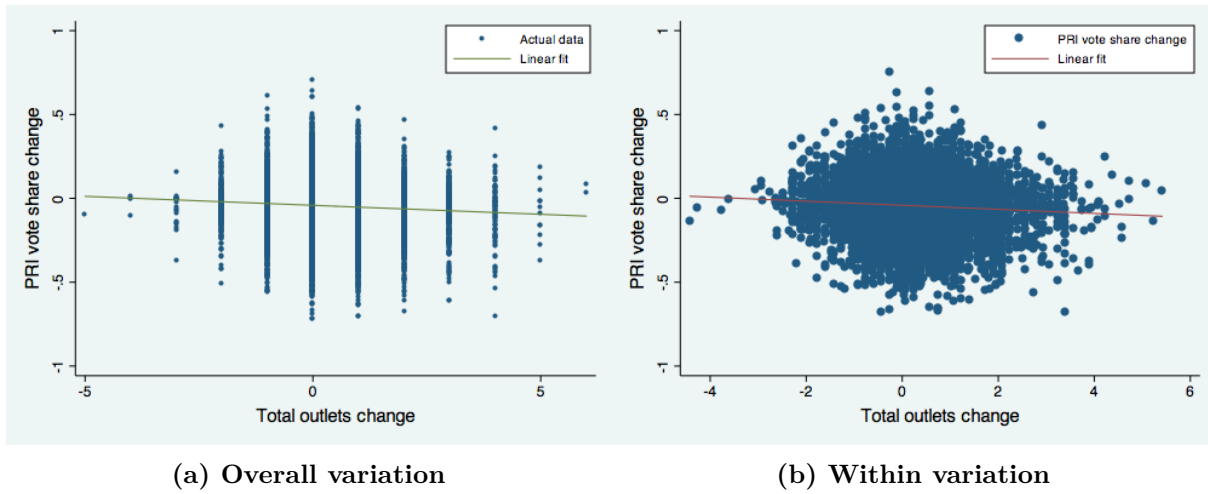


Figure A.2: Variation of PRI Vote Share Change vs. Media Ownership Plurality

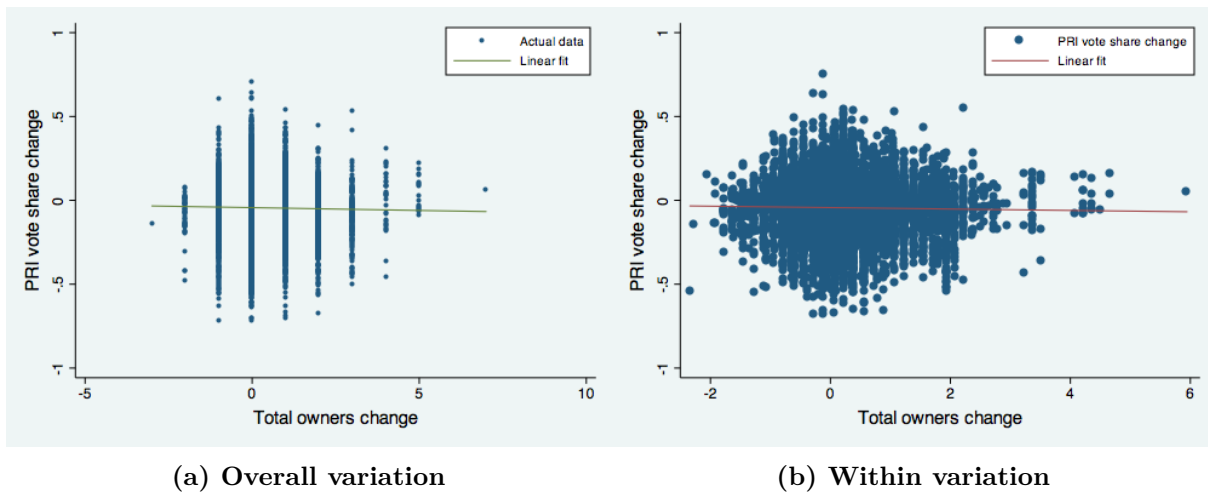
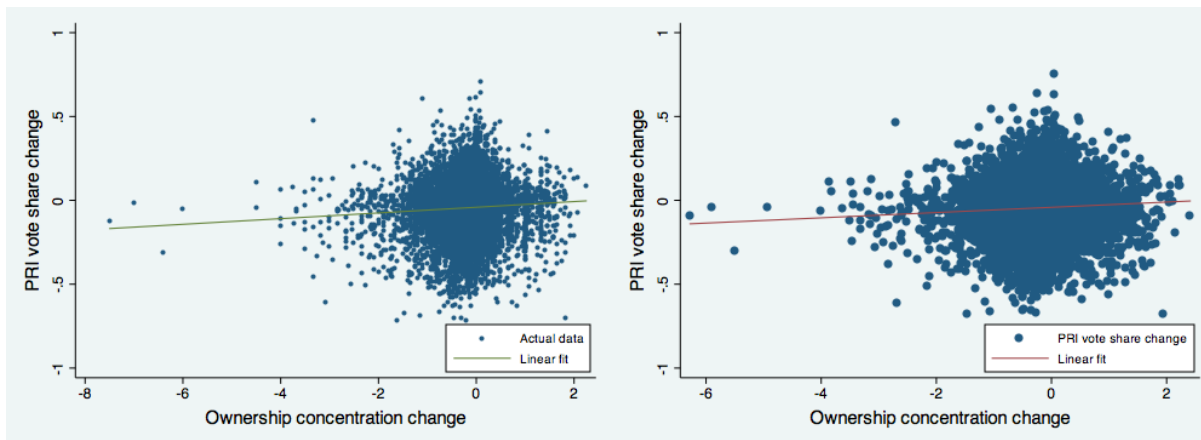


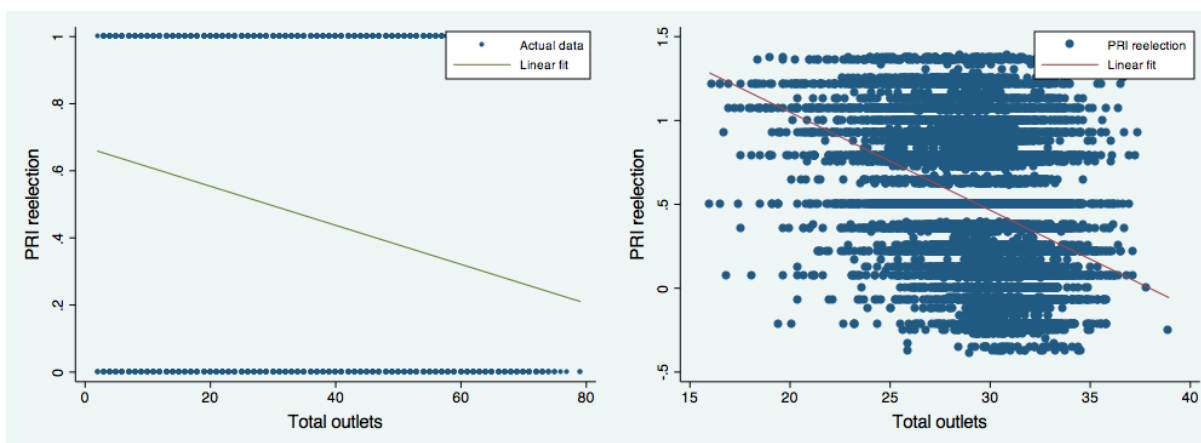
Figure A.3: Variation of PRI Vote Share Change vs. Media Ownership Concentration



