Too Close to Call:

Electoral Competition and Politician Behavior in India*

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Abstract

This paper presents empirical evidence on the causal effect of electoral competition on political selection and performance. Identifying the effect of competition is challenging due to reverse causality: politician actions before an election determine the competitiveness of a race. To overcome this challenge, I propose a shift-share instrument that exploits aggregate shifts in political parties' popularity over time. Unlike the traditional shift-share, these aggregate shifts affect electoral competition across constituencies non-monotonically: a positive shift in a party's popularity *decreases* competition in the party's stronghold, and *increases* competition where voters prefer the opposition. The instrument relies on this non-monotonicity for identification. Using data on Indian state elections, I find parties respond strategically to competition prior to an election by selecting higher quality candidates and reallocating resources to swing constituencies. The most striking result is in the negative selection of candidates with criminal backgrounds, who are significantly less likely to run in a competitive election. Competitive constituencies also experience a significant, though temporary, increase in night lights. Despite changes in campaign strategy prior to an election, however, I find no evidence that politicians elected in competitive constituencies improve economic outcomes once in office, either through selection or moral hazard. Together, these results suggest that while electoral competition can lead politicians to take costly actions prior to an election, it does not necessarily result in improved governance.

Keywords: Electoral competition, political selection, governance

JEL Codes: D72, O17, O43

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1 Introduction

Electoral competition has long been theorized to improve the selection and performance of politicians. Much as market competition between firms can raise consumer welfare, so too can electoral competition raise voter welfare by creating incentives for political parties to select high quality candidates to run in elections, and for politicians to perform well once in office (see, for example, Stigler 1972, Wittman 1989, Wittman 1995).[1] Empirical work testing this theory, however, is scarce, particularly for developing countries where competition may play an even greater role in disciplining politicians in the absence of strong institutions.

This paper studies political selection and performance when an election is "too close to call" in advance. The setting is India, where a large body of work has demonstrated the first-order importance of political institutions in determining economic outcomes,[2] but where relatively little is known about the causal impact of electoral competition. A simple conceptual framework, shown in Figure 1, illustrates the possible channels electoral competition can affect politician behavior, and ultimately economic outcomes. First, political parties may respond strategically to a change in electoral competition prior to an election, selecting a better candidate, reallocating resources, or mobilizing voters to improve the odds of winning a competitive constituency. Second, if parties select a different type of candidate to run in competitive constituencies, the incumbent elected in a competitive election may perform better or worse than the incumbent elected in a lopsided election, with potential implications for economic outcomes. Finally, the anticipation of electoral competition in future elections may change performance incentives over the long-term, which may also determine economic outcomes.

Identifying the causal impact of electoral competition empirically is challenging due to reverse causality. An incumbent politician's performance while in office affects her popularity, changing the level of competition she can expect to face in future elections. Similarly, the actions of political parties prior to an election determine how competitive an election will be. A party's decision to enter or exit a race, the selection of a well-qualified or charismatic candidate, an increase in campaign expenditure - all tilt the balance of a race in favor of one party or another.

I address this identification challenge by developing a general framework to estimate the causal impact of electoral competition in first-past-the-post electoral systems. The

[1] Electoral competition is often used to assess the strength of democratic institutions. For example, a core component of the Polity Score, which measures a country's level of democracy, is the competitiveness of elections.

[2] See Besley and Burgess 2002, Pande 2003, Khemani 2004, Chattopadhyay and Duflo 2004, Cole 2009, etc. for examples.

framework is motivated by the observation that aggregate shifts to a party's popularity over time change the level of competition across constituencies non-monotonically depending on local party preferences. A positive shift in an incumbent party's popularity, for example, *increases* competition in constituencies where voters typically prefer the opposing party, but *decreases* competition in constituencies where voters typically lean towards the incumbent party. I use this observation to construct a shift-share instrument that leverages this non-monotonicity for identification. The instrument is constructed in two steps. In the first step, I predict vote shares for political parties in each constituency and in each election year using a baseline measure of constituency party preferences ("shares") and a leave-out measure of the growth (or decline) in the aggregate popularity of each party across election years ("shifts"). This step is similar to the approach used to construct a typical shift-share instrument, which decomposes growth rates into aggregate and location-specific components, using the former to construct the instrument. In the second step, I use these predicted vote shares to predict electoral competition. Predicted electoral competition is then used to instrument for actual electoral competition. Because competition is a non-monotonic function of vote shares, I am able to control for any direct effects of party popularity, ensuring identification of the causal impact of *competition between parties*, rather than party preferences per se.

The first part of my paper studies how political parties respond to electoral competition during a campaign. Before an election, a party must decide how to allocate candidates and resources across constituencies to maximize its chances of winning as many constituencies as possible.[3,4] I present a simple framework identifying how electoral competition may affect political selection and resource allocation. A party has greater incentive to place higher (observable) quality candidates in competitive constituencies, where voters are less likely to vote based on party loyalty, than in less competitive constituencies, where partisanship may be sufficient to deliver the party a win or a loss. A similar logic can be applied to resource allocation. There are higher electoral returns to placing resources in competitive constituencies than in biased constituencies, where either party loyalty on its own is sufficient to guarantee a win (since the bias is in favor of a party) or even a large influx of resources is unlikely to sway voters (since the bias is against a party).

My results are largely consistent with this framework. Using data from Indian state elections from 1989 to 2007 and from 2008 to 2017,[5] I first show that candidate turnover

[3]In Indian state elections, the party that wins the highest proportion of constituencies can form the state government.

[4]This problem is a version of the Colonel Blotto game, which has no known general solution. A simple version of this game with homogenous locations was solved only recently in Roberson (2006).

[5]Because constituency boundaries were redrawn in 2008, I cannot link constituencies before and after this period. Some outcomes are only available for the earlier or later period.

across elections is high, with incumbent and non-incumbent parties fielding new candidates across election cycles approximately 39% and 77% of the time, respectively. Electoral competition increases the incumbent party's turnover rate, consistent with anecdotal evidence that incumbent parties remove sitting politicians unlikely to be re-elected to counter anti-incumbency bias in India. Electoral competition improves the *candidate pool* by leading to the selection of less corrupt candidates, as measured by their criminal records. In particular, a one standard deviation increase in competition, as measured by a 0.30 reduction in relative vote shares between the incumbent party and strongest opposition party, lowers the probability a candidate has a criminal record by 4.8 percentage points (18%). Electoral competition also affects the characteristics of *elected politicians*: an increase in competition lowers the probability an elected politician is corrupt by 7.8 percentage points (23%) and leads to a 33% increase in a politician's reported net assets at the time of election.

That politician assets are higher in competitive constituencies may either indicate that these individuals are higher ability, with assets providing a proxy for a politician's private sector options (if they were previously not in office), or that politicians need to rely on personal wealth to finance campaigns in competitive constituencies. To explore this further, I analyze the effect of electoral competition on the allocation of campaign funds using official campaign finance and expenditure data.[6] Here, I find little evidence electoral competition affects campaign expenditure. Though most of my estimated effects are imprecise, they suggest if anything that an increase in electoral competition leads to a decrease in official spending. This result provides suggestive evidence that parties may rely on self-financing candidates to win competitive constituencies.

In contrast to the results on campaign funds, I find electoral competition has a large and significant effect on the allocation of state-run resources prior to an election. A number of studies (Min and Golden, 2014; Baskaran et al. 2015) have shown Indian state governments induce electoral cycles in electricity provision. Using data on night lights, I find that electoral competition amplifies these cycles. A one standard deviation increase in anticipated competition leads to a 1.6 percentage point increase in a constituency's annual night lights growth in the year prior to an election. This effect is large in magnitude: for comparison, Asher and Novosad (2017) estimate a 4 percentage point increase in night lights growth for constituencies aligned with the state party over a five-year electoral term. Since it is unlikely that spatial and temporal shifts in electoral competition are coincident with resource needs, this reallocation is likely inefficient.

Finally, I show that electoral competition also leads to the strategic entry and

[6] As discussed later in the paper, this official data is almost certainly an underestimate of true campaign costs.

exit of parties in elections. Though the anticipated closeness of a race does not affect the total number of parties, it does change the *type* of party that chooses to enter an election. An increase in competition encourages the entry of major parties with a high anticipated likelihood of winning, and leads to the exit of small parties with a low anticipated likelihood of winning. In particular, a one standard deviation increase in the closeness of a race reduces the number of small parties by 11%. This suggests that small parties either strategically opt out of races where they are unlikely to garner even a small vote share, or that they are blocked from entering from major parties who fear losing crucial votes.

The second part of my paper shows that despite changes in political selection and resource allocation *prior to an election*, electoral competition does not lead to a significant improvement in incumbent performance *after an election*. I measure incumbent performance using three economic indicators: employment growth, night lights growth, and public goods provision as measured by road building in a rural roads program. The incumbent of an Indian state assembly can plausibly influence all three indicators.[7]

I first test whether electoral competition has a selection effect on incumbent performance by changing the type of politician elected in competitive constituencies. Perhaps surprisingly, I do not find evidence that politicians elected in competitive constituencies perform better once in office. The estimated effect for each economic indicator is negative, and though statistically insignificant, I cannot rule out large negative effects on employment growth, night lights growth, and road building.

Next, I test whether electoral competition influences incumbent performance through a moral hazard channel: an incumbent secure in her tenure may not be as motivated to exert effort as the incumbent who expects to face a high level of *anticipated* competition in the next election. Though here too, I cannot reject a null effect on any economic indicator, the confidence intervals do not rule out a large negative effect on employment growth, or a large positive effect on night lights growth. The effect on night lights is of similar magnitude to the increase in total light emissions observed in the year prior to an election, providing suggestive evidence that any increase in night lights is a result of actions taken close to an election, rather than throughout an incumbent's term in office.

Taken together, the empirical analysis of incumbent performance suggests electoral competition may do little to improve economic outcomes and, if anything, may lead to worse outcomes. The negative (though insignificant) selection effects indicate that even though candidates selected to run in competitive constituencies are more electable, they are not

[7]Several studies show how politicians affect these outcomes: Asher and Novosad (2017), for example, show that politician alignment with the ruling party leads to significantly higher employment and increased night light growth in a constituency. Similarly, Lehne et al. (2016) and Prakash et al. (2016) provide strong evidence that politicians influence implementation of the rural roads program.

necessarily better politicians once in office (at least when using observable economic indicators to measure performance). This implies the qualities that make a candidate electable (e.g. wealth or, in the case of the incumbent party, being a "freshman" politician) are not necessarily correlated with the qualities that make a good politician. Similarly, the moral hazard results show that politicians only respond to anticipated electoral competition close to an election. This result is consistent with the large literature on electoral cycles (e.g. Khemani (2004), Cole (2009), etc.) that show politicians reallocate resources in response to reelection concerns, but only in election years. Whether this is because voters only pay attention to politician actions in this time period, or because it is difficult to forecast future electoral competition far in advance is unclear. In either case, however, the findings suggest that electoral competition has limited influence over incumbents during their full term in office.

1.1 Related Literature

This paper contributes to three strands of literature:

Electoral competition: A handful of empirical studies examine how electoral competition affects political selection and performance. On the selection side, De Paula and Scoppa (2011) and Galasso and Nannicini (2011) study Italian politicians and find that competition improves the quality of elected politicians. Similarly, Banerjee and Pande (2018) show that stronger group identity in India worsened candidate quality. Banerjee et al. (2013) also show that reducing incumbency advantage in India motivated less politically experienced candidates to enter politics. On the performance side, the existing literature shows competition leads politicians to select less partisan, more growth oriented policies (Besley et al. (2010)), improve public goods provision (de Janvry et al. (2012), Arvate (2013), Acemoglu et al. (2014), Acemoglu et al. (2017), Kosec et al. (2015)), and reduce rent-seeking behavior (Svalerd and Vlachos (2009)). Nath (2015), on the other hand, finds that competition leads to *worse* performance by limiting an incumbent's ability to use dynamic incentives to motivate bureaucrats.

Many of the studies above use institutional features to identify the effects of electoral competition.[8] In contrast, I identify the effects of competition using short-term changes to party popularity across election cycles. This variation is a direct measure of competition, rather than a combination of competition and institutional factors, which may have different implications for selection and performance. My identification strategy is closest to the

[8]For example, Acemoglu (2013) uses the number of ruling families in Sierra Leone, Besley et al. (2010) use the introduction of the Voting Rights Act in the United States, and Nath (2015) uses a change in constituency reservation status in India.

handful of papers that exploit aggregate shifts in party popularity to instrument for electoral competition (Svaleryd and Vlachos (2009), Marx (2014), Kosec et al. (2015)). I develop a general framework building on this source of variation and using the non-monotonicity of competition in vote shares for identification.

Political selection: This paper is also related to a broader literature on how electoral institutions in general determine political selection (Caselli and Morelli (2004), Ferraz and Finan (2009), Keane and Merlo (2010), Dal Bò et al. (2017), etc.) - an important question given the large body of work demonstrating leaders play an important role in determining policy and economic performance. My empirical analysis shows how the anticipated likelihood of winning a race affects the quality of candidates and elected politicians.

Electoral cycles and swing districts: Finally, this paper contributes to the literature on political business cycles and the tactical redistribution of resources to competitive districts prior to an election (Baleiras and Costa (2004), Khemani (2004), Cole (2009), Min and Golden (2013), Baskaran et al. (2014)). Many of these papers rely on time variation in years to an election and cross-sectional variation in competition to determine whether politicians target resources to swing districts prior to an election. My paper contributes to this literature by using an instrumental variable to address the endogeneity concern that realized competition is likely a function of prior resource allocation.

The remainder of the paper is organized as follows: Section 2 presents a simple conceptual framework identifying channels through which electoral competition can affect politician behavior. Section 3 provides some background of electoral competition in India and describes the data. Section 4 develops an empirical framework to identify the casual effect of electoral competition and presents the first stage results. Section 5 presents the results. Section **??** concludes.

2 Conceptual Framework

To understand how electoral competition affects politician behavior, I present a simple framework identifying possible channels of influence. My framework is adapted from Banerjee and Pande's (2018) model of political competition and candidate selection. For simplicity, suppose there are two parties, L and R. Constituencies vary in their degree of partisanship, which is parameterized by $\lambda \in [-1, 1]$. A high (positive) value of λ implies a high degree of partisanship in favor of party L, while a low (negative) value of λ implies a high degree of partisanship in favor of party R. Constituencies with λ close to the median are competitive. A voter selects party L if $u_L + \lambda P \geq u_R - \lambda P$, where u_L (u_R) denotes the utility a voter receives from party L's (R's) actions and P is a positive number capturing the tradeoff

between a voter's valuation of party actions and a voter's partisanship.

Electoral competition can affect politician behavior across two time periods: (1) prior to an election, when political parties are choosing a campaign strategy, and (2) after an election, when elected politicians are in office. Each period is considered below.