(a) Overall variation

(b) Within variation

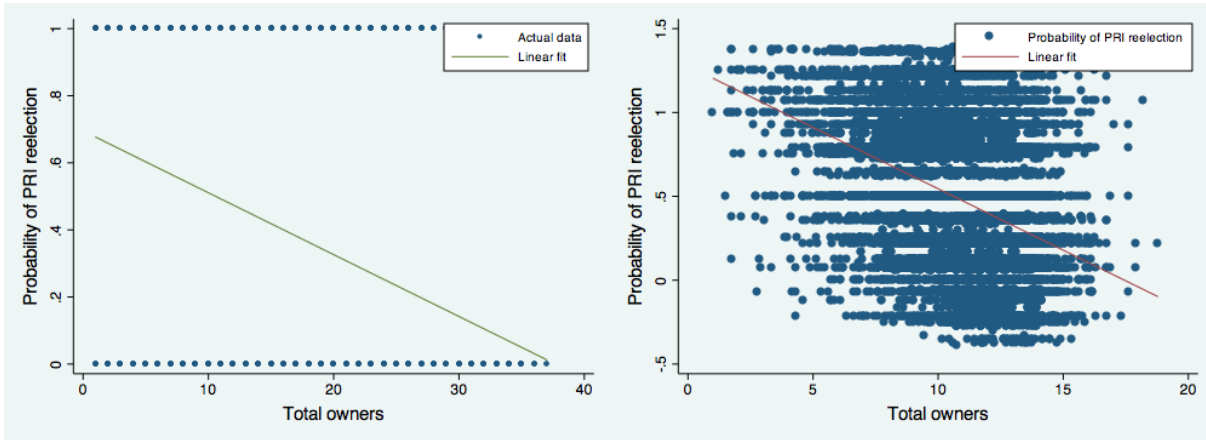
Figure A.4: Variation of Probability of PRI Reelection vs. Media Outlet Plurality



(a) Overall variation

(b) Within variation

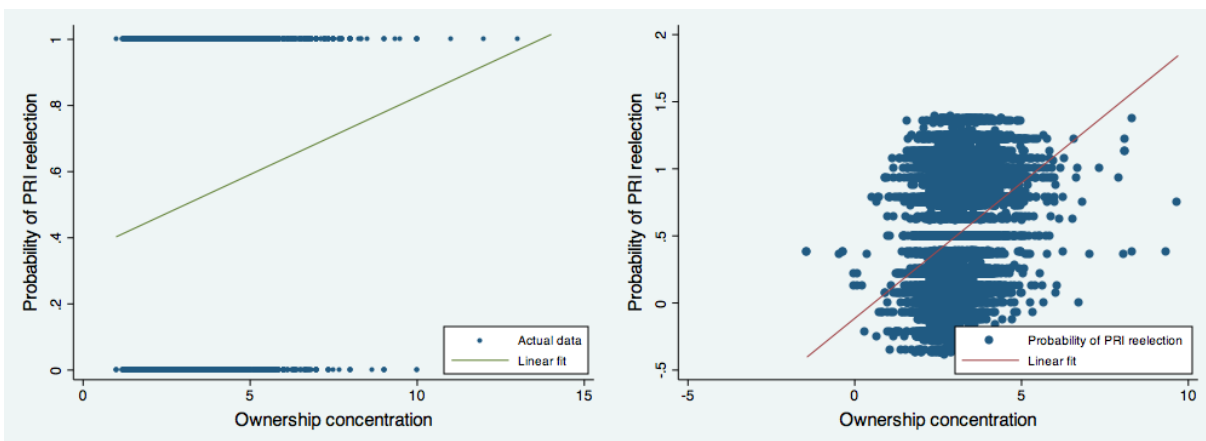
Figure A.5: Variation of Probability of PRI Reelection vs. Media Ownership Plurality



(a) Overall variation

(b) Within variation

Figure A.6: Variation of Probability of PRI Reelection vs. Media Ownership Concentration



(a) Overall variation

(b) Within variation

Table A.1: Effects of Outlet Plurality and Broadcast Heterogeneity on PRI Vote Share Change

	Dependent variable: PRI vote share change							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total outlets		-0.012*** (0.002)	-0.003* (0.002)					
Radio outlets			-0.014*** (0.002)	-0.003 (0.002)			-0.008*** (0.003)	0.002 (0.003)
TV outlets					-0.019*** (0.005)	-0.010** (0.005)	-0.018*** (0.005)	-0.010*** (0.005)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	12948	12919	12948	12919	7664	7642	7664	7642
F	48.832	140.856	44.709	139.959	15.667	68.438	11.626	63.284

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in changes of total vote percentage points. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.2: Effects of Ownership Plurality and Broadcast Heterogeneity on PRI Vote Share Change

	Dependent variable: PRI vote share change							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total owners		-0.004* (0.002)	-0.002 (0.002)					
Radio owners			-0.006*** (0.002)	-0.003 (0.002)			0.004 (0.003)	0.007** (0.003)
TV owners					0.009 (0.006)	0.003 (0.005)	0.009 (0.006)	0.002 (0.005)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	12948	12919	12948	12919	7698	7676	7698	7676
F	3.703	139.870	7.140	140.208	2.571	66.683	2.307	61.422

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in changes of total vote percentage points. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table A.3: Effects of Ownership Concentration and Broadcast Heterogeneity on PRI Vote Share Change

	Dependent variable: PRI vote share change							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total concentration		0.016*** (0.003)	0.009*** (0.003)					
Radio concentration			0.026*** (0.003)	0.016*** (0.003)		0.026*** (0.003)	0.016*** (0.003)	
TV concentration					-0.024*** (0.003)	-0.013*** (0.003)	-0.024*** (0.003)	-0.013*** (0.003)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	12948	12919	12948	12919	12948	12919	12948	12919
F	28.297	140.117	67.453	142.720	65.275	143.931	69.889	136.588

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in changes of total vote percentage points. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: Effects of Outlet Plurality and Broadcast Heterogeneity on the Probability of PRI Reelection

	Dependent variable: Probability of PRI reelection							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total outlets		-0.058*** (0.002)	-0.010*** (0.003)					
Radio outlets			-0.065*** (0.002)	-0.009*** (0.003)			-0.056*** (0.002)	-0.007*** (0.003)
TV outlets					-0.152*** (0.007)	-0.040*** (0.007)	-0.080*** (0.007)	-0.038*** (0.007)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15426	14309	15426	14309	15426	14309	15426	14309
F	1178.385	127.179	1103.122	126.896	493.552	131.137	613.055	120.205

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentages. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table A.5: Effects of Ownership Plurality and Broadcast Heterogeneity on the Probability of PRI Reelection

	Dependent variable: Probability of PRI reelection							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total owners		-0.073*** (0.002)	-0.016*** (0.003)					
Radio owners			-0.081*** (0.002)	-0.019*** (0.003)			-0.075*** (0.002)	-0.018*** (0.003)
TV owners					-0.182*** (0.009)	-0.015 (0.010)	-0.059*** (0.009)	-0.010 (0.010)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15426	14309	15426	14309	15426	14309	15426	14309
F	1303.428	127.824	1394.189	128.202	376.791	128.111	702.318	118.496

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentages. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table A.6: Effects of Ownership Concentration and Broadcast Heterogeneity on the Probability of PRI Reelection

	Dependent variable: Probability of PRI reelection							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total concentration	0.202*** (0.009)	0.050*** (0.009)						
Radio concentration			0.217*** (0.008)	0.061*** (0.010)			0.202*** (0.008)	0.058*** (0.009)
TV concentration					-0.138*** (0.009)	-0.049*** (0.008)	-0.090*** (0.009)	-0.046*** (0.008)
Socioeconomic controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	15426	14309	15426	14309	15426	14309	15426	14309
F	483.700	131.787	676.508	133.788	261.940	134.508	459.722	129.773

Note: All specifications include municipal and year fixed effects. The dependent variable is measured in percentages. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table A.7: The Effect of Radio Ownership Concentration on PRI, PAN, and PRD Vote Share Changes - Preferred Concentration Measure

	PRI vote share change			PAN vote share change			PRD vote share change					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration	0.016*** (0.003)	0.017*** (0.003)	0.018*** (0.003)	0.013*** (0.004)	0.002 (0.004)	0.001 (0.004)	0.001 (0.004)	-0.001 (0.005)	-0.010*** (0.004)	-0.010*** (0.004)	-0.009** (0.004)	-0.019*** (0.005)
Total outlets		-0.005*** (0.002)	-0.005*** (0.002)	-0.005* (0.003)		0.003 (0.002)	0.004* (0.002)	0.002 (0.003)		0.001 (0.002)	0.001 (0.002)	0.004 (0.003)
Share non-commercial			0.029 (0.021)	0.131*** (0.027)			-0.029 (0.029)	-0.054 (0.039)			0.032 (0.027)	0.059* (0.036)
Turnout				-0.002*** (0.000)				0.001*** (0.000)				0.001** (0.000)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12919	12919	12919	7149	10800	10800	10800	6041	10487	10487	10487	5773
F	142.720	134.896	125.305	38.116	9.451	8.871	8.271	5.176	18.022	16.824	15.800	8.927

Note: All specifications include municipal and year fixed effects. The dependent variables are measured in changes of total vote percentage points. Robust standard errors clustered by municipality in parenthesis.