2.1 Campaign Strategy

Consider a political party's decision problem before an election. The party has a fixed pool of candidates and resources that must be allocated across constituencies, which vary in their degree of competitiveness. Selecting a better candidate or better resources relative to other parties can increase the odds of winning. The party's objective is to win as many constituencies as possible; winning the highest proportion of constituencies provides an opportunity to form a government at the state level. Parties determine their allocations simultaneously, and without knowledge of any competing party's strategy.

The first problem is candidate allocation. Assume that candidates vary in *valence* and *quality*. A candidate's valence is a function of observable characteristics such as education, past experience, criminal background, etc. and is valued positively regardless of her ideology. For example, voters may favor candidates with more education than those with less. The former group of candidates would be considered "high valence"; the latter, "low valence". A candidate's quality, which determines her future performance in office, is unobserved but can potentially be inferred from valence. Voters determine who to vote for based on party loyalty and candidate type. A voter will select party L's candidate if $T_L + \lambda P \geq T_R - \lambda P$, where T_L (T_R) is party L's (R's) candidate valence measure.

How will parties allocate candidates? One possible equilibrium is for both parties to place their high-valence candidates in competitive constituencies. The intuition is straightforward: party L has little incentive to place its high-types in constituencies where voters are biased towards them. In these constituencies, party loyalty on its own can ensure a win. Party L also has little incentive to place its high-types in constituencies where voters are biased *against* them. Assuming high-types are limited, party L will not want to waste these candidates in constituencies where even a good candidate is unlikely to induce voters to switch from party R to L. In response, party R will also not want to waste its high-types in these constituencies, since it can win based on party loyalty alone. Both parties therefore allocate their high-type candidates to competitive constituencies.[9]

[9]This argument relies on the assumption that even the best candidate from another party is unlikely to sway voters in highly partisan constituencies. A simple example can provide further intuition. Suppose there are three constituencies with $\lambda_1 = -1, \lambda_2 = 0, \lambda_3 = 1$. Party L has three candidates ranked in order of type: $A_L > B_L > C_L$. Similarly, Party R has three candidates ranked in order of type: $A_R > B_R > C_R$. Assume that $C_L \geq A_R - 2P$, which implies that when a constituency is biased towards party L ($\lambda = 1$), even

Parties also have greater incentive to allocate resources to competitive constituencies. Competitive constituencies offer higher electoral returns than biased constituencies, where either party loyalty on its own is sufficient to guarantee a win (since the bias is in favor of a party) or even a large influx of resources is unlikely to sway voters (since the bias is against a party).[10]

2.2 Incumbent Performance

After an election occurs, competition can affect incumbent performance through two channels: (1) selection, with competition changing the type of politician elected, or (2) moral hazard, with *anticipated* competition changing incentives. Selection occurs if parties allocate candidates strategically. Whether selection improves incumbent performance, however, is ambiguous. Voters choose who to vote for based on a candidate's electability, which may or may not be correlated with a candidate's quality. If electability and quality are positively correlated, than selection should improve subsequent politician performance. If, however, electability and quality are not positively correlated, selection may not affect performance at all. This can occur if voters are myopic or uninformed about what makes a "good" politician. Competition can also affect politician performance through a moral hazard channel. Incumbents expecting to face a highly competitive race in the future may exert greater effort to ensure they are re-elected. Moral hazard will occur only to the extent that politicians can anticipate the true level of competition they will face in an upcoming election. When the true level of competition is unknown until very close to an election, this moral hazard effect will be dampened.

2.3 Testable Implications

This simple framework yields three testable implications:

1. **Candidate selection:** Parties will place high valence candidates in competitive constituencies.
2. **Resource allocation:** Parties will allocate more resources to competitive constituencies prior to an election.

party R's most electable candidate cannot beat party L's least electable candidate. Similarly, assume that $C_R \geq A_L - 2P$. Intuitively, voters in highly partisan constiutencies select only on party loyalty and ignore candidate type altogether. This implies that party L will place C_L in the constituency with $\lambda = 1$. Since party R is guaranteed to lose in this constituency, it will place B_R, so as not to waste its best candidate A_R. The best candidates from both parties, A_R and A_L will be placed in the most competitive constituency where $\lambda = 0$.

[10] This argument assumes there is no trade-off between resources and candidates. In a richer model, parties may substitute between resources and candidates when making allocation decisions.

3. **Incumbent performance:** Competition will improve incumbent performance through a *selection effect* if parties allocate high valence candidates to competitive constituencies and this type is positively correlated with quality. Competition will improve incumbment performance through a long-term *moral hazard effect* if politicians can anticipate future competition.

3 Setting and Data

3.1 Indian State Elections

My empirical analysis focuses on state elections in India. State elections are conducted in a first-past-the-post system, with the candidate obtaining a plurality of votes in an election winning the single-member constituency. The party that wins the highest proportion of constituencies within a state has the opportunity to form the state-level government, either on its own or by forming a coalition with other parties. Elections are held every five years,[11] with different states holding elections in different years.

Though the Indian National Congress Party dominated elections in India's early post-Independence years, several parties have become formidable challengers over the last few decades. These parties include the Bharatiya Janata Party (BJP), Congress' main opposition party at the national level, as well as several regional and caste-based parties that regularly win elections at the state-level. Figure 2A maps electoral competition over time and across regions in India. The average winning margin, which measures the difference in vote shares between the winner and runner-up candidate in an election, declined from between 15 to 20% in the 1950s to approximately 12% in the 2000s, an indicator of highly competitive elections.[12]

The average state election fields 12 candidates, with approximately half representing parties and half running as independents. In most elections, however, the top two or three candidates capture 60 to 70% of the vote share, indicating the *effective* number of parties in an election is much lower. The top parties in a constituency vary by state. Figure 2B displays variation in vote shares in 2007 state elections in Gujarat, Punjab, and Uttar Pradesh. Congress was among the top three parties in each state, but its relative strength varied considerably: in Gujarat and Punjab, Congress captured 20 to 40% of the total vote share, but captured only 5% in Uttar Pradesh. The *identity* of the opposition party also varied by state: in Gujarat, Congress faced the stiffest competition from BJP, but in Punjab, the Sikh regional party Shiromani Akali Dal (SAD) and in Uttar Pradesh, the caste-based

[11] Elections can be called early, but most election terms last the full five years.

[12] For comparison, the average winning margin in the 2016 elections for the US House of Representatives was 37%.

Bahujan Samaj Party (BSP) formed the strongest opposition.

Once elected, state governments command significant administrative and legislative power. State governments are responsible for the provision of public goods and services, overseeing credit, managing land rights, and collecting retail taxes (Asher and Novosad, 2017). In addition, state governments influence the management of state-run companies, either by direct intervention in company decisions or indirect political appointments. For example, state governments frequently intervene in the operation of state power utilities, selecting villages for electrification projects and determining the location and length of power outages (Baskaran et al., 2015). State governments also influence state-owned public sector banks by appointing board members to key committees that set credit levels (Cole 2009).

Though the executive branch wields much of this power formally, elected members of state assembly constituencies (MLAs) play a significant informal role acting as intermediary between citizens and the state. Voters expect MLAs to help obtain goods and services (Asher and Novosad, 2017, Chopra, 1993) and assess MLAs accordingly on their ability to "get things done" (Jensenius, 2013). MLAs also exert control over the state bureaucracy via promotions and transfers (Iyer and Mani 2012, Sukhtankar and Vaishav 2015). Taken together, this formal and informal power over public goods, infrastructure, and bureaucrats suggests that state governments may have considerable influence on the economic prospects of a constituency. A growing body of empirical work has provided evidence in support of this hypothesis, demonstrating that the state government and MLAs influence employment and night light growth in a constituency (Asher and Novosad, 2017; Baskaran et al. 2015) and the provision of public goods (Lehne et al, 2016; Prakash et al, 2016).

3.2 Data

I conduct the empirical analysis on a panel of Indian state assembly constituencies from 1989 to 2007, and from 2008 to 2017.[13] To study the effects of electoral competition on politician behavior, I combine data from several sources, described in detail below:

Elections: Data on Indian state elections is assembled for each election held between 1989 and 2017 using the Election Commission of India's reported statistics. I collect data on each party that fielded a candidate in an election, party vote shares, and voter turnout. I also collect data on alliances between the party in control of the state government and other parties between 1989 and 2008 from Asher and Novosad (2017).

Candidate characteristics: Data on candidates is collected from the Election Commission

[13] Because constituency boundaries were redrawn in a delimitation exercise in 2008, I cannot link constituencies before and after this period.

and the Association for Democratic Reforms (ADR), a non-partisan organization dedicated to increasing transparency in electoral politics. The Election Commission reports the gender and names of all candidates in all election years, the latter allowing me to determine if a candidate has prior political experience or is a newcomer. ADR also reports a candidate's age, education level, declared assets and liabilities at the time of the election, and any criminal convictions against the candidate. This data, however, is available only from 2004 onwards.

Official campaign financing and expenditure: The Election Commission of India publishes official campaign financing and expenditure data for all winning candidates of state assembly elections from 2008 onwards. Official spending is capped at Rs. 2.8 million (approximately $\$40,000$), but it is well-known that candidates spend in excess of that amount (see Bussell et al. (2018)). This data therefore reflects how candidates finance campaigns *officially* and how this money is spent.

Night lights: I use satellite data on night lights to proxy for electricity supply and economic growth. The National Oceanic and Atmospheric Administration publishes gridded average annual night light data from 1992 onwards. Night lights are measured on a scale from 0 to 63, allowing me to compare night lights intensity across grids in the same year.[14] I match grids to constituency polygons in each election year and compute the log of total night lights intensity. I estimate changes in night lights over a short, one year period and a longer term five year period. It is likely that changes in night lights over the shorter time horizon are driven primarily by changes in electricity supply, rather than economic growth. However, because I cannot conclude this definitively, I interpret night lights as a proxy for both electricity supply and economic growth.

Employment growth: Data on employment growth is obtained from the Economic Censuses conducted in 1990, 1998, and 2005. The Censuses track all firms from the manufacturing and service sectors across India in repeated cross-sections. I use Asher and Novosad's (2017) Census data, which is merged to constituencies using location identifiers, and use their measure of employment growth: the change in log constituency-level employment from 1990 to 1998 and 1998 to 2005. This measure is an imperfect reflection of a politician's performance during her election term: the 7 year time frame spans two election terms so it captures a combination of the performance of a politician and her successor. Given the lack of high frequency, high resolution economic data, however, this measure allows for the best assessment of a politician's impact on economic performance in her constituency.

[14]Because satellite-specific factors such as sensor properties can affect how well night lights are measured, I can only compare grids in the same year, which are all measured using the same satellite technology. This is not a problem in my setting since my empirical specifications include year fixed effects.

Public goods: Public goods are measured using construction data from the Pradhan Mantri Gram Sadak Yojana (PMGSY), a national rural roads plan to provide roads to unconnected villages. The program is implemented by bureaucrats, but there is strong evidence that politicians influence the allocation of road contracts (Lehne et al. 2016) and project completion (Prakash et al. 2016). Data is collected from 2000 onwards at the Census-block level. I use matched data from Prakash et al. (2016), which assigns a block to a constituency if at least 50% of villages in a block also belong to that particular constituency.

4 Empirical Framework

In this section, I present a general empirical framework to estimate the effects of electoral competition on politician behavior. First, I introduce the main specification (Section 4.1) and propose a shift-share instrument for electoral competition (Section 4.2). Next, I detail how the instrument is constructed and discuss the identifying assumptions (Section 4.3). Finally, I present the first stage results (Section 4.4).

4.1 Main Specification

The goal of this paper is to estimate the causal effect of electoral competition on politician behavior in Indian state elections. Since most outcomes are observed for constituencies across multiple years, the basic specification can be written as follows:

$$y_{cst} = \beta Competition_{cst} + \alpha_c + \delta_{st} + \epsilon_{cst} \tag{1}$$

where y_{cst} is an outcome for constituency c in state s and year t, C_{cst} is a measure of electoral competition either anticipated in an upcoming election or realized in the past election, α_c are constituency fixed effects and δ_{st} are state-year fixed effects. Constituency fixed effects absorb time-invariant variation at the constituency level, while state-year fixed effects absorb variation across years within a state. The coefficient of interest, β, estimates the effect of competition on outcomes within the same constituency across years, compared to other constituencies in a given state-year. Standard errors are clustered at the constituency level.

4.1.1 Defining competition

I measure electoral competition in two ways: the winning margin and Herfindahl-Hirshman Index (HHI). I define *competition* as the difference in (realized or expected) vote shares between the incumbent and her opposition. In first-past-the-post electoral systems, where a party need only secure a plurality of votes to win, this difference reflects the level

of competition an incumbent faces when trying to win an election. The closer an incumbent party's vote share to the opposition, the more competitive an election is for her. Using notation, we have:

$$Competition_{cst} = 1 - |s_{icst} - s_{ocst}| \tag{2}$$

where s_{icst} is the vote share of the incumbent party and s_{ocst} is the vote share of the opposition. In multi-party settings such as India where there may be more than one opposition party, s_{ocst} is the vote share of the (realized or expected) *strongest* opposition, $s_{ocst} = \max\{s_{1cst}, s_{2cst}, \ldots, s_{kcst}\}$.

There are two limitations to this measure. First, the measure is incumbent-centric, and ignores cases where a party other than that of the incumbent may be the relevant challenger to the opposition. Second, there are cases where the assumption that the incumbent party ignores the behavior of all other parties except the strongest opposition may be less likely to hold. For example, suppose in a three-party setting Constituency 1's vote shares for parties A, B and C are $\{0.50, 0.48, 0.02\}$, while Constituency 2's vote shares are $\{0.35, 0.33, 0.32\}$. Using my measure of competition for the incumbent party A, both constituencies would be assigned a value of 0.98, indicating highly competitive races. However, it is likely that party A faces a greater degree of competition in Constituency 2, where both opposition parties are strong challengers, than in Constituency 1, where only one opposition party poses a credible threat. To deal with these scenarios, I use an additional measure of competition: the dispersion of party vote shares. To construct this measure, I compute the HHI for the incumbent and opposition parties. Using notation, we have:

$$Dispersion_{cst} = 1 - \sum_{p=1}^{k} (s_{pcst})^2 \tag{3}$$

This measure is not incumbent-centric and increases as a party faces a credible threat from multiple opposition parties.[15]

4.2 Instrument for Electoral Competition

4.2.1 Identification challenge

The challenge in estimating equation (1) is that electoral competition is likely to be endogenous to outcomes of interest. In particular, unobserved time-varying constituency char-

[15] If there are k parties, dispersion can range from 0 (vote shares are concentrated in one party), to $1 - \frac{1}{k}$ (vote shares are dispersed equally among all k parties).

acteristics may be correlated with electoral competition and outcomes, leading to biased estimates of β. Consider a specification estimating the effects of competition on candidate selection. A party's choice of candidate will change its expected vote share, shifting the level of competition. Suppose, for example, that a party fields a wealthy candidate who is able to finance vote buying exchanges prior to an election. If the party was otherwise not expected to do well in the race, this would increase the level of competition. If, on the other hand, the party was expected to do well, selecting a candidate who could take actions to increase the party's vote share even further would decrease the level of competition. In either case, estimates of the effect of competition on the selection of wealthy candidates would be biased (upwards in the first case, downwards in the second case).