* $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Table A.8: The Effect of Radio Ownership Concentration on the Probability of PRI, PAN, and PRD Reelection Rates - Preferred Concentration Measure

	Pr(PRI reelection)			Pr(PAN reelection)			Pr(PRD reelection)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Radio concentration	0.061*** (0.010)	0.059*** (0.010)	0.057*** (0.010)	0.077*** (0.012)	-0.001 (0.005)	-0.000 (0.005)	0.000 (0.005)	-0.011* (0.006)	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.006 (0.005)
Total outlets		-0.009*** (0.003)	-0.006** (0.003)	-0.004 (0.004)		0.002 (0.001)	0.001 (0.001)	-0.000 (0.002)		-0.001 (0.001)	-0.001 (0.001)	-0.003* (0.002)
Share non-commercial			-0.458*** (0.077)	-0.755*** (0.109)			0.137*** (0.037)	0.265*** (0.062)		0.015 (0.033)	0.015 (0.033)	0.074 (0.052)
Turnout				-0.005*** (0.001)				0.000 (0.000)				0.001*** (0.000)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14309	14309	14309	8361	14309	14309	14309	8361	14309	14309	14309	8361
F	133.788	122.449	120.363	93.070	20.207	20.004	20.046	17.080	10.924	10.088	9.803	11.816

Note: All specifications include municipal and year fixed effects. The dependent variables are measured in percentages. Robust standard errors clustered by municipality in parenthesis.
 * $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$

Appendix B

Appendix to Chapter 3

Proof of Proposition 1:

Begin with stage 6. A voter who chooses outlet i , observes signal \tilde{y}_i . Voters vote for the incumbent if $\tilde{y}_i = 0$ or for a challenger of unknown type if $\tilde{y}_i = b$. Elections are held and payoffs realized.

Voters vote for the incumbent if $\tilde{y}_i = 0$ and for a challenger of unknown type if $\tilde{y}_i = b$. The incumbent is re-elected if and only if at least half of the viewers and listeners observe $\tilde{y}_i = 0$. Thus, the following condition must hold:

$$\frac{N_2^c}{N_2} \geq \frac{1}{2}$$

At stage 5, “flipped” media outlets and newly bribed outlets that the incumbent bribes ($x\lambda(1 - f_2)N_1^c$ and $z(1 - f_1)(1 - s)N_0^{nc}$, respectively), decide to accept or reject their transfers ($t_{x,2}$ and $t_{z,2}$, respectively).

It costs the incumbent an amount k to rebribe “flipped” media outlets.¹ Thus, I assume “flipped” media who are rebribed will accept the transfer if and only if:

$$t_{x,2} \geq k$$

The total cost of rebribing flipped media is thus:

$$kx\lambda(1 - f_2)N_1^c$$

The cost of bribing media for the first time is slightly different. Suppose that previously independent outlet z who is for the first time bribed in the second period has been offered a transfer $t_{z,2}$ and it conjectures that total non-captured outlets $N_2^{nc} = f_1N_0^{nc} + \lambda f_2N_1^c + (1 - x)\lambda(1 - f_2)N_1^c + (1 - z)(1 - f_1)(1 - s)N_0^{nc}$ (including himself) will suppress their signal². His payoff is:

$$\pi_z = \begin{cases} \frac{t_{z,2}}{\tau} & \text{if it accepts} \\ \frac{a}{N_2^{nc}} & \text{if it rejects} \end{cases}$$

Thus, newly bribed media accept the transfer if and only if:

$$t_{z,2} \geq \frac{a\tau}{N_2^{nc}}$$

The total cost of bribing new outlets in period 2 media is thus:

$$\frac{a\tau}{N_2^{nc}}z(1 - s)(1 - f_1)N_0^{nc}$$

¹Recall that the amount k may include transaction costs and other foregone revenues of remaining truthful.

²In this case, outlet z would form part of the fraction $(1 - z)(1 - f_1)(1 - s)N_0^{nc}$.

The total cost of suppressing the signal for N_2^c of the outlets in period 2 is thus³:

$$C_2 = kx\lambda(1 - f_2)N_1^c + \frac{a\tau}{N_2^{nc}}z(1 - s)(1 - f_1)N_0^{nc}$$

At stage 4, a fraction $\lambda \in [0, 1]$ of captured media flipped against the incumbent and a fraction f_2 of these become completely independent, honest, and non-bribeable. The incumbent chooses between leaving media free or making sure that, once again, half of the media are silenced. He can rebribe flipped outlets or bribe for the first time those outlets that he did not capture in period 1. The choice between capturing one group or another will depend on two factors. First, it will depend on whether the cost of silencing flipped media ($t_{x,2}$) is larger or smaller than the cost of silencing first period outlets for the first time ($t_{z,2}$). Second, it will depend on the percentage of captured media that flipped (λ) compared to the percentage of those who became non-bribeable (f_2), as well as on the original fraction of non-bribeable outlets (f_1).

The total number of stations captured is given by:

$$N_2^c = (1 - \lambda)N_1^c + x\lambda(1 - f_2)N_1^c + z(1 - s)(1 - f_1)N_0^{nc} \quad (\text{B.1})$$

In order to be reelected, the incumbent needs:

$$\frac{N_2^c}{N_2} \geq \frac{1}{2}$$

Since no new outlets can be created in the second period, $N_2 = N_1 = N_0 + n$. Suppose the condition above is binding, I then have that, in period 2, the incumbent will choose x^* and z^* so that the following condition is met:

$$(1 - \lambda)N_1^c + x^*\lambda(1 - f_2)N_1^c + z^*(1 - s)(1 - f_1)N_0^{nc} = \frac{N_0 + n}{2}$$

$$z^* = f(x^*) = \frac{N_0 + n}{2(1 - s)(1 - f_1)N_0^{nc}} + \frac{(1 + \lambda(x^*(1 - f_2) - 1))N_1^c}{(1 - s)(1 - f_1)N_0^{nc}}$$

The incumbent's payoff in period 2 is given by:

$$R_2 = \begin{cases} r - [C_1 + C_2] & \text{if he is reelected} \\ -[C_1 + C_2] & \text{if he is not reelected} \end{cases}$$

³An implicit assumption of this setup is that outlets that do not turn against the incumbent, do not demand any additional transfers after they receive their original bribe (or license, in the case of new outlets). This assumption is made for simplicity and does not affect results.

where $C_1 = C_1(s^*, n^*)$ are the costs associated with first-period transfers $t_{i,1}$ and $C_2 = C_2(x^*, z^*)$ are those associated with second-period transfers $t_{i,2}$. Thus, in period 2 the incumbent bribes outlets $x\lambda(1 - f_2)N_1^c + z(1 - s)(1 - f_1)$ if and only if:

$$r \geq C_1 + C_2$$

And, if the condition above holds, the incumbent will offer $t_{x,2} = k$ to flipped outlets and $t_{z,2} = \frac{a\tau}{N_2^{nc}}$ to newly bribed outlets in period 2, as these are the second period cost-minimizing transfers.

At stage 3, media outlets i who were offered transfer $t_{i,1}$ decide to accept or reject the transfer. Suppose that bribable outlet i has been offered a transfer $t_{i,1}$ and it conjectures that non-captured outlets in the first period $N_1^{nc} = f_1 N_0^{nc} + (1 - f_1)(1 - s)N_0^{nc}$ (including himself) will suppress their signal⁴. His payoff in period 1 is:

$$\pi_i = \begin{cases} \frac{t_{i,1}}{\tau} & \text{if it accepts} \\ \frac{a}{N_1^{nc}} & \text{if it rejects} \end{cases}$$

Thus, outlet i will accept $t_{i,1}$ if and only if:

$$t_{i,1} \geq \frac{a\tau}{N_1^{nc}}$$

The total cost of bribing media in period 1, which is the cost of bribing a fraction s of bribable non-captured media outlets $(1 - f_1)N_0^{nc}$ is thus:

$$\frac{a\tau}{N_1^{nc}} s(1 - f_1)N_0^{nc}$$

So the total cost of suppressing the signal for N_1^c of the outlets in period 1 is thus:

$$C_1 = \frac{a\tau}{N_1^{nc}} s(1 - f_1)N_0^{nc}$$

At stage 2, the incumbent observes the media signal y_i and chooses between leaving the media free or making sure that half of the voters are silenced. If he decides to silence media, he gives out media licenses to $n \leq \bar{N} - N_0$ new outlets who become captured during period 1 and bribes a fraction s of bribable non-captured media $(1 - f_1)N_0^{nc}$, who also become captured during period 1, offering them a transfer $t_{i,1} \geq 0$ in order to maximize his chances of reelection. The choice between capturing one group or another will depend on whether the future cost of creating new, initially captured outlets is larger or smaller than the cost of silencing first period outlets ($t_{i,1}$). Recall that, for simplicity, I assume that creating new outlets n is *initially* free. However, the incumbent knows that, with probability λ , these new outlets will flip in the second period and the incumbent will have to rebribe them at a non-negative cost $t_{x,2}$. Moreover, creating outlets increases the

⁴In this case, outlet i would form part of the fraction $(1 - f_1)(1 - s)N_0^{nc}$.

total number of existing outlets and, given that some flipped outlets (including new ones) become non-bribable with probability f_2 , the second period chances of reelection may actually decrease as a result of creating new outlets in period 1. Thus, the incumbent faces the following tradeoff: give out new licenses in period 1⁵ in order to compensate both for existing outlets that will flip in the future as well as for future non-bribable outlets (that will include part of the n new outlets), at the cost of having to pay a higher cost for rebribing the necessary outlets in the second period in order to ensure reelection.

The total number of stations captured in period 1 is given by:

$$N_1^c = N_0^c + s(1 - f_1)N_0^{nc} + n \quad (\text{B.2})$$

In order to suppress information for at least half of the voters and get reelected, the incumbent must choose s^* and n^* in the first period so that:

$$\frac{N_2^c}{N_2} \geq \frac{1}{2}$$

Thus, he will set s^* and n^* in order to satisfy the following condition:

$$E \left[\frac{N_2^c}{N_2} \right] \geq \frac{1}{2}$$

Since no new outlets can be created in the second period, $N_2 = N_1 = N_0 + n$, and the condition becomes:

$$\frac{E[N_2^c]}{N_0 + n} \geq \frac{1}{2}$$

Suppose the condition above is binding, I then have that, in period 1, the incumbent will choose s^* and n^* so that the following condition is met:

$$E[(1 - \lambda)N_1^c + x^*\lambda(1 - f_2)N_1^c + z^*(1 - s^*)(1 - f_1)N_0^{nc}] = \frac{N_0 + n^*}{2}$$

$$(1 - \mu)N_1^c + x^*\mu(1 - e_2)N_1^c + z^*(1 - s^*)(1 - f_1)N_0^{nc} = \frac{N_0 + n^*}{2}$$

$$n^* = f(s^*) = \frac{2}{N_0} [((1 - \mu) + x^*\mu(1 - e_2)) N_1^c + z^*(1 - s^*)(1 - f_1)N_0^{nc}]$$

The incumbent's payoff in period 1 is given by:

⁵Recall that licenses are only given out in period 1. This assumption is essential for the model: if it were free to create new outlets and outlets could be created in period 2, the model would become trivial, as the incumbent's optimal strategy would be to set $s^* = 0$ and in the second period set $n_2 = \frac{N_2}{2} - N_2^c$. The assumption that outlets can only be created in the first period is a reasonable assumption if setting up new stations takes time, as is expected. It may also be reasonable given that there is a limit to the maximum number of outlets, i.e., \bar{N} .

$$R_1 = \begin{cases} r - [C_1 + \beta E[C_2]] & \text{if he is reelected} \\ -[C_1 + \beta E[C_2]] & \text{if he is not reelected} \end{cases}$$

where $C_1 = C_1(s^*, n^*)$ are the costs associated with first-period transfers $t_{i,1}$, $E[C_2] = E[C_2(x^*, z^*)]$ are those associated with expected second-period transfers $E[t_{i,2}]$, and β is the discount factor. Thus, in period 1 the incumbent bribes outlets $s(1 - f_1)N_0^{nc}$ and gives licenses to outlets n if and only if:

$$r \geq C_1 + \beta E[C_2]$$

And, if the condition above holds, the incumbent will offer $t_{i,1} = \frac{a\tau}{N_1^{nc}}$ to existing outlets as these are the first period cost-minimizing transfers.

The expected total cost of capture for the incumbent in period 1 is then given by:

$$C = C_1 + \beta E[C_2]$$

Thus, the cost minimization problem of an incumbent who wants to suppress the signal is as in Proposition 1. ■

Proof of Proposition 2:

I have that:

$$\frac{\partial C^*}{\partial a} = \frac{\tau}{N_1^{nc}} s(1 - f_1) N_0^{nc} + \beta E \left[\frac{\tau}{N_2^{nc}} z(1 - s)(1 - f_1) N_0^{nc} \right] \geq 0$$

$$\frac{\partial C^*}{\partial N_0^{nc}} = \frac{a\tau}{N_1^{nc}} s(1 - f_1) + \beta E \left[\frac{a\tau}{N_2^{nc}} z(1 - s)(1 - f_1) \right] \geq 0$$

$$\frac{\partial C^*}{\partial \mu} = \beta E [kx(1 - f_2) N_1^c] \geq 0$$

$$\frac{\partial C^*}{\partial k} = \beta E [x\lambda(1 - f_2) N_1^c] \geq 0$$

$$\frac{\partial C^*}{\partial \tau} = \frac{a}{N_1^{nc}} s(1 - f_1) N_0^{nc} + \beta E \left[\frac{a}{N_2^{nc}} z(1 - s)(1 - f_1) N_0^{nc} \right] \geq 0$$

$$\frac{\partial C^*}{\partial f_1} = -\frac{a\tau}{N_1^{nc}} s N_0^{nc} - \beta E \left[\frac{a\tau}{N_2^{nc}} z (1-s) N_0^{nc} \right] \leq 0$$

$$\frac{\partial C^*}{\partial f_2} = -\beta E [kx\lambda N_1^c] \leq 0$$

Therefore, the cost of capture C^* is an increasing function of the commercial motive a , the initial number of independent media N_0^{nc} , expected media loyalty μ , the cost of rebribing media k , and transaction costs τ , and it is a decreasing function of the fraction of truthful media in each period, f_1 and f_2 . ■

Proof of Proposition 3:

I follow the proof of Proposition 1 in Besley and Prat's (2006) baseline model.

The equilibrium strategies and beliefs are:

(a) Voter i believes:

$$Pr(\theta = g) = \begin{cases} 0 & \text{if } \tilde{y}_i = b \\ \gamma & \text{if } \tilde{y}_i = 0 \end{cases}$$

(b) Voter i votes for the challenger of unknown type if $\tilde{y}_i = b$ and reelects the incumbent if $\tilde{y}_i = 0$.