A similar concern holds when estimating the effects of competition on economic outcomes. Incumbents in constituencies with high economic growth or better public goods provision likely face less competition than those in constituencies with low economic growth or poor public goods provision. This reverse causation would bias estimates of β downwards. On the other hand, more parties may choose to field candidates in constituencies experiencing economic growth or better public goods. These constituencies are arguably easier to administer and offer higher potential rents. This would lead to *greater* competition, and bias estimates of β upwards.[16]

4.2.2 Motivation for instrument

To address these endogeneity problems, I propose a shift-share instrument that exploits changes to aggregate party popularity over time to predict electoral competition. To motivate the instrument, consider two types of voters: (1) partisan voters, who vote for a party based on ideological preferences, and (2) swing voters, who vote for a party based on performance. Swing voters observe a party's performance not only at the constituency level, but also at the state or national level. This latter source of variation can be used to construct an instrument. As an example, a state-level corruption scandal involving politicians from the Congress Party may compel swing voters to shift their support towards Congress' opposition. This shift in vote share will change the level of competition in a constituency, with the direction of the change depending on the policy preferences of its partisan voters. In constituencies with a large Congress base, the state-level corruption scandal will lead to an increase in competition by increasing the vote share of the opposition. In constituencies

[16] Yet another potential source of bias is the correlation between changes in party vote shares and changes in constituency demographics such as income level or ethnicity. If voters select parties along ethnic lines (which is often the case in India), we may estimate $\hat{\beta} > 0$ (alternatively, $\hat{\beta} < 0$), not due to the effect of competition on politician performance, but because constituencies with more heterogenous (alternatively, homogenous) populations have better outcomes.

with a low Congress base, the corruption scandal will lead to a decrease in competition, since the opposition already has a secure vote share. Because changes in competition are driven by actions at the state rather than constituency level, they are not susceptible to the endogeneity concerns described above.

The motivation for the instrument is shown graphically in Figure 3A. For simplicity, I illustrate a two-party setting, though the intuition carries over to the multi-party case. Suppose there are two parties, a left-wing party, L, and a right-wing party R. Constituency preferences vary from left (0 to 0.5) to right (0.5 to 1). Competition, as defined in equation (2), is plotted as a function of constituency policy preferences.[17] Constituencies where policy preferences are close to the median are competitive. Constituencies where policy preferences are towards either extreme (left or right) are not competitive: the left-wing party is always elected in constituencies where preferences are towards the left, while the right-wing party is always elected in constituencies where preferences are towards the right.

Suppose a state-level corruption scandal occurs, reducing the popularity of the right-wing party among swing voters. This negative shock, shown in Figure 3B, shifts the competition curve towards the right and changes the level of competition across constituencies non-monotonically. Constituencies near the median which were once competitive become less so as the left-wing party becomes relatively more attractive. On the other hand, constituencies which were once the right-wing party's stronghold become more competitive.

In a multi-party setting such as India, the effects of state-level shifts in party popularity are similar, though more complicated since the composition of policy preferences can vary across constituencies. For example, some constituencies may be dominated by the left-wing and right-wing parties, while others may be dominated by the left-wing and more centrist parties. Aggregate changes in the right-wing party's popularity would affect these types of constituencies differently, with competition changing in constituencies choosing between the left-wing and right-wing parties, and remaining the same in constituencies choosing between the left-wing and centrist parties. The basic intuition, however - state-level changes in a party's popularity affect a constituency's level of competition - still holds.

4.3 Constructing the Instrument

Using the intuition presented in Figure 3, I construct a shift-share instrument, where "shifts" are changes to aggregate party popularity over time and "shares" are a measure of constituency policy preferences, to predict electoral competition. I construct the instrument

[17] We can also motivate the instrument by plotting dispersion, as defined in equation (3), as a function of constituency policy preferences. The functional form of electoral competition will change, but the intuition carries over.

in two steps. First, I predict party vote shares for each constituency and in each election year using the shifts and shares. Second, I use these predicted vote shares to predict electoral competition. Predicted electoral competition is used to instrument for actual electoral competition. Each step is described in detail below.

4.3.1 Predicting party vote shares

Party vote shares are predicted using state-level shifts in party popularity and constituency policy preferences. I compute the state-level shifts using a leave-out measure of the growth or decline in party support in a state across election years. By leaving out the change in party support in the constituency of interest, I ensure that changes in vote shares are not driven by location-specific factors such as the selection of a particular candidate or the actions of the incumbent. I use state-level growth rates, rather than an overall national growth rate, since party popularity in India is typically state-specific. The shifts are analogous to those used in the traditional shift-share framework, which decomposes growth rates into an aggregate component and location-specific component, using the former to construct the instrument.

I compute constituency preferences using party vote shares in the baseline year, defined as the first election year in the sample period for each state. Baseline vote shares proxy for constituency partisanship, though they are a combination of both constituency partisanship and any shocks to party popularity in the baseline year.[18]

Denoting the baseline party vote share for each party p in each constituency c and state s as z_{pcs} and the leave-out measure of state-level changes to party support from the baseline year to time t as g^{-c}_{pst}, the predicted vote share for party p is given by:

$$\hat{s}_{pcst} = z_{pcs} + g^{-c}_{pst} \tag{4}$$

The predicted party vote shares, $\hat{s}_{pcst}$, will be close to the true party vote shares to the extent that baseline party support shifts along with state-level trends in party popularity. This is is likely to occur in constituencies with a large proportion of swing voters. It is unlikely to occur in constituencies with a large proportion of partisan voters loyal to a particular party and inelastic to state-level trends.

To test if predicted party vote shares are close to actual party vote shares, I estimate

[18]Ideally, constituency preferences would be measured by party registration or survey data on party affiliation at baseline. Given that party registration data is unavailable, however, baseline vote shares provide the next best measure of constituency preferences.

the following specification in Table 1:

$$VoteShare_{pcst} = \gamma PredictedVoteShare_{pcst} + \alpha_c + \delta_{st} + \epsilon_{cst} \tag{5}$$

I predict party vote shares for four major parties in each state: the Indian National Congress Party (INC), the Bharatiya Janata Party (BJP), and the two largest parties in each state (excluding INC and BJP). Together, these parties capture approximately 76% of the total vote share in each election year and represent the major players in most constituencies.[19] Before estimating the specification, I re-scale party vote shares to sum to 1. This ensures that I capture the relative popularity of these four parties with respect to one another, rather than to smaller parties or independent candidates.

Each column in Table 1 reports results for a single party. The coefficient on predicted vote share for all parties is positive and statistically significant, suggesting that support for these parties is responsive to state-level trends.[20] A look at the data suggests the "errors" in prediction are largely of commission (I predict a positive vote share, when the actual vote share is 0) or omission (I predict a 0 vote share, when the actual vote share is positive). These are driven by idiosyncrasies in the baseline year. For example, if I do not observe a party compete in a constituency in the baseline year, and I only observe negative shocks to the party's popularity in a state, I will always assign a 0 vote share to that party in that constituency - even if it fielded candidates in later elections. Aside from these types of errors, however, there is a strong relationship between predicted and actual vote shares.

4.3.2 Predicting electoral competition

I construct two instruments for electoral competition using the predicted vote shares described above. Using the measure for electoral competition defined in equation (2), predicted competition is given by:

$$PredictedCompetition_{cst} = 1 - |\hat{s}_{icst} - \hat{s}_{ocst}| \tag{6}$$

where $\hat{s}_{icst}$ is the predicted vote share for the incumbent party and $\hat{s}_{ocst} = \max\{\hat{s}_{1cst}, \hat{s}_{2cst}, \ldots, \hat{s}_{kcst}\}$, is the predicted vote share for the opposition party predicted to be the strongest.

[19] In principle, it is possible to extend the analysis to additional parties. However, to the extent that the popularity of smaller parties is driven by location-specific, rather than state-specific, factors, the predictions will be less powerful.

[20] Note that the predicted vote shares are a combination of constituency-specific and state-year-specific variation. Predicted vote shares are not entirely collinear due to constituency-specific variation in aggregate shocks. The results in Table 1 are qualitatively similar when removing constituency fixed effects, state-year fixed effects, and both constituency and state-year fixed effects from the specification.

Using the measure for electoral competition defined in equation (3), predicted dispersion is given by:

$$PredictedDispersion_{cst} = 1 - \sum_{p=1}^{k} (\hat{s}_{pcst})^2 \tag{7}$$

Each predicted measure of electoral competition is used to instrument for actual predicted competition. The basic first stage equations are given by:

$$Competition_{cst} = \gamma PredictedCompetition_{cst} + \alpha_c + \delta_{st} + \epsilon_{cst} \tag{8}$$

$$Dispersion_{cst} = \gamma PredictedDispersion_{cst} + \alpha_c + \delta_{st} + \epsilon_{cst} \tag{9}$$

4.3.3 Identifying assumptions

The key identifying assumption for the instruments is that predicted competition or predicted dispersion are not correlated with outcomes other than through their effect on actual electoral competition, conditional on constituency and year fixed effects. There are two potential threats to this assumption: endogeneity of shares and the violation of the stable unit treatment value assumption (SUTVA). I address each potential threat below.

Shares: Shift-share instruments are a common empirical strategy in the trade and immigration literature.[21] Several recent studies have focused on opening the "black box" of these instruments to clarify the assumptions needed for identification (Goldsmith-Pinkham et al (2018), Borusyak et al. (2018)). Goldsmith-Pinkham et al. (2018) argue that a shift-share instrument is asymptotically equivalent to using the shares themselves as instruments, implying that shares cannot be endogenous to outcomes.[22]

Unlike in the standard shift-share framework, the shifts in my setting affect predicted competition non-monotonically, with the same shift increasing competition in some constituencies while decreasing competition in others depending on the shares. In other words, the shares determine how predicted competition changes both in *magnitude* and *direction* in response to a shift. In the standard shift-share framework, by contrast, the instrument is the inner product of shares and shifts and the shares determine only the magnitude of the response to a shift, not the direction.[23]

[21] Jaeger et al. (2018) note, "It is difficult to overstate the importance of this instrument for research on immigration. Few literatures rely so heavily on a single instrument or variants thereof."

[22] Borusyak et al. (2018) propose an alternative identification assumption relying on the exogeneity of shocks. However, their argument assumes the number of shocks grows in number with the sample - an assumption not applicable to my setting.

[23] See Appendix B for a simple example clarifying the difference between standard shift-share instruments,

Since I am interested in identifying the effect of a non-monotonic function of shares (where the non-monotonicity is driven by the functional form of competition in vote shares), I can control for any effects driven by the shares themselves in my specifications. I estimate a modified version of equation (1) that controls directly for predicted vote shares:

$$y_{cst} = \beta Competition_{cst} + \sum_{i=1}^{k} \theta_i \hat{s}_{icst} + \alpha_c + \delta_{st} + \epsilon_{cst} \tag{10}$$

The coefficients θ_i control for the direct effects of the predicted vote shares for each party, while the coefficient of interest, β, estimates the causal effect of competition on outcomes y_{cst}.

SUTVA: A second identification concern is the potential violation of the stable unit treatment value assumption (SUTVA). Any shift in party vote shares treats all constituencies in a state, leaving no "pure control" group. To see this clearly, suppose the party in control of the state government prioritizes resource allocation to competitive constituencies. Assuming the level of resources is fixed, a shift in party vote shares that increases the number of competitive constituencies will lead to a reduction in resources in non-competitive constituencies.

This concern can be addressed by interpreting β appropriately. β is the effect of experiencing a greater degree of competition on an outcome *relative* to other constituencies in the same state-year that experienced a lower degree of competition. In other words, β estimates the effect of competition in the observed equilibrium allocation.

4.4 First Stage

Having presented the empirical framework for estimating the causal effect of electoral competition, I now turn to the first stage results. Table 2 estimates the relationship between predicted competition and actual competition (Panel A), and predicted dispersion and actual dispersion (Panel B). Each specification controls for constituency and year fixed effects. In Panel A, Column (1) regresses actual competition on predicted competition. In Columns (2) through (4), I add predicted party vote shares for BJP, Congress, and the top two parties in each state one-by-one. In Column (4), I estimate the preferred first stage equation controlling for all predicted party vote shares:

$$Competition_{cst} = \gamma PredictedCompetition_{cst} + \sum_{i=1}^{k} \theta_i \hat{s}_{icst} + \alpha_c + \delta_{st} + \epsilon_{cst} \tag{11}$$

and the shift-share instrument used here.

The results suggest a strong and robust relationship between actual and predicted competition. The coefficient for predicted competition is positive and statistically significant. Including the direct effects of predicted party vote shares does little to change the coefficient on predicted competition, which remains stable around 0.33. The F-statistic is well above conventional levels in all of the specifications. These results indicate the relationship between predicated and actual competition is driven by the non-monotonicity of predicted vote shares rather than direct policy preferences.

In Panel B, I conduct a similar analysis regressing actual dispersion on predicted dispersion. Here again, there is a strong relationship between predicted and actual dispersion that holds even after controlling for the direct effects of predicted party vote shares. The F-statistic is lower than that for predicted competition, but still above conventional levels.

In Figure 4, I present an example of how predicted and actual competition vary non-monotonically as a function of initial shares. To illustrate the non-monotonicity, I focus on competition between two parties, BJP and INC, in the state of Karnataka. Figure 4 plots predicted and actual competition as a function of INC vote shares across election years. The blue dots show the actual level of competition between BJP and INC, while the red dots show the predicted level of competition between BJP and INC. Panel A displays the mechanical relationship between competition and INC vote shares in the baseline year. Panel B shows that competition shifts towards the right in 1994, as the BJP becomes a more competitive party vis-a-vis INC. Constituencies that were once INC strongholds become more competitive. In 1999, competition shifts back towards the left, indicating a positive shift for INC in Panel C. Finally, in Panel D, the BJP once again becomes competitive, threatening INC strongholds.

Figure 4 also shows that the set of competitive constituencies in Karnataka changes across election years. This suggests a substantial share of constituencies respond to aggregate shifts in party popularity. In Appendix A, Table 1, I compute the standard deviation of competition and dispersion (actual and predicted) within the same constituency across election years to show this occurs in nearly all states: Column (2), for example, shows that the median standard deviation of predicted competition within constituencies is 0.12.[24] For comparison, the corresponding standard deviation is 0.19 in Karnataka.