(c) The incumbent is re-elected if and only if at least half of the viewers and listeners observe $\tilde{y}_i = 0$. Thus, the condition $\frac{N_2^c}{N_2} \geq \frac{1}{2}$ must hold. Since the incumbent minimizes costs, this condition is binding and, thus, $\frac{N_2^c}{N_2} = \frac{1}{2}$.

(d) In the first period, outlet i accepts $t_{i,1}$ if and only if $t_{i,1} \geq \frac{a\tau}{N_1^{nc}}$.

(e) In the second period, previously bribed outlets x accept $t_{x,2}$ if and only if $t_{x,2} \geq k$ and newly bribed outlets z accept $t_{z,2}$ if and only if $t_{z,2} \geq \frac{a\tau}{N_2^{nc}}$.

(f) The incumbent offers $t_{i,1} = \frac{a\tau}{N_1^{nc}}$ to all outlets i in the first period and gives out media licenses to $n \leq \bar{N} - N_0$ new outlets if: (i) outlets have observed $\tilde{y}_i = b$ and (ii) $r \geq C_1 + \beta E [C_2]$. It offers $t_{x,2} = k$ and $t_{z,2} = \frac{a\tau}{N_2^{nc}}$ if $r \geq C_1 + C_2$ in the second period. The incumbent offers 0 to all outlets in both periods and gives out no new licenses if $r < C_1 + \beta E [C_2]$.

This is clearly a perfect Bayesian equilibrium (PBE). I next prove that this is the unique pure-strategy PBE in which voters do not play weakly dominated strategies.

Voter behavior

The only information voters receive is the signal \tilde{y}_i . Thus, their strategy can be conditioned only on \tilde{y}_i . Not reelecting the incumbent if they observe $\tilde{y}_i = b$ is a strictly dominant strategy. I now turn to the possibility of a pure-strategy PBE in which the incumbent is not reelected if $\tilde{y}_i = \emptyset$. But this is impossible because, if that were the case, the incumbent would have no incentive to silence media and hence the posterior probability when the voters observe $\tilde{y}_i = \emptyset$ would be strictly greater than γ , and voters should actually reelect the incumbent whenever they observe $\tilde{y}_i = \emptyset$. Thus, in every pure strategy PBE in which voters do not play weakly dominated strategies the incumbent is reelected if and only if $\tilde{y}_i = \emptyset$.

Interaction between media and incumbent

By assumption, every new media outlet n is initially captured and every informed outlet x bribed for the second time after it has changed sides against the incumbent accepts $t_{x,2} > k$ and rejects $t_{x,2} < k$. I now show that in every pure strategy PBE in which players do not play weakly dominated strategies an informed outlet bribed for the first time accepts $t_{i,T} > \frac{a}{N_T^{nc}}$ and rejects $t_{i,T} < \frac{a}{N_T^{nc}}$ both in period $T = 1$ and in $T = 2$. First, the commercial revenue of i cannot be higher than $\frac{a}{N_T^{nc}}$. Thus, in any equilibrium i must accept offers above $\frac{a}{N_T^{nc}}$. Second, given any reply function on the part of outlets, in equilibrium the incumbent buys off enough outlets so that $\frac{N_2^c}{N_2} = \frac{1}{2}$ holds. Suppose that there exists an equilibrium in which i accepts an offer strictly below $\frac{a}{N_T^{nc}}$. This must be an equilibrium in which all outlets needed for $\frac{N_2^c}{N_2} = \frac{1}{2}$ to hold, are silenced. But then, if i rejects the offer, it is the only outlet to break news and he gets $\frac{a}{N_T^{nc}}$: a contradiction.

The fact that new outlets n are initially always captured, that every informed outlet x bribed for the second time after it has changed sides against the incumbent accepts $t_{x,2} > k$ and rejects $t_{x,2} < k$, and that an informed outlet bribed for the first time accept $t_{i,T} > \frac{a}{N_T^{nc}}$ and reject $t_{i,T} < \frac{a}{N_T^{nc}}$ both in period $T = 1$ and in $T = 2$, means that in every pure strategy PBE in which players do not play weakly dominated strategies, the incumbent silences the media if $C^* \leq r$ (I assume that the incumbent silences media when he is indifferent and $C^* = r$) and does not silence them if $C^* > r$.

Therefore, in every pure strategy PBE in which players do not play weakly dominated strategies, the equilibrium described above defines players' optimal behavior. ■

Proof of Proposition 4:

Equilibrium choices s^* , n^* , x^* , and z^* in Proposition 1 can be found using backward induction.

In period 2, the incumbent will want to minimize the cost of reelection:

$$C_2^* = \min_{x,z} \left\{ kx\lambda(1-f_2)N_1^c + \frac{a\tau}{N_2^{nc}}z(1-s)(1-f_1)N_0^{nc} \right\} \quad (1)$$

$$s.t. \quad \frac{N_2^c}{N_2} \geq \frac{1}{2} \quad (2)$$

Since the incumbent minimizes costs, condition (2) is binding:

$$N_2^c = \frac{N_2}{2} = \frac{N_0 + n}{2}$$

Substituting equation (B.1), I find that the fraction of bribable non-captured media from the first period that the incumbent bribes in the second period is given by :

$$z(n, s, x) = \frac{N_0 + n}{2(1-f_1)(1-s)N_0^{nc}} - \frac{(1-\lambda(1-x(1-f_2)))N_1^c}{(1-f_1)(1-s)N_0^{nc}} \quad (B.3)$$

By definition, the number of non-captured media outlets in period 2 is given by:

$$N_2^{nc}(s, x, z) = f_1N_0^{nc} + \lambda f_2N_1^c + (1-x)\lambda(1-f_2)N_1^c + (1-z)(1-f_1)(1-s)N_0^{nc}$$

Substituting equation (B.3) in the expression above, I obtain:

$$N_2^{nc}(n, s) = (1-s(1-f_1))N_0^{nc} + N_1^c - \frac{N_0 + n}{2} \quad (B.4)$$

After substituting equations (B.3) and (B.4), the second period minimization problem becomes:

$$C_2^* = \min_x \left\{ kx\lambda(1-f_2)N_1^c + \frac{a\tau(N_0+n-2((1-\lambda(1-x(1-f_2)))N_1^c))}{2(1-s(1-f_1))N_0^{nc}+2N_1^c-(N_0+n)} \right\} \quad (1')$$

$$s.t. \quad \frac{N_2^c}{N_2} \geq \frac{1}{2} \quad (2')$$

Minimizing the function above, I obtain the optimal number of captured media in the first period from the second period's perspective:

$$N_1^c(n, s) = \frac{a\tau}{k} + \frac{N_0 + n}{2} - (1-s(1-f_1))N_0^{nc} \quad (B.5)$$

Equating (B.5) to the definition of N_1^c given by equation (B.2), I find the optimal number of license creation in period 1:

$$n^* = \frac{2a\tau}{k} - N_0 \quad (\text{B.6})$$

Thus:

$$N_1^c(s) = \frac{2a\tau}{k} - (1 - s(1 - f_1))N_0^{nc}$$

and:

$$z(s, x) = \frac{a\tau(1 - 2(1 - \lambda(1 - x(1 - f_2))))}{k(1 - f_1)(1 - s)N_0^{nc}} + \frac{(1 - s(1 - f_1))(1 - \lambda(1 - x(1 - f_2)))}{(1 - f_1)(1 - s)} \quad (\text{B.7})$$

In period 1, the incumbent minimizes the following function:

$$C^* = \min_s C_1(s) + \beta E[C_2(s, x)] \quad (1'')$$

$$s.t. \quad \frac{N_1^c}{N_1} \geq \frac{1}{2} \quad (2'')$$

The solution to the minimization problem above determines the optimal fraction of non-captured, bribable outlets that the incumbent chooses to bribe in the first period:

$$s^* = \begin{cases} \frac{1}{1-f_1} \left(1 - \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right) & \text{if } \frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc} \\ \frac{1}{1-f_1} \left(1 + \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right) & \text{if } \frac{a\tau}{\beta k} \leq (1 - \mu)N_0^{nc} \end{cases}$$

As the incumbent's objective is to minimize total costs, he will always chose $s^* = \frac{1}{1-f_1} \left(1 - \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right)$ whenever possible, i.e., as long as $\frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc}$. If, however, $\frac{a\tau}{\beta k} \leq (1 - \mu)N_0^{nc}$, the incumbent will chose $s^* = \frac{1}{1-f_1} \left(1 + \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right)$.

Since $E[N_2^c] = \frac{N_0+n}{2}$, I have that:

$$x(n, s, z) = \frac{N_0 + n}{2\lambda(1 - f_2)N_1^c} - \frac{1 - \lambda}{\lambda(1 - f_2)} - \frac{z(1 - f_1)(1 - s)N_0^{nc}}{\lambda(1 - f_2)N_1^c}$$

Substituting equation (B.7) into the equation above, I get the optimal fraction of outlets bribed in the second period:

$$x^*(n^*, s^*) = \frac{k(N_0 + n^*) - 2(1 - \lambda)kN_1^c + 2(1 - 2\lambda)a\tau N_1^c - 2(1 - \lambda)[1 - s^*(1 - f_1)]kN_0^{nc}}{2\lambda(1 - f_2)\{N_1^c(k - 2a\tau) + [1 - s^*(1 - f_1)]kN_0^{nc}\}}$$

and:

$$z^*(n^*, s^*) = \frac{[1 - s^*(1 - f_1)]k(N_0 + n^*)N_0^{nc} - 2a\tau(N_0 + n^* - N_1^c)}{2(1 - f_1)(1 - s^*)N_0^{nc}\{k\{N_0^{nc}[1 - (1 - f_1)s^*] + N_1^c\} - 2a\tau}}$$

Thus, equilibrium choices s^* , n^* , x^* , and z^* are as stated in Proposition 4. ■

Proof of Proposition 5:

I have that:

$$\frac{\partial n^*}{\partial N_0} = -1 < 0$$

$$\frac{\partial n^*}{\partial a} = \frac{2\tau}{k} \geq 0$$

$$\frac{\partial n^*}{\partial \tau} = \frac{2a}{k} \geq 0$$

$$\frac{\partial n^*}{\partial k} = -\frac{2a\tau}{k^2} \leq 0$$

Therefore, the optimal number of new licenses created in the first period n^* is a non-decreasing function of the commercial motive a and transaction costs τ ; a non-increasing function of the cost of rebribing media in the second period k ; and a decreasing function of initial media plurality N_0 .

If $\frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc}$, I have $s^* = \frac{1}{1-f_1} \left(1 - \sqrt{\frac{a\tau}{\beta(1-\mu)kN_0^{nc}}} \right)$, and:

$$\frac{\partial s^*}{\partial f_1} = \frac{-(f_1 - 1)^2 - \frac{a\tau(f_1 - 1)^4}{\sqrt{\beta a k \tau (f_1 - 1)^4 (1 - \mu) N_0^{nc}}}}{(f_1 - 1)^4}$$

Thus,

- If

$$\frac{1}{(f_1 - 1)^4} > (f_1 - 1)^2 \sqrt{\frac{a\tau}{\beta k (1 - \mu) N_0^{nc}}}$$

then the effect is increasing.

- If

$$\frac{1}{(f_1 - 1)^4} < (f_1 - 1)^2 \sqrt{\frac{a\tau}{\beta k (1 - \mu) N_0^{nc}}}$$

then the effect is decreasing.

- If

$$\frac{1}{(f_1 - 1)^4} = (f_1 - 1)^2 \sqrt{\frac{a\tau}{\beta k(1 - \mu)N_0^{nc}}}$$

then there is no effect.

I also have that:

$$\frac{\partial s^*}{\partial \tau} = -\frac{a(1 - f_1)}{2\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}} < 0$$

$$\frac{\partial s^*}{\partial a} = -\frac{\tau(1 - f_1)}{2\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}} < 0$$

$$\frac{\partial s^*}{\partial \mu} = -\frac{a\tau(1 - f_1)}{2(1 - \mu)\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}} < 0$$

$$\frac{\partial s^*}{\partial N_0^{nc}} = \frac{a\tau(1 - f_1)}{2N_0^{nc}\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}} > 0$$

$$\frac{\partial s^*}{\partial \beta} = \frac{a\tau(1 - f_1)}{2\beta\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}} > 0$$

$$\frac{\partial s^*}{\partial k} = \frac{a\tau(1 - f_1)}{2k\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}} > 0$$

Therefore, when $\frac{a\tau}{\beta k} > (1 - \mu)N_0^{nc}$, the optimal fraction of media bribed in the first period s^* is an ambiguous function of the fraction of non-bribable media in period 1 f_1 ; a decreasing function of transaction costs τ , the commercial motive a , and the probability that outlets turn against the incumbent μ ; and an increasing function of the cost of rebribing media in the second period k , the initial number of independent media N_0^{nc} , and the discount factor β .

If $\frac{a\tau}{\beta k} \leq (1 - \mu)N_0^{nc}$, I have $s^* = \frac{1}{1 - f_1} \left(1 + \sqrt{\frac{a\tau}{\beta(1 - \mu)kN_0^{nc}}} \right)$, and:

$$\frac{\partial s^*}{\partial f_1} = \frac{((f_1 - 1)^2 + \frac{a\tau(f_1 - 1)^4}{\sqrt{\beta ak\tau}(f_1 - 1)^4(1 - \mu)N_0^{nc}})}{(f_1 - 1)^4} > 0$$

$$\frac{\partial s^*}{\partial \tau} = \frac{a(1-f_1)}{2\sqrt{\beta ak\tau}(f_1-1)^4(1-\mu)N_0^{nc}} > 0$$

$$\frac{\partial s^*}{\partial a} = \frac{\tau(1-f_1)}{2\sqrt{\beta ak\tau}(f_1-1)^4(1-\mu)N_0^{nc}} > 0$$

$$\frac{\partial s^*}{\partial \mu} = \frac{a\tau(1-f_1)}{2(1-\mu)\sqrt{\beta ak\tau}(f_1-1)^4(1-\mu)N_0^{nc}} > 0$$

$$\frac{\partial s^*}{\partial N_0^{nc}} = -\frac{a\tau(1-f_1)}{2N_0^{nc}\sqrt{\beta ak\tau}(f_1-1)^4(1-\mu)N_0^{nc}} < 0$$

$$\frac{\partial s^*}{\partial \beta} = -\frac{a\tau(1-f_1)}{2\beta\sqrt{\beta ak\tau}(f_1-1)^4(1-\mu)N_0^{nc}} < 0$$

$$\frac{\partial s^*}{\partial k} = -\frac{a\tau(1-f_1)}{2k\sqrt{\beta ak\tau}(f_1-1)^4(1-\mu)N_0^{nc}} < 0$$

Therefore, when $\frac{a\tau}{\beta k} \leq (1-\mu)N_0^{nc}$, the optimal fraction of media bribed in the first period s^* is an increasing function of the fraction of non-bribable media in period 1 f_1 , transaction costs τ , the commercial motive a , and the probability that outlets turn against the incumbent μ ; and a decreasing function of the cost of rebribing media in the second period k , the initial number of independent media N_0^{nc} , and the discount factor β .

Finally, I have that:

(i) The effect of k on x^* is given by:

$$\frac{\partial x^*}{\partial k} = \frac{a\tau\{n + N_0 + N_0^{nc}[s(1-f_1) - 1] - N_1^c\}}{\lambda(1-f_2)(k\{N_0^{nc}[1 - (1-f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

• If

$$n + N_0 - N_1^c + N_0^{nc}[s(1-f_1) - 1] > 0$$

then the effect is non-increasing.

- If

$$n + N_0 - N_1^c + N_0^{nc}[s(1 - f_1) - 1] < 0$$

then the effect is non-decreasing.