[24]Delhi and Tripura are exceptions, with low variation in predicted competition within constituencies. Constituencies in these states experience some variation in competition (the standard deviation of actual competition, shown in Column (1), is larger); but this variation is likely driven by factors other than state-level trends.

5 Results

This section presents the core empirical results on electoral competition and politician behavior. The first part of the analysis focuses on political parties' campaign strategy *before* an election, while the second part studies incumbent performance *after* an election.

5.1 Political Selection

I begin by presenting the effects of electoral competition on the selection of candidates (Section 5.1.1) and elected politicians (Section 5.1.2).

5.1.1 Candidates

Turnover: A necessary first step in examining how electoral competition affects candidate selection is to establish that candidates change over time. If political parties field the same candidates repeatedly across election cycles, then short-term changes in electoral competition will have little effect on the distribution of candidates across constituencies. I identify whether a candidate has changed across election cycles by conducting a fuzzy string match on candidate names. Average candidate turnover in Indian state elections is high: approximately 75% of candidates running for office are different than the candidate who ran on the party's ticket in the preceding election year. The turnover rate for candidates of the incumbent party is markedly lower in comparison: the incumbent party replaces a sitting politician only 39% of the time.

Table 3 shows that electoral competition increases the incumbent party's turnover rate. I estimate equation (10) with candidate turnover as the dependent variable in four samples: (1) all parties' candidates, (2) the incumbent party's candidates, (3) the strongest opposition party's candidates, and (4) all remaining parties' candidates. To control for possible differences in political parties' pool of potential candidates, I also include party fixed effects in each specification. The results without party fixed effects, reported in Appendix Table 2, are largely similar qualitatively.

Panel A presents estimates using the incumbent winning margin to measure electoral competition. Columns (1) and (2) report OLS and 2SLS estimates for the sample including all candidates. Both coefficients are negative and similar in magnitude, but the 2SLS point estimate is imprecise. Column (3) restricts the sample to the incumbent party. Though insignificant, the point estimate is positive and large in magnitude. Since the standard deviation of my measure of competition is approximately 0.3, the estimate suggests a one standard deviation increase in competitiveness leads to a 18.9 percentage point in-

crease in the likelihood the sitting politician is replaced by the incumbent party (48% of the mean).[25]

In Panel B, I use the dispersion of vote shares to measure electoral competition. Column (3) shows that a one standard deviation increase in dispersion (approximately 0.2) increases the incumbent party's turnover rate by 36.6 percentage points - a doubling of the mean turnover rate of 39%. This estimate is significant at the 5% level. This result is consistent with anecdotal evidence that incumbent parties remove sitting politicians who are unlikely to be re-elected.[26] In settings such as India where there is significant anti-incumbency bias (Linden, 2004), replacing the incumbent politician may be a necessary strategy for the incumbent party to remain viable in competitive constituencies.

I find no significant effect of electoral competition on non-incumbent parties' turnover rate. Average candidate turnover for these parties is fairly high (77% for the strongest opposition party and 92% for other parties). Columns (4) and (5) of Panel B report negative effects on turnover for non-incumbent parties, but these coefficients are imprecisely estimated. Though this result should be interpreted with caution (especially since I do not observe a similar effect in Panel A), it suggests that non-incumbent parties may have an incentive to remain with the candidate who ran in the last election. One possible reason may be name recognition: the candidate who ran in the previous election is likely recognizable and unlike the incumbent, cannot be judged by their performance in office.

Taken together, these results suggest parties *do* field different candidates across Indian state election cycles on average, and that competition increases the incumbent party's turnover rate.

Criminal Record: I next examine whether electoral competition leads to the positive or negative selection of candidates in observable measures of valence. The first measure of valence is a candidate's criminal record at the time of declaring her candidacy.

Data on candidates' background is available only for 2004 onwards. Since constituency boundaries were redrawn in 2008, I cannot compare constituencies before and after this time period. This means I observe only one election for most constituencies between 2004 and 2008, and only one election for most constituencies between 2008 and 2017.[27] To deal with this issue, I run a modified version of equation (10) by stacking constituen-

[25]The corresponding estimate without party fixed effects is also positive, but smaller in magnitude. However, the coefficient is still substantially larger than the effects on non-incumbent parties' turnover rate. The estimated effect using dispersion to measure electoral competition is large and significant, both with party fixed effects (at the 5% level) and without party fixed effects (at the 10% level).

[26]See, for example, https://www.hindustantimes.com/india-news/bjp-to-conduct-survey-in-rajasthan-to-gauge-popularity-of-its-mlas/story-QeL2Tm30c2b4RsPwzXASHO.html.

[27]Two actual election years are observed, but the baseline year - used to construct initial shares - cannot be used for analysis.

cies before and after delimitation and running a cross-sectional regression with additional controls. The 2SLS specification is as follows:

$$y_{cst} = \beta Competition_{cst} + \sum_{i=1}^{p} \theta_i \hat{s}_{icst} + \delta_{st} + \gamma_p + \mathbf{X}'_{cst}\Omega + \epsilon_{cst} \tag{12}$$

where γ_p are party fixed effects and $\mathbf{X}'_{cst}$ is a vector of controls: the initial level of competition and initial vote shares in each constituency. The controls address the concern that unobserved variation across constituencies may bias estimates. β estimates the effect of electoral competition on candidate selection, conditional on a constituency's baseline level of competition, party preferences in the current and baseline year, and state-year fixed effects.

Results are reported in Table 4A, and shown graphically in Figures 5A and 5B. Panel A of Table 4A shows a one standard deviation increase in electoral competition lowers the probability a candidate has a criminal record by 4.8 percentage points. Given that 27% of candidates report having a criminal record at the time of declaring their candidacy, this represents a substantial drop of 17.7%. Panel B shows the effects of electoral competition are even larger when measured by dispersion: a one standard deviation increase in the dispersion of party vote shares lowers the probability a candidate has a criminal record by 10.6 percentage points, or 40% of the mean.

While the estimated effects are negative for incumbent and non-incumbent parties, the effects are more precisely estimated for the latter group (Columns (4) and (5)). This can be explained by the relatively higher candidate turnover rate for non-incumbent parties - non-incumbent parties frequently select new candidates in each election cycle; the incumbent party less so.

Education: Electoral competition also leads to the positive selection of candidates by educational attainment, with the effect concentrated in non-incumbent parties. I measure education on a 0 to 7 scale, ranging from no formal education (illiterate) to post-graduate education. Columns (1) and (2) of Table 4B report the OLS and 2SLS estimates for all candidates. While the OLS coefficient is insignificant, the 2SLS is positive and precisely estimated: a one standard increase in competition leads to a 0.13 category point increase in a candidate's educational level (2.5% of the mean), while a one standard deviation increase in dispersion leads to a 0.47 category point increase (8.9% of the mean). The results are robust to different ways of coding education (e.g. years of schooling, secondary school completion versus incomplete or no secondary school). Columns (3)-(5) show the effects are driven by candidates of non-incumbent parties, rather than those of the incumbent party.

Net Assets: Next, I examine the effects of electoral competition on a candidate's net assets

at the time of declaring candidacy. For non-incumbent candidates, net assets provide a proxy of a candidate's private sector outside options and can therefore be considered a measure of valence. Net assets are measured by the sum of reported movable and immovable assets minus any liabilities. The estimated effects of electoral competition, reported in Table 3C, are insignificant for all parties. Column (3) reports a negative coefficient for the incumbent party, while Column (4) reports a positive coefficient for the strongest opposition party. However, these estimates are too imprecise to distinguish.

These results stand in contrast to those for criminality and education, where competition leads non-incumbent parties in particular to select higher valence candidates. Here, there is no significant effect on non-incumbent party candidates' net assets. One possible explanation is that education and criminality are both positively correlated with wealth: a candidate with at least a secondary school education reports 34% higher wealth than a candidate without secondary school education, while a candidate with a criminal record reports 36% higher wealth than a candidate without a criminal record. Since competition positively selects on the former and negatively on the latter, any effect on wealth could cancel out.

Gender and Age: Finally, I also test whether electoral competition leads to the selection of candidates that differ by gender or age. While these demographics are not necessarily linked to valence, it is worth exploring whether electoral competition can create space for traditionally less well-represented groups (e.g. women, younger individuals) to enter politics. Appendix Table 3A reports the effect of electoral competition on the gender of a candidate.[28] I find little significant effect on a candidate's gender, except in the sample of opposition party candidates. Column (3), Panel A shows a one standard deviation increase in electoral competition, as measured by the incumbent's winning margin, leads to a 3.9 percentage point increase in the likelihood the opposition party selects a female candidate. This is a sizable increase over the mean of 6%. However, the effect is no longer significant when measuring electoral competition by the dispersion of vote shares (Column (3), Panel B), and does not hold for non-incumbent parties other than the strongest opposition (Column (4)) .

Appendix Table 3B reports the effect of electoral competition on the age of a candidate. Here too, I find little significant effect, except in the sample of non-incumbent parties (Column (5)), where the effects are significant but small in magnitude. For this sample, a one standard deviation increase in competition lowers the average candidate's age by about one year (from a mean age of 47 years) and a one standard deviation increase in the dispersion of vote shares lowers the average candidate's age by about 3 years. It is worth noting that the coefficients for all samples are negative, indicating candidates in competitive

[28]Since data on gender is available in all election years, I can estimate the specification with constituency fixed effects (e.g. equation (10)).

constituencies are younger, but the results are too noisy to reject the null.

Discussion: The results above, summarized in Figures 5A and 5B, provide evidence that electoral competition between political parties leads to the positive selection of candidates in Indian state elections. Candidates placed in competitive constituencies are less likely to have criminal records and are more educated than candidates placed in non-competitive constituencies.

The underlying assumption of this analysis is that voters value a candidate's lack of criminal record and educational attainment, which is why they are selected to run in competitive constituencies. Of course, candidates without these attributes are still frequently elected (and re-elected) in India. One explanation is that voters actually prefer criminal or less (observably) qualified candidates because of their ethnic ties or the patronage they provide (Banerjee et al. 2014). Simply comparing the vote shares of high and low valence candidates cannot reveal voters' preferences since, as the above analysis shows, candidates are placed strategically across constituencies. The empirical evidence on voter preferences suggests that voters do not, in fact, prefer criminal or less qualified candidates. In a survey experiment asking voters in Uttar Pradesh to choose between hypothetical candidates with and without criminal records, for example, voters expressed strong preferences for the latter (Banerjee et al. 2014). In another experiment in Delhi, though voters did not pay attention to candidates' criminal records, they were more likely to vote for non-incumbents with higher education (Banerjee et al. 2011).[29] This suggests that low valence candidates may be elected not because of voters' preferences, but for other reasons such as a lack of viable competing candidates - an explanation consistent with the empirical analysis of electoral competition above.

5.1.2 Elected Politicians

The preceding analysis demonstrates that electoral competition improves the quality of the *candidate pool*. Whether electoral competition leads to the positive selection of *elected politicians* is arguably a more important question since these individuals determine policy once in office. The selection effects on elected politicians may differ from those on candidates if incumbent and non-incumbent party candidates differ on observables, and if certain types of candidates (e.g. more educated, wealthier, etc.) have a higher likelihood of winning.

Table 5 estimates the effect of electoral competition on valence (as measured by

[29] Dal Bó and Finan (2018) provides an overview of empirical evidence showing voters care about valence in a number of settings.

criminality, educational attainment, and reported assets), and demographic characteristics (gender and age). The corresponding estimates are summarized in Figure 6. The results suggest that the politicians elected in competitive constituencies are less likely to have a criminal record and wealthier than those elected in non-competitive constituencies. Column (1) in Panel A shows a one standard deviation increase in competition decreases the likelihood an elected politician has a criminal record by 7.8 percentage points, or 23%. When using the dispersion of vote shares to measure competition in Panel B, the effect is still large and negative, but imprecisely estimated. Column (2) suggests a positive effect of competition on the educational attainment of educated politicians. These estimates are insignificant, however, and smaller in magnitude than the estimates for candidates. Finally, Column (3) shows elected politicians in competitive constituencies are much wealthier than those in non-competitive constituencies: a one standard deviation increase in competition leads to a 33% increase in reported net assets, while a one standard deviation increase in dispersion leads to a 57% increase.

Table 5 also shows that electoral competition has little effect on the age or gender of Indian state politicians. The estimates in Columns (4) and (5) are small and insignificant, suggesting that at least in this setting, competition does not increase the representation of less well-represented groups in legislative assemblies.

Discussion: These results provide evidence that electoral competition also leads to the positive selection of elected politicians. This is seen most clearly in the decline in the likelihood an elected politician has a criminal record as a constituency becomes more competitive. The estimates for education are more muted, perhaps because electoral competition leads to the positive selection by educational attainment of only non-incumbent party candidates (see Table 4B). Since incumbent party and non-incumbent party candidates are almost equally likely to win as a constituency becomes more and more competitive, the selection effect on education is dampened.[30]

The strongest selection effect is in net assets: the politician elected in a competitive constituency is much wealthier than the politician elected in a non-competitive constituency. Given that there is no significant difference in the wealth of the candidate pool running in competitive and non-competitive constituencies, this implies that wealthier candidates are systematically more likely to win in competitive constituencies. How should we interpret these results? On the one hand, net assets provide a proxy for a politician's private sector outside options (if they were previously not in politics). Higher net assets may therefore

[30]This result also highlights the importance of looking at the selection effects on candidates and elected politicians separately - even if electoral competition improves the quality of the candidate pool, it may not necessarily improve the quality of elected politicians if the effects on the candidate pool are asymmetric.

signal higher ability, and imply that voters are more likely to select these higher ability individuals in competitive constituencies. On the other hand, these results may also imply that candidates need to rely on personal wealth to finance campaigns in competitive constituencies - the candidates without this source of financing are unable to win. Electoral competition, while improving the quality of elected politicians on some margins such as criminality, may therefore also act as a barrier to less wealthy candidates. I explore the effects of electoral competition on campaign financing in more detail in the next section.

5.2 Resource Allocation

Political parties may strategically allocate not only candidates, but also resources in response to short-term changes in electoral competition. This section examines how electoral competition affects the allocation of campaign funds (Section **??**) and state-run resources (Section **??**) prior to an election.

5.2.1 Campaign Funds

Though there is growing concern about the rising costs of election campaigns in India - in 2014, India was second only to the United States in campaign expenditure, spending an estimated $5 billion in total - few studies have examined how politicians fund their campaigns or how this money is spent due to a lack of reliable data. One notable exception is Bussell et al. (2018), who use politician self-reported survey data to study sources of campaign funding. The survey data suggests candidates for state assemblies are financed primarily through illicit sources (46% of total campaign costs), followed by individual donations (30%), personal income (12%), and party funds (8%).

For this analysis, I use official financing and expenditure data submitted by elected politicians to the Election Commission. The Election Commission caps spending by state assembly candidates at Rs. 2.8 million (approximately $40,000), but even candidates vying for much lower stakes seats are known to spend well above this limit. The official data is therefore almost certainly an underestimate of true campaign costs. Still, the data provides a glimpse of how politicians fund campaigns *officially* and where this money is spent.

Campaign data is only available from 2008 onwards, and only for elected politicians (not all candidates). Since I observe one election in this time period for most constituencies (excluding the baseline election year), I estimate equation (11), which controls for the initial level of competition and initial vote shares in each constituency.

Table 6A reports 2SLS estimates of the effect of electoral competition on official campaigning for three samples: (1) all elected politicians; (2) elected politicians of the in-

cumbent party; and (3) elected politicians of non-incumbent parties. The effects on total expenditure, presented in Columns (1)-(3), are negative, small in magnitude, and insignificant. The effects on funding from personal wealth are also negative, but large in magnitude. Though these effects are not significant, they suggest that, if anything, elected politicians in competitive constituencies spend *less* from their own pockets on campaigns - at least officially.

Table 6A also shows that elected politicians in competitive constituencies receive less official funding from their parties. The estimated effect for politicians of the incumbent party, reported in Column (8), is significant at the 5% level, though only when electoral competition is measured using the dispersion of vote shares. The effect for politicians of non-incumbent parties is also negative, but not significant.

Finally, Columns (10)-(12) estimate the effect of electoral competition on other sources of funding, defined as donations and gifts received from individuals or firms. Here, the point estimates are positive, but again are too noisy to reject the null. These estimates provide suggestive evidence that as constituencies become more competitive, politicians rely increasingly on non-party funds to officially finance their campaigns.

Table 6B reports the corresponding 2SLS estimates for campaign expenditures. I analyze disaggregated expenditure for three categories: (1) meetings, print materials, and transportation, (2) electronic/print media (including television ads), and (3) visits by party leaders. The bulk of campaign funding is spent on the first category. An increase in electoral competition significantly lowers campaign spending on this category (Column (1)), with the effect driven primarily by non-incumbent parties (Column (3)). Consistent with the estimates from Table 6A, I find that elected politicians of the incumbent party spend less on party visits: a one standard deviation in electoral competition as measured by the incumbent margin lowers official spending on party visits by 45%.[31]

While most estimated effects on campaign funds are imprecise, they provide suggestive evidence that elected politicians in competitive constituencies spend less *officially* on their campaigns than elected politicians in non-competitive constituencies. Whether spending using *total* funds - official and unofficial - is also lower in competitive constituencies is unclear. Two pieces of evidence suggest that this may not necessarily be the case. First, financing from donations and gifts is higher in competitive constituencies, suggesting these constituencies may also attract more unofficial donations. Second, as shown in the preceding

[31]One possible explanation of this result is that incumbent parties may fear negative press when visiting constituencies where their candidate faces intense competition. A visit to such constituencies may generate negative press for the incumbent party if, for example, a campaign rally draws a small crowd. A visit to a stronghold constituency, by contrast, is likely to have the opposite effect: large crowds and positive press. The incentive to avoid "bad optics" may divert party funds to less competitive constituencies.

section, elected politicians in competitive constituencies are much wealthier than those in non-competitive constituencies. This suggests politicians in competitive constituencies may draw on their personal wealth to finance their campaigns unofficially. Indeed, Sukhtankar and Vaishnav (2015) note that as costs of elections has surged in India, parties have become more reliant on self-financing candidates. Better data on campaign funds, perhaps using third-party assessments of visible displays of campaign expenditures, is needed to form a definite conclusion.

5.2.2 State Resources

Along with campaign funds, the party in control of the state government (henceforth "state party") can reallocate resources from state-run companies and institutions towards particular constituencies as part of its campaign strategy.[32] To test how state resources are reallocated, I focus on electricity supply, which can be proxied using high-frequency and high-resolution satellite data on night lights. Though night lights can reflect both changes in economic activity and changes in electricity supply, I examine short-term changes in night lights in the year before and year after an election. These short-term changes are more likely to reflect changes in electricity supply, which can be reallocated immediately before and after an election, rather than changes in economic activity, which take a much longer time horizon to shift.

I estimate the following 2SLS version of equation (10):

$$\begin{aligned} y_{cst} =& \beta_1 Competition_{cst} + \beta_2 Competition_{cst} \text{ x } Pre\text{-}Election_{st} \\ &+ \gamma Pre\text{-}Election_{st} + \sum_{i=1}^{p} \theta_i^A \hat{s}_{icst} + \sum_{i=1}^{p} \theta_i^B \hat{s}_{icst} \text{ x } Pre\text{-}Election_{st} + \alpha_c + \delta_{st} + \epsilon_{cst} \end{aligned}$$

The outcome variable of interest, y_{cst}, is a measure of total nightlights in constituency. I restrict the sample to the years prior and after an election to estimate short-term changes in electricity supply. β_1 captures how competition affects the yearly growth rate in night lights, while $\beta_1 + \beta_2$ captures the total effect of competition in the year prior to an election.

Table 7 presents the results of this exercise using the yearly change in log total night lights as the outcome variable, and the incumbent margin as the measure of electoral competition.[33] Columns (1) and (2) report OLS and 2SLS estimates of the equation above. The OLS estimates are small in magnitude, $\beta_1 + \beta_2 = -0.006$, and insignificant. In contrast,

[32] See Khemani, 2004; Cole, 2009; Baskaran et al., 2015 for examples of political budget cycles in state-run resources including public goods, credit, and electricity supply, respectively.

[33] In Appendix Table 4, I use an alternate measure: log of total light emissions. The results are qualitatively similar.

the 2SLS estimate of the total effect is large, $\beta_1 + \beta_2 = 0.053$, and significant at the 5% level. The estimate implies a one standard deviation increase in electoral competition leads to a 1.6 percentage point increase in annual night lights growth. For comparison, Asher and Novosad (2017) estimate a 4 percentage point increase in night lights growth for constituencies aligned with the state party over a five-year electoral term. Baskaran et al. (2015) estimate a similar effect on night lights growth in special election years.[34]

More broadly, these results are in line with the literature on tactical reallocations motivated by reelection incentives (e.g. Khemani 2004, Cole 2009), which finds that politicians target resources towards swing districts in election years. To my knowledge, however, much of this literature relies on OLS to assess whether politicians target swing districts. The results in Table 7 highlight the importance of correcting for omitted variable bias in the OLS estimates. OLS may be severely downward biased, likely because constituencies that receive large influxes of state resources prior to an election have less competitive races afterwards.

In Columns (3) and (4), I test whether the reallocation in electricity supply is directed towards constituencies aligned with the ruling state party. Intuitively, the state party may care primarily about constituencies where its own incumbent in jeopardy, where a reallocation of resources can tilt electoral competition in its favor. It may care less about constituencies where an incumbent of another party is in jeopardy, since a reallocation of resources will likely be attributed to the other party rather than the state party. The OLS estimates are again much smaller in magnitude than the 2SLS estimates. Column (4) shows electricity supply is targeted towards constituencies aligned with the state party. Though the total effect is insignificant, the magnitude is large, $\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0.046$, (p-value = 0.182). While I cannot reject a similar effect for non-aligned constituencies, Column (4) provides suggestive evidence that state-run resources are primarily targeted towards competitive constituencies where the incumbent is aligned with the state ruling party.

Overall, Table 7 demonstrates that electoral competition leads to a significant reallocation of state-run resources prior to an election towards swing constituencies. Since it is unlikely that spatial and temporal shifts in electoral competition are coincident with resource needs, this reallocation is likely inefficient.

[34]Baskaran et al. (2015) also find that the increase in night lights growth is concentrated in competitive constituencies by comparing constituencies where the margin of victory was less than 5% in the previous election to constituencies where the margin of victory was greater than 5%. In contrast to their study, I look at the impact of *anticipated* competition in the upcoming election year and use a continuous measure of competition.

5.3 Campaign Strategy: Additional Outcomes

Before turning to post-election outcomes, I examine the effect of electoral competition on two additional outcomes related to campaign strategy: party entry and exit decisions (Section **??**), and voter mobilization (Section **??**).

5.3.1 Party Entry and Exit

Table 8 shows that electoral competition increases the number of major parties with a high likelihood of winning in a race, and decreases the number of smaller parties with a low likelihood of winning in a race. Columns (1) and (2) report OLS and 2SLS estimates of the effect of competition on the total number of parties. While the OLS estimates are positive and significant, the 2SLS estimates are negative and imprecisely estimated. The upward bias of the OLS estimate is likely due to reverse causality: an increase in the number of political parties increases the competitiveness of a race. The 2SLS estimate suggests that competition does not affect the overall number of parties.

Even if the overall number of parties does not vary, competition may affect the *type* of party that chooses to enter an election. The 2SLS estimates show that major parties, defined as BJP and INC, and the top two regional parties in each state, are more likely to enter competitive elections. Column (4) shows that a one standard deviation increase in competitiveness, as measured by the difference in incumbent and strongest opposition party vote shares in Panel A, increases the number of major parties in a race by 15.5 percentage points (2.9% of the mean). Column (5) estimates the entry decision of major parties *excluding* the incumbent and strongest opposition. Reassuringly, the estimates are insignificant in Panel A, since the difference in incumbent and strongest opposition party vote shares is not the relevant competition-metric for these parties, and significant in Panel B, which uses the dispersion of all vote shares to measure competition.

Finally, small parties are less likely to enter competitive elections. Column (8) indicates that a one standard deviation increase in competition reduces the number of small parties in a race by 24.1 percentage points (11.1% of the mean). A small party's decision to exit a race may be in anticipation of strategic voting. Voters in competitive races are more pivotal and hence have a greater incentive to allocate their votes strategically. Parties may act strategically themselves, opting out of races where they are unlikely to win.[35] Alternatively, a small party's exit may be the result of vote-buying by major parties. These parties have an incentive to block entry of additional parties in competitive races to improve their

[35]This possibility has been discussed in the literature (Cox 1997, Fey 2007). Cox (1997), for example, argues that "(party) elite anticipation of strategic voting should lead to prudent withdrawals and hence a reduction in the number of competitors entering the field of battle."

chance of winning. Paying off a candidate of a small party so that she does not run can ensure more potential votes. In either case, the results of Table 8 suggest that parties choose which electoral races to enter strategically, opting in when they are likely to win and opting out when they are unlikely to.

5.3.2 Voter Mobilization

In selecting candidates or reallocating resources, a party may be attempting to either persuade undecided voters or mobilize new voters.[36] Table 9 tests whether competition mobilizes voters by examining the effect of electoral competition on voter turnout. Columns (1) and (2) report the results from the OLS and 2SLS specifications. The estimated coefficients are small and precisely estimated, suggesting a null average effect on overall turnout. Panel A, Column (2) indicates that a one standard deviation increase in competition increases voter turnout by a negligible 0.06 percentage points (0.09% of the mean). The results for dispersion are qualitatively similar. This result stands in contrast to a number of studies that find a positive correlation between electoral competition and voter turnout in the United States (see, for example, Cox and Munger (1989)). Given that voter turnout is India is already relatively high at an average of 66%, it may be that most potential voters vote regardless of how competitive an election will be. This suggests that parties likely make strategic candidate and resource allocation decisions to persuade undecided voters in competitive constituencies, rather than increase turnout.

5.4 Incumbent Performance

I now consider the effects of electoral competition on incumbent performance in office. Competition can potentially affect incumbent performance through two main channels: (1) selection, with competition changing the type of politician elected, or (2) moral hazard, with anticipated competition changing incentives. Each of these effects is examined empirically below.

5.4.1 Selection

The preceding section on political selection shows that politicians elected in competitive constituencies differ on observables from politicians elected in non-competitive con-

[36] If "political leaders focus their efforts on the tight contests and forget about the cakewalks," voters in competitive constituencies are more likely to be mobilized by campaigns (Rosenstone and Hansen, 2003). Voter mobilization may also increase if competitive races attract greater media attention (Jackson (1996), for example, finds media coverage for competitive U.S. House races is greater than that for less competitive ones).

stituencies. Whether these observable (and any unobservable) differences have implications for governance, however, is unclear. To determine whether there is a selection effect on governance, I examine incumbent performance using three economic indicators: employment growth, change in night lights growth, and public goods provision as measured by new construction in the PMGSY rural roads program. As described in the data section, the empirical evidence suggests that the incumbent in an Indian state assembly constituency can have a significant impact on all three indicators. Nightlights growth and public goods provision are measured during an incumbent's full five-year term. Due to the unavailability of high frequency data, employment growth is measured over a seven-year time frame, therefore capturing a combination of an incumbent's performance and that of her successor.

Table 10A, Panel A presents estimates of equation (10) for each economic indicator. Competition is measured by (1 minus the) winning margin at the time of an incumbent's election.[37] I report both OLS and 2SLS estimates. The 2SLS estimates for each indicator are negative, but imprecisely estimated. Though I cannot reject the null of no effect for any indicator, the confidence intervals do not rule out large effect sizes. In particular, the upper bound of the negative effect size on each indicator from a one standard deviation increase in competition is 1.5 log points for employment growth; 7.9 percentage points for night lights growth; and 30.8% for length of all new roads.

5.4.2 Moral Hazard

The second channel through which competition can affect incumbent performance is moral hazard throughout the incumbent's term. An incumbent secure in her tenure may not be as motivated to exert effort when compared to the incumbent facing a high level of *anticipated* competition in the upcoming election. Table 10A, Panel B estimates the effect of anticipated competition using the expected winning margin between the incumbent and her strongest opponent in the upcoming election year. Here too, the results are imprecisely estimated. The moral hazard effect on employment growth is negative and similar in magnitude to the selection effect. I cannot rule out an effect size of a 1.7 log point decrease in employment growth from a one standard deviation increase in anticipated competition. In contrast to employment growth, the effect on night lights growth is positive. Column (4) shows the 95% confidence interval contains an effect size of 8.2 percentage points from a one standard deviation increase in anticipated competition. Finally, the moral hazard effect on public goods provision is large and negative (Columns (5) and (6)). However, I cannot infer the effect size from the 2SLS estimates because the first stage F-statistic is well below

[37]The first stage using the dispersion of vote shares to measure electoral competition is weaker in some of these samples due to the smaller number of observations.

conventional levels in this restricted sample.