- (ii) The effect of n and N_0 on x^* is given by:

$$\frac{\partial x^*}{\partial n} = \frac{\partial x^*}{\partial N_0} = \frac{k}{2\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)}$$

Thus,

- If

$$k[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}] - 2a\tau > 0$$

then the effect is non-decreasing.

- If

$$k[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}] - 2a\tau < 0$$

then the effect is non-increasing.

- (iii) The effect of λ on x^* is given by:

$$\frac{\partial x^*}{\partial \lambda} = -\frac{k\{n + N_0 + 2[N_0^{nc}(s(1 - f_1) - 1) - N_1^c]\} + 2a\tau}{2\lambda^2(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)}$$

Thus,

- If

$$\frac{k\{n + N_0 - 2[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}]\} + 2a\tau}{k[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}] - 2a\tau} > 0$$

then the effect is non-increasing.

- If

$$\frac{k\{n + N_0 - 2[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}]\} + 2a\tau}{k[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}] - 2a\tau} < 0$$

then the effect is non-decreasing.

(iv) The effects of N_0^{nc} , N_1^c , and f_1 on x^* are given by:

$$\frac{\partial x^*}{\partial N_0^{nc}} = -\frac{k[1 - s(1 - f_1)][k(n + N_0) - 2a\tau]}{2\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

$$\frac{\partial x^*}{\partial N_1^c} = -\frac{k[k(n + N_0) - 2a\tau]}{2\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

$$\frac{\partial x^*}{\partial f_1} = -\frac{ksN_0^{nc}[k(n + N_0) - 2a\tau]}{2\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$k(n + N_0) - 2a\tau > 0$$

then the effects are non-increasing.

- If

$$k(n + N_0) - 2a\tau < 0$$

then the effects are non-decreasing.

(v) The effect of f_2 on x^* is given by:

$$\frac{\partial x^*}{\partial f_2} = \frac{k[n + N_0 - 2(1 - \lambda)\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\}] + 2a\tau(1 - 2\lambda)}{2\lambda(f_2 - 1)^2(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)}$$

Thus,

- If

$$\frac{k[n + N_0 - 2(1 - \lambda)\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\}] + 2a\tau(1 - 2\lambda)}{k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau} > 0$$

then the effect is non-decreasing.

- If

$$\frac{k[n + N_0 - 2(1 - \lambda)\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\}] + 2a\tau(1 - 2\lambda)}{k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau} < 0$$

then the effect is non-increasing.

(vi) The effect of s on x^* is given by:

$$\frac{\partial x^*}{\partial s} = \frac{(1 - f_1)kN_0^{nc}[k(n + N_0) - 2a\tau]}{2\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$k(n + N_0) - 2a\tau > 0$$

then the effect is non-decreasing.

- If

$$k(n + N_0) - 2a\tau < 0$$

then the effect is non-increasing.

(vii) The effects of a and τ on x^* are given by:

$$\frac{\partial x^*}{\partial a} = \frac{k\tau\{n + N_0 - N_0^{nc}[1 - (1 - f_1)s] - N_1^c\}}{\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

$$\frac{\partial x^*}{\partial \tau} = \frac{ak\{n + N_0 - N_0^{nc}[1 - (1 - f_1)s] - N_1^c\}}{\lambda(1 - f_2)(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$N_0^{nc} - s(1 - f_1)N_0^{nc} + N_1^c - (n + N_0) > 0$$

then the effects are non-increasing.

- If

$$N_0^{nc} - s(1 - f_1)N_0^{nc} + N_1^c - (n + N_0) < 0$$

then the effects are non-decreasing.

(viii) The effect of k on z^* is given by:

$$\frac{\partial z^*}{\partial k} = -\frac{a\tau N_1^c \{n + N_0 + N_0^{nc} [s(1 - f_1) - 1] - N_1^c\}}{\lambda(1 - f_1)(1 - s)N_0^{nc} (k\{N_0^{nc} [1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$n + N_0 - N_1^c + N_0^{nc} [s(1 - f_1) - 1] > 0$$

then the effect is non-decreasing.

- If

$$n + N_0 - N_1^c + N_0^{nc} [s(1 - f_1) - 1] < 0$$

then the effect is non-increasing.

(ix) The effect of n and N_0 on z^* is given by:

$$\frac{\partial z^*}{\partial n} = \frac{\partial z^*}{\partial N_0} = \frac{kN_0^{nc} [1 - (1 - f_1)s] - 2a\tau}{2(1 - f_1)(1 - s)N_0^{nc} (k\{N_0^{nc} [1 - (1 - f_1)s] + N_1^c\} - 2a\tau)}$$

Thus,

- If

$$\frac{kN_0^{nc} [1 - s(1 - f_1)] - 2a\tau}{k[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}] - 2a\tau} > 0$$

then the effect is non-decreasing.

- If

$$\frac{kN_0^{nc} [1 - s(1 - f_1)] - 2a\tau}{k[N_0^{nc} + N_1^c - s(1 - f_1)N_0^{nc}] - 2a\tau} < 0$$

then the effect is non-increasing.

(x) The effect of N_0^{nc} on z^* is given by:

$$\frac{\partial z^*}{\partial N_0^{nc}} = -\frac{k^2[1 - (1 - f_1)s]^2(n + N_0)N_0^{nc2}}{2(1 - f_1)(1 - s)N_0^{nc2}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2} + \frac{2a\tau k(n + N_0 - N_1^c)\{N_1^c + 2N_0^{nc}[1 - (1 - f_1)s]\}}{2(1 - f_1)(1 - s)N_0^{nc2}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2} - \frac{4a^2\tau^2(n + N_0 - N_1^c)}{2(1 - f_1)(1 - s)N_0^{nc2}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$k^2(n + N_0)N_0^{nc2}[1 - s(1 - f_1)]^2 - 2ka\tau(n + N_0 - N_1^c)\{N_1^c + 2N_0^{nc}[1 - s(1 - f_1)]\} + 4a^2\tau^2(n + N_0 - N_1^c) > 0$$

then the effect is non-increasing.

- If

$$k^2(n + N_0)N_0^{nc2}[1 - s(1 - f_1)]^2 - 2ka\tau(n + N_0 - N_1^c)\{N_1^c + 2N_0^{nc}[1 - s(1 - f_1)]\} + 4a^2\tau^2(n + N_0 - N_1^c) < 0$$

then the effect is non-decreasing.

(xi) The effect of f_1 on z^* is given by:

$$\frac{\partial z^*}{\partial f_1} = \frac{k^2(n + N_0)N_0^{nc}\{N_1^c + N_0^{nc}[1 - (1 - f_1)s]^2\}}{2(f_1 - 1)^2(1 - s)N_0^{nc}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2} - \frac{2a\tau k[2nN_0^{nc} + 2N_0N_0^{nc} + nN_1^c + N_0N_1^c - N_0^{nc}N_1^c - N_1^{c2} - 2(1 - f_1)sN_0^{nc}(n + N_0 - N_1^c)]}{2(f_1 - 1)^2(1 - s)N_0^{nc}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2} + \frac{4a^2\tau^2(n + N_0 - N_1^c)}{2(f_1 - 1)^2(1 - s)N_0^{nc}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$\begin{aligned}
& k^2(n + N_0)N_0^{nc}\{N_1^c + N_0^{nc}[1 - s(1 - f_1)]^2\} \\
& - 2ka\tau[2nN_0^{nc} + 2N_0N_0^{nc} + nN_1^c + N_0N_1^c - N_0^{nc}N_1^c - N_1^{c2} - 2s(1 - f_1)N_0^{nc}(n + N_0 - N_1^c)] \\
& \quad + 4a^2\tau^2(n + N_0 - N_1^c) > 0
\end{aligned}$$

then the effect is non-decreasing.