Discussion: These results, though imprecisely estimated, suggest that if anything electoral competition has a negative selection effect on incumbent performance and that moral hazard does little to improve incumbent performance. It is possible that incumbents react differently to anticipated competition depending on the level of competition at the time of their election. To check this, Table 10B estimates the effects of (1) electoral competition at the time of an incumbent's election and (2) anticipated electoral competition simultaneously. The results are largely consistent with Table 10A. Column (4) again shows that anticipated competition leads to a large, positive (though insignificant) increase in night lights growth. The night lights estimates here are of the same order of magnitude as those presented in Table 7, which estimates the increase in total lights emission in the year prior to an election.[38] This provides suggestive evidence that any increase in night lights growth is taken close to an upcoming election, rather than throughout an incumbent's term.

The selection results can be explained by two hypotheses. First, it may be that even though the candidates selected to run in competitive constituencies are more electable, they are not better politicians (at least when measured by observable economic indicators). The results on political selection suggest the politicians in competitive constituencies are wealthier - this wealth may be used during a campaign to ensure victory, but is not necessarily correlated with the ability to do well once in office. Second, elected politicians in competitive constituencies are less likely to have prior political experience (electoral competition increases the incumbent party's turnover rate, as shown in Table 3). It is possible that this inexperience leads to an initial negative effect on economic outcomes, but that eventually these politicians will perform better as they gain experience.

There are also two stories to explain the moral hazard results. First, if voters are myopic, it would make sense for incumbents to save their effort until very close to an election when voters are more likely to pay attention and the electoral returns to effort are higher. One concern with this explanation, however, is that it assumes politicians can correctly forecast changes in competition. Given that my instrument relies on short-term changes in electoral competition, this may not be the case. A second story, therefore, is that politicians *do* respond to electoral competition when in office, but given uncertainty about future competition, they can only do so close to an election. Survey data on politicians' beliefs about anticipated competition could disentangle these explanations.

[38]The point estimate in Table 10B is 0.058; in Table 7 it is 0.053.

6 Concluding remarks

This paper estimates the effect of electoral competition on political selection and performance in Indian state elections. To identify the causal impact of electoral competition, I develop an empirical framework motivated by the observation that aggregate shifts to a party's popularity over time change the level of competition across constituencies non-monotonically depending on local party preferences. I use this observation to construct a shift-share instrument that leverages this non-monotonicity for identification.

My main findings suggest that parties respond strategically to competition prior to an election. When a race becomes competitive, parties field candidates that are ostensibly higher quality, as indicated by their less corrupt background. Politicians in competitive constituencies are also wealthier. This result, combined with no significant effect of electoral competition on campaign funds, indicates that parties may rely on self-financing candidates to win competitive constituencies. I also find competitive constituencies experience a large, though temporary, increase in night light growth prior to an election, implying that the party in control of the state government reallocates state-run resources (e.g. electricity) strategically. Despite changes in campaign strategy prior to an election, however, I find no significant evidence that the politicians elected in competitive constituencies improve economic outcomes once in office, or improve performance in anticipation of future competition over the long-term - though the estimated effects have large confidence intervals.

The findings in this paper open a number of avenues for future work. First, a key contribution of this paper is the proposal of an identification strategy that can be easily used to study electoral competition in other countries with first-past-the-post electoral systems. Understanding how the effects of electoral competition vary across countries (developed versus developing countries, less autocratic versus more autocratic countries, etc.) is important for testing the external validity of the results presented here, and for developing richer models of electoral competition that take into account institutional structure. Second, the results in this paper suggest parties may make strategic trade-offs *between* candidates and resources when campaigning in competitive constituencies. Better data on campaign financing can shed light on this trade-off and the implications for political selection. Finally, this paper focuses on short-term changes to electoral competition. A long-term change to electoral competition - a result, perhaps, of gerrymandering or political polarization - may have very different consequences for political selection and performance and merits further investigation.

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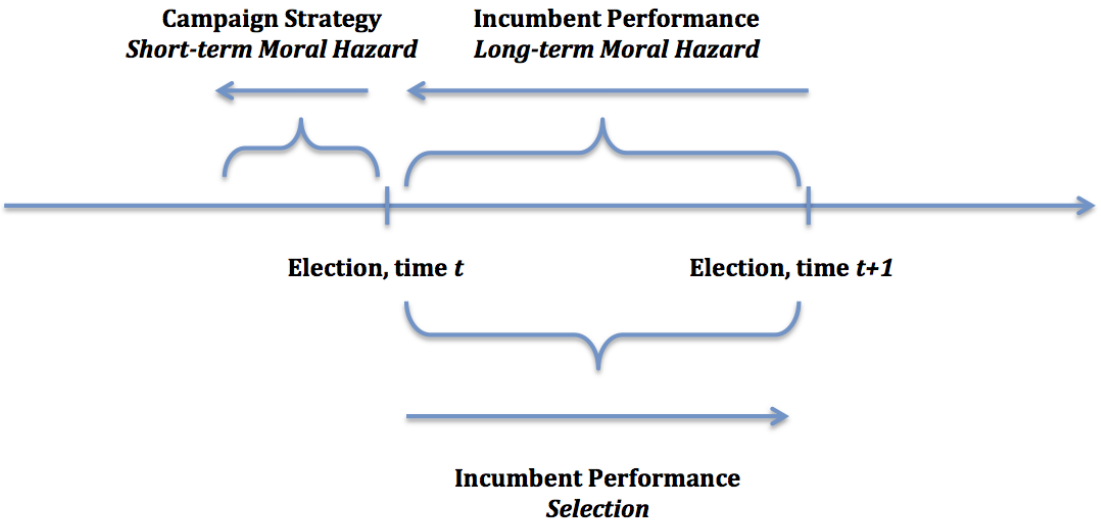
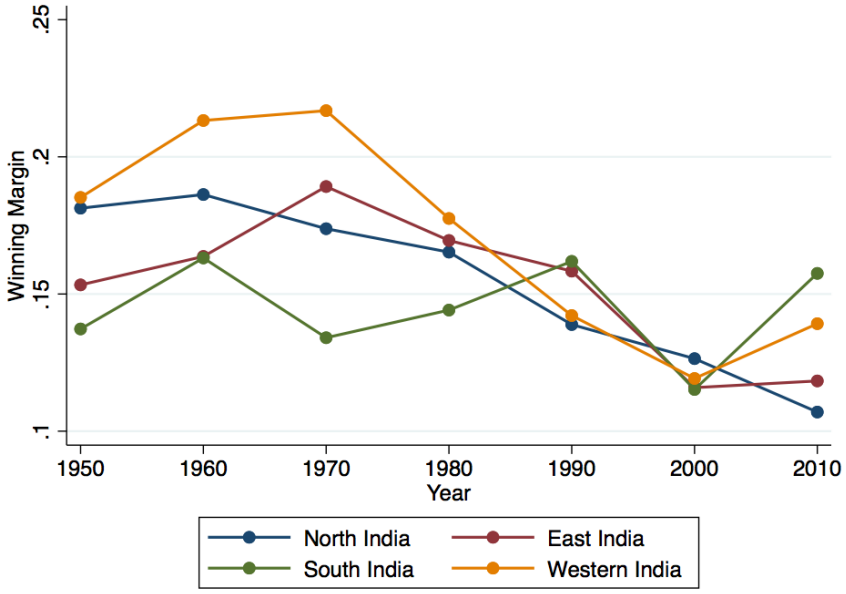
Figure 1: Conceptual Framework



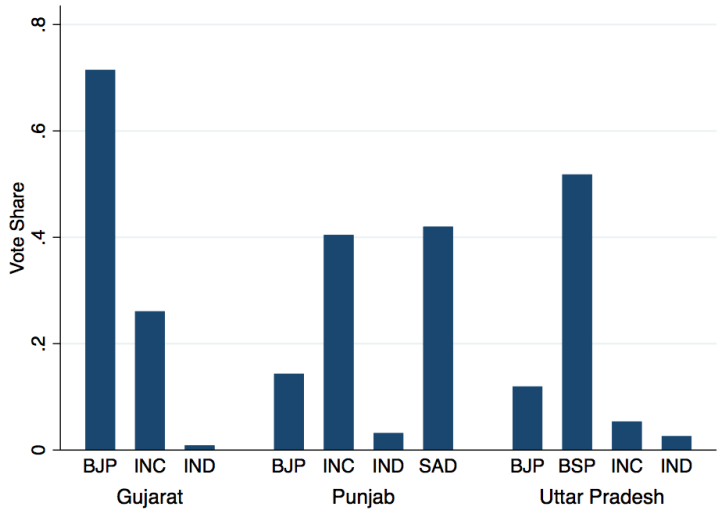
Note: This figure provides an overview of the conceptual framework linking electoral competition to politician selection and performance. In the campaign period, political parties allocate candidates and resources across constituencies to maximize the number of seats they win in the upcoming election. Strategic decisions taken during this time are motivated by "short-term moral hazard" concerns. In the post-election period, electoral competition may affect incumbent performance through two channels: (1) a "selection" channel, if competition changes the type of politician elected, or (2) a "long-term moral hazard" channel, if anticipated competition changes performance incentives over the long-term.

Figure 2A: Electoral Competition in Indian State Elections



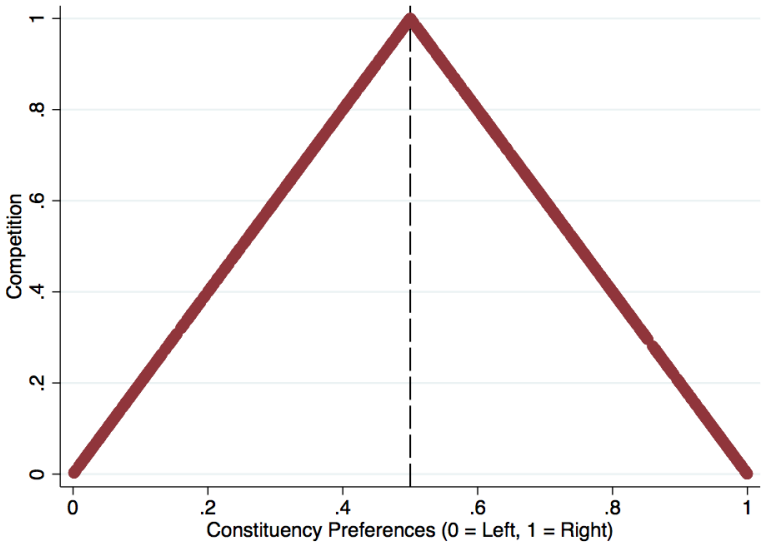
Note: This figure plots the average winning margin between the winner and runner-up in Indian state elections by region across decades.

Figure 2B: Vote Shares in Select States (2007)



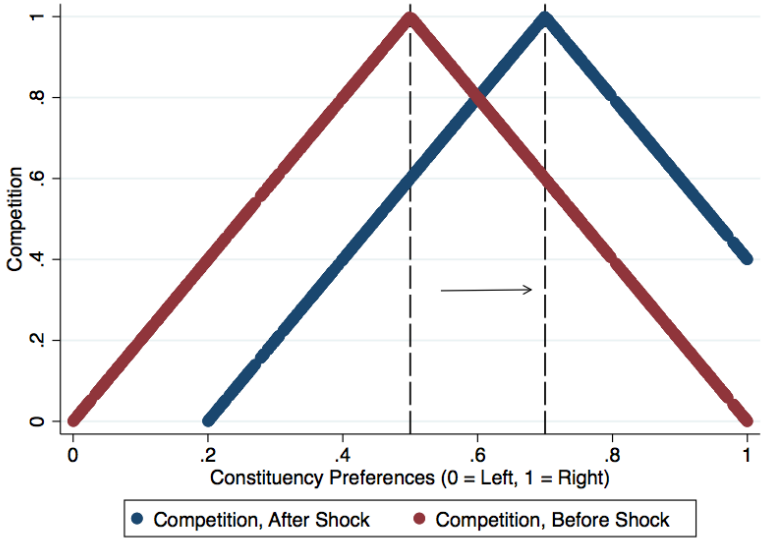
Note: This figure plots vote shares for major parties in the 2007 state elections. BJP is the Bharatiya Janata Party; INC is the Indian National Congress; IND are independent candidates; SAD is the Shiromani Akali Dal party; and BSP is the Bahujan Samaj Party.

Figure 3A: Identification Strategy, Two Party Example



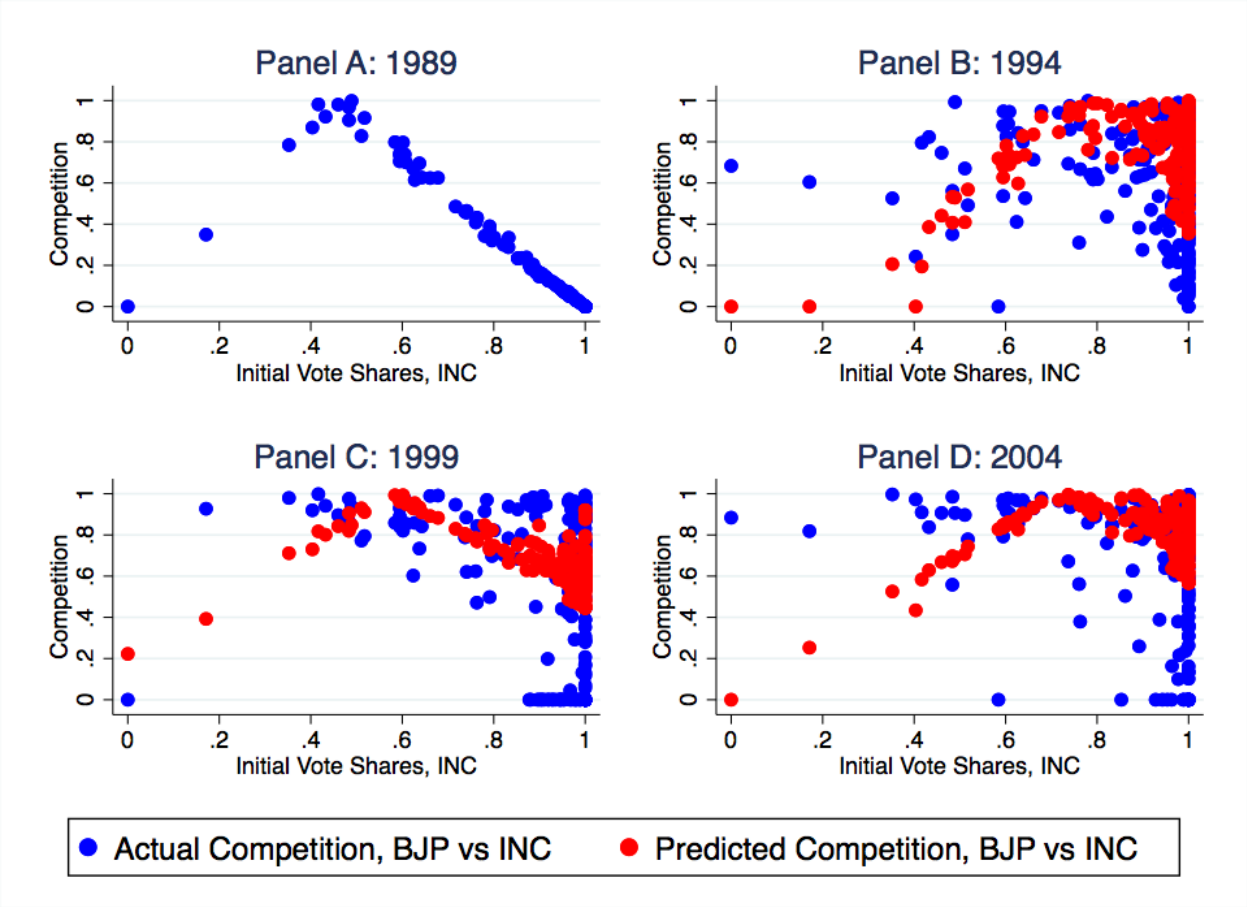
Note: This figure plots competition as a function of constituency policy preferences. Competition is defined as 1 minus the winning margin. Constituency policy preferences range from left (0 to 0.5) to right (0.5 to 1).

Figure 3B: Negative Aggregate Shock to Right-Wing Party



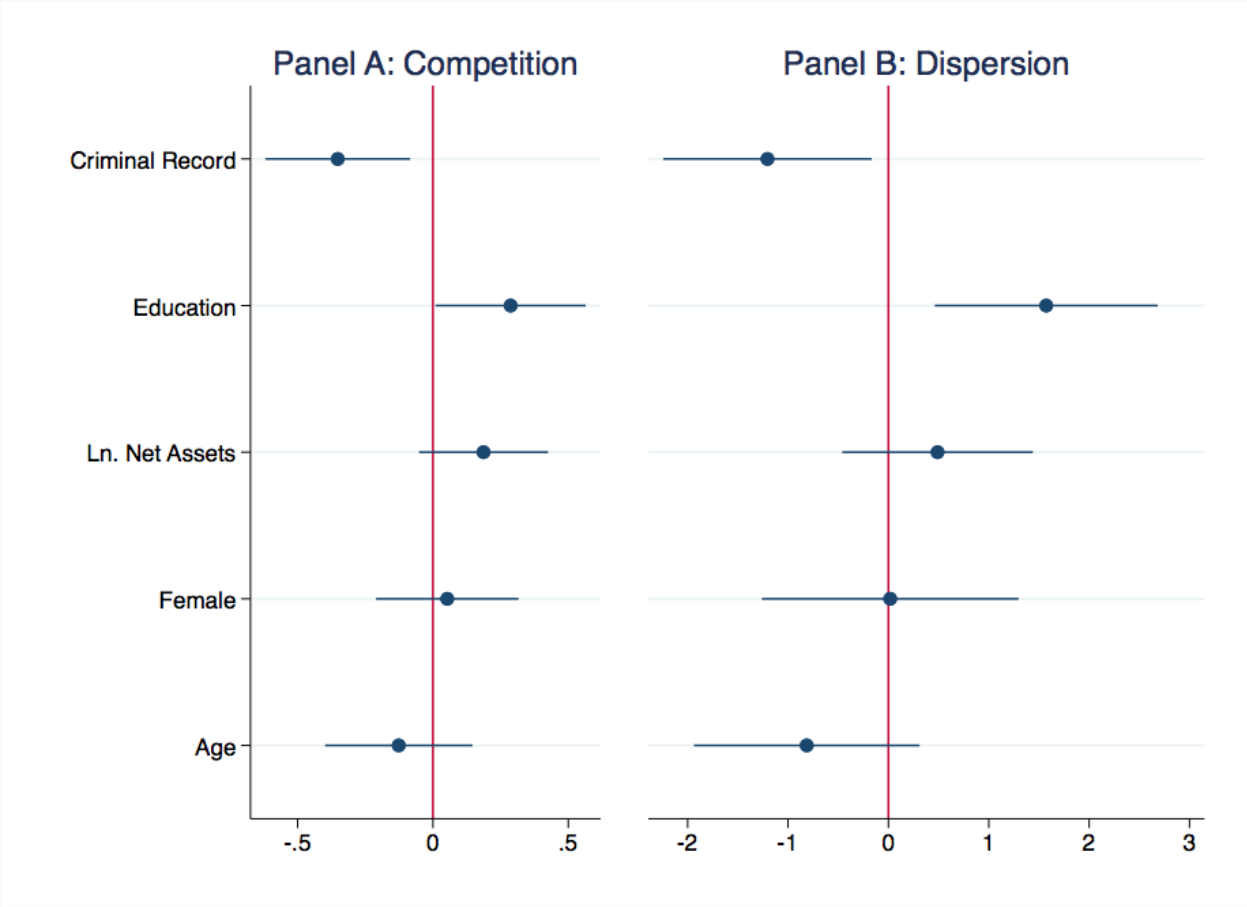
Note: This figure plots competition as a function of constituency policy preferences. Competition is defined as 1 minus the winning margin. Constituency policy preferences range from left (0 to 0.5) to right (0.5 to 1). The blue curve plots competition after a negative shock to the right-wing party. Constituencies near the median which were once competitive become less so as the left-wing party becomes relatively more attractive. Constituencies which were once the right-wing party's stronghold become more competitive.

Figure 4: Actual vs Predicted Competition in Karnataka



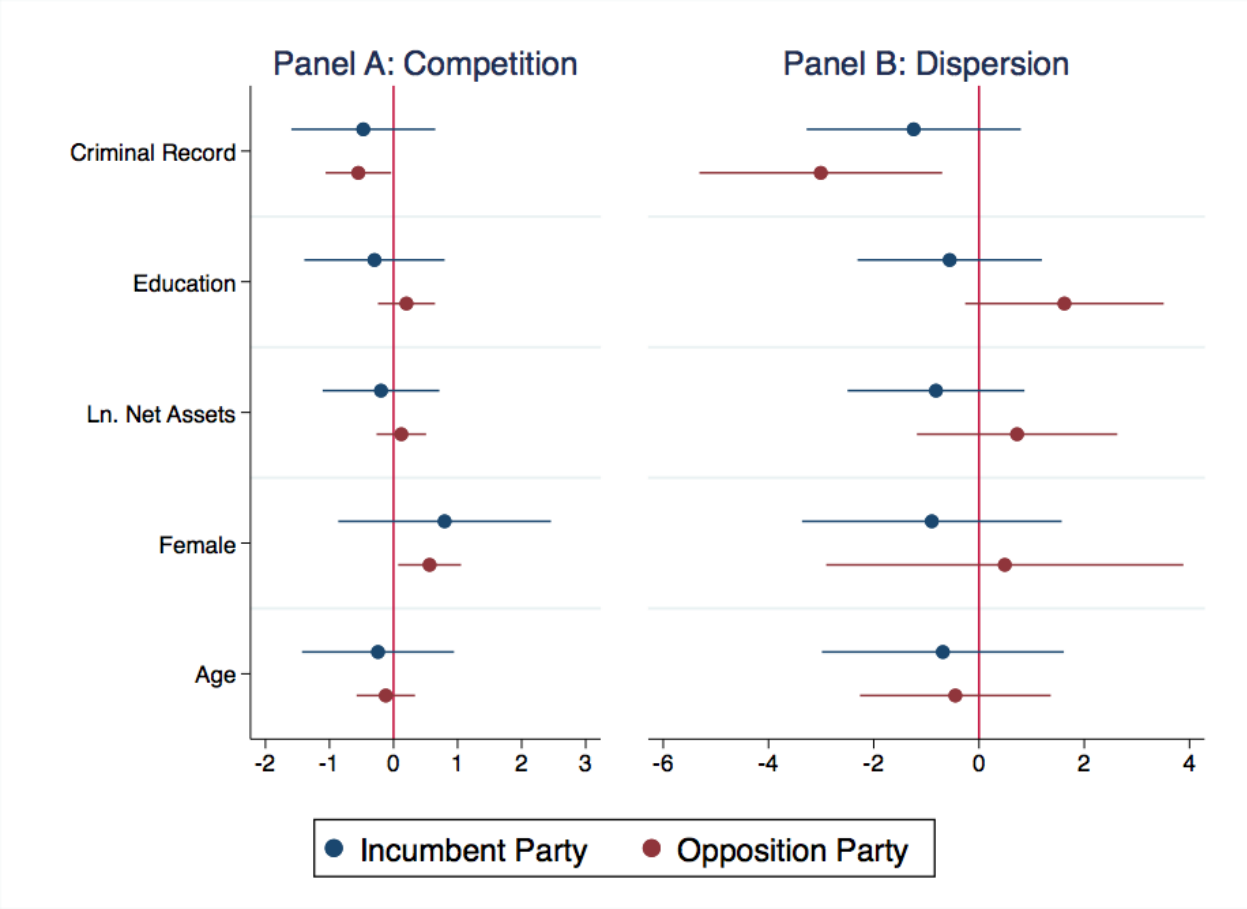
Note: This figure shows a scatterplot of actual and predicted competition between BJP and INC across election years in Karnataka. Competition is plotted as a function of initial vote shares for INC in the baseline year, 1989. The initial vote share is rescaled to indicate the level of support for INC in comparison to BJP. Panel A displays the mechanical relationship between competition and INC vote shares in the baseline year. Panel B shows that competition shifts towards the right in 1994, as the BJP becomes a more competitive party vis-a-vis INC. Panel C shows competition shifts back towards the left, indicating a positive shift for INC in 1999. Finally, Panel D shows the BJP once again becomes competitive, threatening INC strongholds.

Figure 5A: Candidate Selection, Demographics (All Candidates)



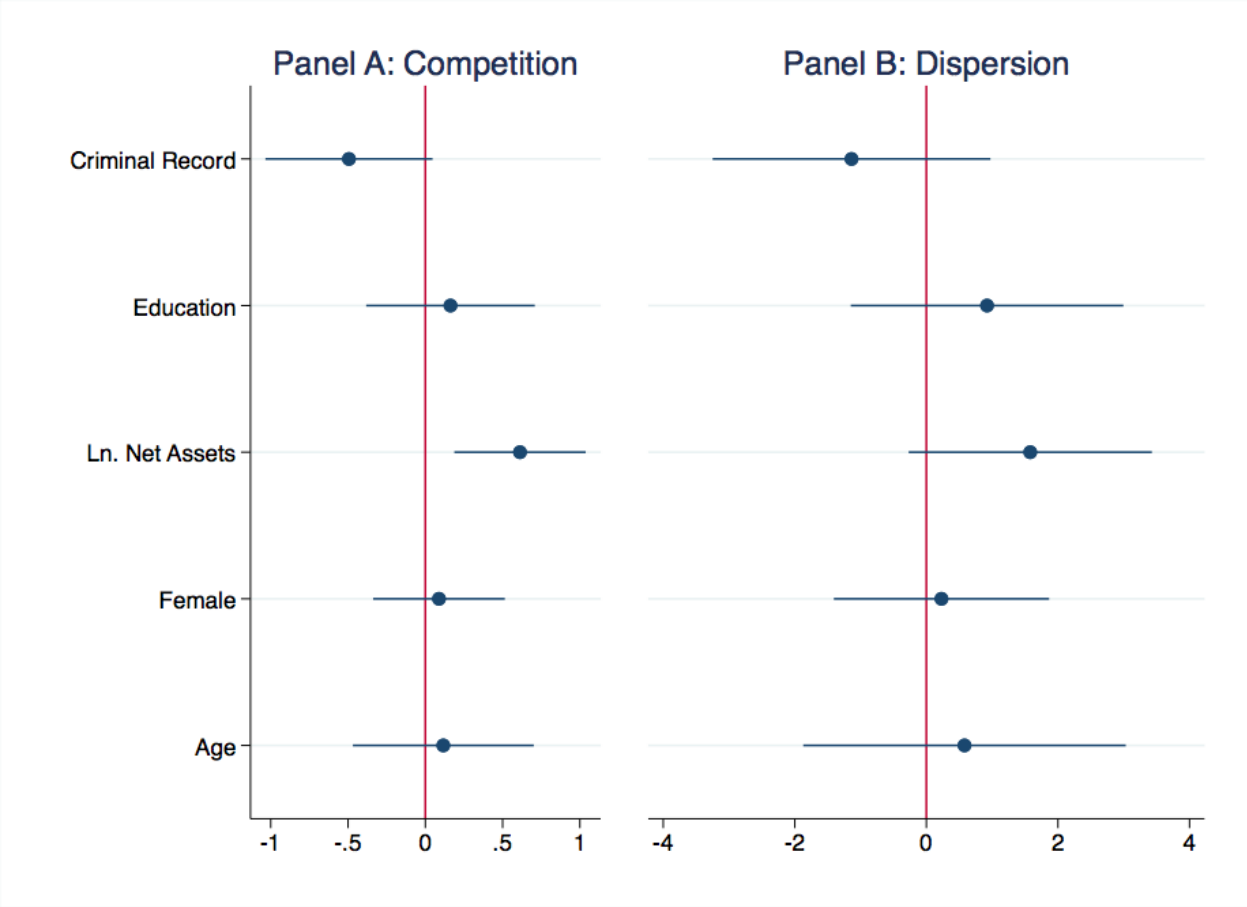
Note: This figure presents estimates of the effect of competition and dispersion on candidate demographics. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Each row on the y-axis reports the treatment effect and 95% confidence interval based on robust standard errors. Each specification includes party fixed effects, baseline year competition controls, and state-year fixed effects. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Dependent variables are normalized by their mean and standard deviations to allow for comparison across variables. Tables 4A-4C and Appendix Tables 3A-3B report corresponding coefficients.

Figure 5B: Candidate Selection, Demographics (Incumbent and Opposition Party Candidates)



Note: This figure presents estimates of the effect of competition and dispersion on candidate demographics separately for the candidate selected by the incumbent party and the (strongest) opposition party. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Each row on the y-axis reports the treatment effect and 95% confidence interval based on robust standard errors. Each specification includes party fixed effects, baseline year competition controls, and state-year fixed effects. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Dependent variables are normalized by their mean and standard deviations to allow for comparison across variables. Tables 4A-4C and Appendix Tables 3A-3B report corresponding coefficients.

Figure 6: Winner Selection, Demographics (All Elected Politicians)



Note: This figure presents estimates of the effect of competition and dispersion on elected politician demographics. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Each row on the y-axis reports the treatment effect and 95% confidence interval based on robust standard errors. Each specification includes party fixed effects, baseline year competition controls, and state-year fixed effects. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Dependent variables are normalized by their mean and standard deviations to allow for comparison across variables. Tables 5 reports corresponding coefficients.