- If

$$\begin{aligned}
& k^2(n + N_0)N_0^{nc}\{N_1^c + N_0^{nc}[1 - s(1 - f_1)]^2\} \\
& - 2ka\tau[2nN_0^{nc} + 2N_0N_0^{nc} + nN_1^c + N_0N_1^c - N_0^{nc}N_1^c - N_1^{c2} - 2s(1 - f_1)N_0^{nc}(n + N_0 - N_1^c)] \\
& \quad + 4a^2\tau^2(n + N_0 - N_1^c) < 0
\end{aligned}$$

then the effect is non-increasing.

(xii) The effect of s on z^* is given by:

$$\begin{aligned}
\frac{\partial z^*}{\partial s} = & \frac{k^2(n + N_0)N_0^{nc}\{f_1N_1^c + N_0^{nc}[1 - (1 - f_1)s]^2\}}{2(1 - f_1)(s - 1)^2N_0^{nc}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2} \\
& - \frac{2a\tau k(2nN_0^{nc} + 2N_0N_0^{nc} + nN_1^c + N_0N_1^c - 2N_0^{nc}N_1^c + f_1N_0^{nc}N_1^c - N_1^{c2})}{2(1 - f_1)(s - 1)^2N_0^{nc}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2} \\
& - \frac{2(1 - f_1)sN_0^{nc}(n + N_0 - N_1^c) + 4a^2\tau^2(n + N_0 - N_1^c)}{2(1 - f_1)(s - 1)^2N_0^{nc}(k\{N_0^{nc}[1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}
\end{aligned}$$

Thus,

- If

$$\begin{aligned}
& k^2(n + N_0)N_0^{nc}\{f_1N_1^c + N_0^{nc}[1 - s(1 - f_1)]^2\} \\
& - 2ka\tau[2nN_0^{nc} + 2N_0N_0^{nc} + nN_1^c + N_0N_1^c - 2N_0^{nc}N_1^c + f_1N_0^{nc}N_1^c - N_1^{c2} - 2s(1 - f_1)N_0^{nc}(n + N_0 - N_1^c)] \\
& \quad + 4a^2\tau^2(n + N_0 - N_1^c) > 0
\end{aligned}$$

then the effect is non-decreasing.

- If

$$\begin{aligned}
& k^2(n + N_0)N_0^{nc}\{f_1N_1^c + N_0^{nc}[1 - s(1 - f_1)]^2\} \\
& - 2ka\tau[2nN_0^{nc} + 2N_0N_0^{nc} + nN_1^c + N_0N_1^c - 2N_0^{nc}N_1^c + f_1N_0^{nc}N_1^c - N_1^{c2} - 2s(1 - f_1)N_0^{nc}(n + N_0 - N_1^c)] \\
& \quad + 4a^2\tau^2(n + N_0 - N_1^c) < 0
\end{aligned}$$

then the effect is non-increasing.

(xiii) The effects of a and τ on z^* are given by:

$$\frac{\partial z^*}{\partial a} = -\frac{k\tau N_1^c \{n + N_0 - N_0^{nc} [1 - (1 - f_1)s] - N_1^c\}}{(1 - f_1)(1 - s)N_0^{nc} (k\{N_0^{nc} [1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

$$\frac{\partial z^*}{\partial \tau} = -\frac{kaN_1^c \{n + N_0 - N_0^{nc} [1 - (1 - f_1)s] - N_1^c\}}{(1 - f_1)(1 - s)N_0^{nc} (k\{N_0^{nc} [1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$N_0^{nc} - s(1 - f_1)N_0^{nc} + N_1^c - (n + N_0) > 0$$

then the effects are non-decreasing.

- If

$$N_0^{nc} - s(1 - f_1)N_0^{nc} + N_1^c - (n + N_0) < 0$$

then the effects are non-increasing.

(xiv) The effect of N_1^c on z^* is given by:

$$\frac{\partial z^*}{\partial N_1^c} = -\frac{[k(n + N_0) - 2a\tau] \{kN_0^{nc} [1 - (1 - f_1)s] - 2a\tau\}}{2(1 - f_1)(1 - s)N_0^{nc} (k\{N_0^{nc} [1 - (1 - f_1)s] + N_1^c\} - 2a\tau)^2}$$

Thus,

- If

$$[k(n + N_0) - 2a\tau] \{kN_0^{nc} [1 - s(1 - f_1)] - 2a\tau\} > 0$$

then the effect is non-increasing.

- If

$$[k(n + N_0) - 2a\tau] \{kN_0^{nc} [1 - s(1 - f_1)] - 2a\tau\} < 0$$

then the effect is non-decreasing.

Therefore, the optimal fraction of media bribed in the second period, z^* and x^* , are ambiguous functions of all model parameters. ■

Proof of Proposition 6:

Without media capture, media always reveal the incumbent's type if they observe it, so total expected audience-related revenues, A , equal the probability that media observe the incumbent's type (a precondition for receiving audience-related revenues), q , times total audience-related revenues which are given by $\sum_{i \in N} \frac{a}{N_i} = \frac{Na}{N} = a$. Thus, $A = qa$.

With media capture, total expected audience-related revenues, A , is equal to zero if and only if the incumbent is able to afford buying off the outlets it needs in order to ensure reelection, once the fraction λ of first period captured outlets has changed sides. This happens when $r \geq C_1 + E[C_2]$. Otherwise, if the incumbent cannot afford to capture the outlets it needs, i.e., if $r < C_1 + E[C_2]$, then media will not be captured and they will reveal the signal and recover audience-related revenues. Thus, the sum of expected audience-related revenues is now equal to the probability that media observe the incumbent's type, q , times total audience-related revenues, a , times the probability that media will change sides after being initially captured, μ . Thus, $A = \mu qa$. ■

Proof of Proposition 7:

Without media capture, media always reveal the incumbent's type if they observe it, so turnover equals the probability that the incumbent is "caught", i.e., the probability that his type is "bad" times the probability that media become informed of his type. In other words, $T = (1 - \gamma)q$.

With media capture, turnover is equal to zero if and only if the incumbent is able to afford buying off the outlets it needs in order to ensure reelection, once the fraction λ of first period captured outlets has changed sides. This happens when $r \geq C_1 + E[C_2]$. Otherwise, if the incumbent is unable to capture the outlets it needs, i.e., if $r < C_1 + E[C_2]$, then even with initial media capture, turnover is still possible. In this case, turnover is the probability that the incumbent's type is "bad" times the probability that media become informed of his type, times the probability that media will change sides after being initially captured. Thus, $T = (1 - \gamma)\mu q$. ■

Proof of Proposition 8:

Without media capture, voters' expected utility in period 1 is given by the probability that the incumbent is good (γ) times the payoff that voters receive when the incumbent is good, which is equal to one. Thus, expected utility equals γ . In the second period, given that media always reveal the incumbent's type if they observe it, voters' expected utility is given by the probability that the incumbent is good in the first period (which ensures his reelection for the second period and a payoff of 1) plus the joint probability that the incumbent is bad in the first period, that media observe his type and that he is

then replaced by a challenger of type $\theta = g$. In other words, expected utility in period 2 is given by $\gamma + q(1 - \gamma)\gamma = \gamma[1 + q(1 - \gamma)]$.

With media capture, voters expected utility in period 1 is given by the probability that the incumbent is good, γ , as in the case without media capture. However, things might change in period 2. If capture is ensured even after the incumbent loses some of its media “supporters” ($r \geq C_1 + E[C_2]$), voters are never able to identify bad incumbents and their expected utility is again given by γ , the probability that a randomly selected politician is of type $\theta = g$, thus yielding a payoff of one to voters. If capture cannot be ensured ($r < C_1 + E[C_2]$), then voters’ expected welfare in period 2 is given by the probability that the incumbent is good in the first period (which ensures his reelection for the second period and a payoff of 1) plus the joint probability that the incumbent is bad in the first period, that media observe his type, that media flip, and that he is then replaced by a challenger of type $\theta = g$. In other words, expected utility in period 2 is given by $\gamma + \mu q(1 - \gamma)\gamma = \gamma[1 + \mu q(1 - \gamma)]$. ■