Table 1: Predicted Vote Shares

	Dep. Variable: Party Vote Share			
	(1)	(2)	(3)	(4)
Predicted Vote Share, BJP	0.470***			
	(0.150)			
Predicted Vote Share, INC		0.600***		
		(0.085)		
Predicted Vote Share, State Party 1			0.888***	
			(0.058)	
Predicted Vote Share, State Party 2				0.732***
				(0.113)
Mean dep. var.	0.27	0.38	0.20	0.14
R2	0.78	0.74	0.81	0.79
Number of clusters	3013	3013	3013	3013
Obs	9425	9425	9425	9425

Notes: All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. BJP is the Bharatiya Janata Party; INC is the Indian National Congress; and State Party 1 and 2 are the parties with the top vote shares (excluding INC and BJP) in each state. Party vote shares are re-scaled to sum to 1. Sample years are 1989-2008, excluding baseline election year. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 2: First Stage

Panel A:	*Dep. Variable:* Competition			
	(1)	(2)	(3)	(4)
Predicted Competition	0.331***	0.324***	0.323***	0.326***
	(0.027)	(0.027)	(0.027)	(0.027)
Predicted Vote Share, BJP		-0.239	-0.238	-0.049
		(0.147)	(0.145)	(0.188)
Predicted Vote Share, INC			-0.291***	-0.114
			(0.095)	(0.167)
Predicted Vote Share, State Party 1				0.205
				(0.140)
F-stat excluded instrument	149.3	141.5	142.9	147.1
R2	0.65	0.65	0.65	0.65
Number of clusters	3013	3013	3013	3013
Obs	9425	9425	9425	9425
Panel B:	*Dep. Variable:* Dispersion			
	(1)	(2)	(3)	(4)
Predicted Dispersion	0.183***	0.165***	0.163***	0.171***
	(0.035)	(0.035)	(0.035)	(0.035)
Predicted Vote Share, BJP		-0.260***	-0.259***	-0.115
		(0.088)	(0.086)	(0.103)
Predicted Vote Share, INC			-0.295***	-0.161*
			(0.061)	(0.096)
Predicted Vote Share, State Party 1				0.154*
				(0.079)
F-stat excluded instrument	27.7	22.1	21.4	23.2
R2	0.68	0.68	0.68	0.68
Number of clusters	3013	3013	3013	3013
Obs	9425	9425	9425	9425

Notes: All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Competition is defined as 1 minus the winning margin. Dispersion is defined as 1 minus the HHI. BJP is the Bharatiya Janata Party; INC is the Indian National Congress; and State Party 1 and 2 are the parties with the top vote shares (excluding INC and BJP) in each state. Party vote shares are re-scaled to sum to 1. Sample years are 1989-2008, excluding baseline election year. * p<0.10, ** p<0.05, *** p<0.01.

Table 3: Candidate Turnover

	Dep Variable: New Candidate				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	-0.040***	-0.074	0.630	0.001	-0.009
	(0.011)	(0.054)	(0.467)	(0.109)	(0.064)
Mean dep. var.	0.75	0.75	0.39	0.77	0.92
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		221.28	18.06	214.74	152.00
Number of clusters	3013	3010	2370	2466	2826
Obs	30183	30180	6811	7246	15102
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	0.006	0.371	1.829**	-1.016	-0.373
	(0.021)	(0.284)	(0.828)	(0.759)	(0.334)
Mean dep. var.	0.75	0.75	0.39	0.77	0.92
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		29.37	20.12	15.15	17.91
Number of clusters	3013	3010	2370	2466	2826
Obs	30183	30180	6811	7246	15102

Notes: This table estimates the effect of electoral competition on whether a candidate running for office also ran in the previous election in the same constituency. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Table 4A: Selection of Candidates, Criminal Record

	Dep Variable: Candidate Has Criminal Record				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	-0.019	-0.155***	-0.208	-0.242**	-0.192**
	(0.018)	(0.060)	(0.253)	(0.115)	(0.086)
Mean dep. var.	0.27	0.27	0.31	0.30	0.23
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		712.29	40.35	231.71	320.30
Obs	7879	7879	1852	2103	3971
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	-0.020	-0.532**	-0.548	-1.328**	-0.408
	(0.032)	(0.234)	(0.459)	(0.520)	(0.309)
Mean dep. var.	0.27	0.27	0.31	0.30	0.23
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		142.92	35.65	39.75	70.78
Obs	7879	7879	1852	2103	3971

Notes: This table estimates the effect of electoral competition on the criminal record of a candidate at the time of declaring candidacy. Crime is defined as 1 if the candidate has any criminal record, and 0 otherwise. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Specifications include party fixed effects, baseline year competition controls, and state-year fixed effects. Robust standard errors. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Vote shares rescaled to sum to 1.

Table 4B: Selection of Candidates, Educational Attainment

	Dep Variable: Candidate Education				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	-0.041	0.429**	-0.445	0.303	0.569*
	(0.061)	(0.212)	(0.836)	(0.340)	(0.339)
Mean dep. var.	5.24	5.24	5.42	5.39	5.08
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		675.61	34.46	219.24	304.61
Obs	7535	7535	1795	2017	3770
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	-0.091	2.353***	-0.832	2.428*	2.837**
	(0.107)	(0.848)	(1.337)	(1.439)	(1.324)
Mean dep. var.	5.24	5.24	5.42	5.39	5.08
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		135.28	34.59	39.86	64.00
Obs	7535	7535	1795	2017	3770

Notes: This table estimates the effect of electoral competition on the educational attainment of a candidate at the time of declaring candidacy. Education is coded on a 0 to 7 scale, ranging from illiterate to post-graduate education. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Specifications include party fixed effects, baseline year competition controls, and state-year fixed effects. Robust standard errors. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Vote shares rescaled to sum to 1.

Table 4C: Selection of Candidates, Net Assets

	Dep Variable: Candidate Ln. Net Assets				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	0.026	0.347	-0.363	0.226	-0.321
	(0.065)	(0.226)	(0.863)	(0.366)	(0.355)
Mean dep. var.	15.73	15.73	16.21	16.19	15.20
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		688.56	38.33	212.23	303.20
Obs	7290	7290	1805	2023	3506
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	0.097	0.910	-1.518	1.344	-0.881
	(0.112)	(0.900)	(1.593)	(1.804)	(1.276)
Mean dep. var.	15.73	15.73	16.21	16.19	15.20
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		130.99	33.80	31.13	66.84
Obs	7290	7290	1805	2023	3506

Notes: This table estimates the effect of electoral competition on (log) net assets. A candidate's net assets are defined as assets net of liabilities at the time of declaring candidacy. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Specifications include party fixed effects, baseline year competition controls, and state-year fixed effects. Robust standard errors. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Vote shares rescaled to sum to 1.

Table 5: Selection of Elected Politicians

Dependent Variable:	Criminal Record	Education	Net Assets	Age	Gender
	(1)	(2)	(3)	(4)	(5)
	2SLS	2SLS	2SLS	2SLS	2SLS
Panel A:					
Competition	-0.260**	0.273	1.089***	1.950	0.013
	(0.130)	(0.371)	(0.386)	(3.057)	(0.047)
Mean dep. var.	0.34	5.42	16.16	50.63	0.06
Controls	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument	171.52	168.20	161.20	171.52	226.70
Obs	2264	2207	2190	2264	7437
	(1)	(2)	(3)	(4)	(5)
	2SLS	2SLS	2SLS	2SLS	2SLS
Panel B:					
Dispersion	-0.684	1.559	2.872*	7.043	0.048
	(0.506)	(1.411)	(1.677)	(12.726)	(0.202)
Mean dep. var.	0.34	5.42	16.16	50.63	0.06
Controls	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument	36.23	36.28	34.06	36.23	40.32
Obs	2264	2207	2190	2264	7437

Notes: This table estimates the effect of electoral competition on winner characteristics. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Specifications in Columns (1)-(4) include baseline year competition controls, and state-year fixed effects. Robust standard errors. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Specification in Column (5) includes constituency and state-year fixed effects. Standard errors clustered by constituency. All vote shares rescaled to sum to 1.

Table 6A: Official Campaign Financing of Elected Politicians

	Total Expenses			Own Funds			Party Funds			Other Funds		
	All Parties	Incumb. Parties	Opp. Parties	All Parties	Incumb. Parties	Opp. Party	All Parties	Incumb. Parties	Opp. Parties	All Parties	Incumb. Parties	Opp. Parties
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A:												
Competition	-0.034	-0.112	0.134	-0.426	-0.607	-0.085	-0.649	-3.831	-0.881	0.257	0.848	0.827
	(0.113)	(0.200)	(0.121)	(0.938)	(2.230)	(0.976)	(1.342)	(2.588)	(1.561)	(1.363)	(2.598)	(1.534)
Mean dep. var.	13.94	13.93	13.95	5.31	5.10	5.42	5.21	4.03	5.82	7.03	6.14	7.49
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument	268.99	88.21	205.70	268.99	88.21	205.70	268.99	88.21	205.70	268.99	88.21	205.70
Obs	1216	414	802	1216	414	802	1216	414	802	1216	414	802
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel B:												
Dispersion	-0.050	-0.338	0.577	-2.369	-6.724	-0.262	-5.589	-21.136**	-6.149	1.289	1.734	5.462
	(0.432)	(0.682)	(0.435)	(2.747)	(6.269)	(3.197)	(4.009)	(9.087)	(4.927)	(4.210)	(8.472)	(4.928)
Mean dep. var.	13.94	13.93	13.95	5.31	5.10	5.42	5.21	4.03	5.82	7.03	6.14	7.49
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument	79.26	25.23	53.83	79.26	25.23	53.83	79.26	25.23	53.83	79.26	25.23	53.83
Obs	1216	414	802	1216	414	802	1216	414	802	1216	414	802

Notes: This table reports 2SLS estimates of the effect of electoral competition on campaign financing for all winning candidates, winning candidates from the incumbent party, and winning candidates from non-incumbent parties. All dependent variables are in logs. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Specifications include baseline year competition controls, and state-year fixed effects. Robust standard errors. Sample period is 2008-2017. Vote shares rescaled to sum to 1.

Table 6B: Official Campaign Expenditure of Elected Politicians

	Meetings, Materials, Transport			Media			Party Visits		
	All Parties	Incumb. Parties	Opp. Parties	All Parties	Incumb. Parties	Opp. Party	All Parties	Incumb. Parties	Opp. Parties
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A:									
Competition	-2.434**	0.892	-1.462	1.157	1.766	1.668	-0.305	-1.489*	0.262
	(1.009)	(1.300)	(1.217)	(1.244)	(2.358)	(1.452)	(0.359)	(0.869)	(0.256)
Mean dep. var.	10.19	13.29	9.09	7.52	7.98	7.29	0.07	0.10	0.05
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument	307.37	88.21	215.19	268.99	88.21	205.70	268.99	88.21	205.70
Obs	1580	414	1166	1216	414	802	1216	414	802
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel B:									
Dispersion	-9.935***	4.477	-7.139**	-0.212	4.585	0.154	-1.111	-4.379	0.607
	(2.836)	(4.608)	(3.525)	(3.882)	(7.796)	(4.403)	(1.235)	(3.303)	(0.578)
Mean dep. var.	10.19	13.29	9.09	7.52	7.98	7.29	0.07	0.10	0.05
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument	108.21	25.23	63.25	79.26	25.23	53.83	79.26	25.23	53.83
Obs	1580	414	1166	1216	414	802	1216	414	802

Notes: This table reports 2SLS estimates of the effect of electoral competition on campaign expenditure for all winning candidates, winning candidates from the incumbent party, and winning candidates from non-incumbent parties. All dependent variables are in logs. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Specifications include baseline year competition controls, and state-year fixed effects. Robust standard errors. Sample period is 2008-2017. Vote shares rescaled to sum to 1.

Table 7: State Resource Allocation, Power Supply

	Dep Var: Ln Lights, Annual Growth			
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS
Competition	0.007	-0.094***	0.019	-0.037
	(0.008)	(0.025)	(0.013)	(0.032)
Competition x Pre-Election Year	-0.013	0.147***	-0.032*	0.061
	(0.011)	(0.027)	(0.019)	(0.048)
Competition x Aligned			-0.019	-0.129***
			(0.015)	(0.044)
Competition x Pre-Election Year x Aligned			0.032	0.151***
			(0.023)	(0.057)
Pre-Election Year x Aligned			-0.029*	-0.102***
			(0.015)	(0.034)
Aligned			0.017*	0.084***
			(0.010)	(0.026)
Pre-Election Year	-0.200***	-0.264***	-0.187***	-0.210***
	(0.016)	(0.018)	(0.019)	(0.028)
P-val, $\beta_1 + \beta_2 = 0$	0.447	0.026	0.386	0.579
P-val, $\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$			0.925	0.182
Mean dep. var.	0.002	0.002	0.001	0.001
Baseline dep. var	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of clusters	2300	2300	2258	2258
Obs	9516	9516	9430	9430

Notes: This table estimates the effect of electoral competition on power supply measured by annual log growth in total light emissions before and after an election. Sample is restricted to the years preceding and following an election year. Aligned constituencies are those where the incumbent is a member of the party or coalition in control of the state government. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Table 8: Party Entry and Exit

Number of:	Parties		Major Parties		Major Parties, Other		Small Parties		Independents	
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS	(7) OLS	(8) 2SLS	(9) OLS	(10) 2SLS
Panel A:										
Competition	0.298***	-0.280	0.844***	0.518***	0.151***	0.046	-0.552***	-0.802**	-1.201*	-2.565
	(0.083)	(0.401)	(0.045)	(0.186)	(0.049)	(0.206)	(0.072)	(0.354)	(0.716)	(3.023)
Mean dep. var.	5.35	5.35	3.19	3.19	1.59	1.59	2.16	2.16	5.92	5.92
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		217.87		217.69		217.26		216.71		216.64
Number of clusters	3013	2879	3013	2873	3013	2879	3013	2879	3013	2879
Obs	9425	9291	9417	9277	9425	9291	9425	9291	9425	9291

	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS	(7) OLS	(8) 2SLS	(9) OLS	(10) 2SLS
Panel B:										
Dispersion	0.928***	-1.197	2.001***	1.986***	0.907***	6.289***	-1.084***	-3.073*	-1.223	3.805
	(0.157)	(1.827)	(0.082)	(0.757)	(0.092)	(1.184)	(0.135)	(1.600)	(1.110)	(9.469)
Mean dep. var.	5.35	5.35	3.19	3.19	1.59	1.59	2.16	2.16	5.92	5.92
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		34.90		37.94		34.71		34.18		34.22
Number of clusters	3013	2879	3013	2873	3013	2879	3013	2879	3013	2879
Obs	9425	9291	9417	9277	9425	9291	9425	9291	9425	9291

Notes: This table estimates the effect of electoral competition on party entry and exit. The dependent variables are the number of parties, major parties, major parties excluding the incumbent and opposition party, small parties and independent candidates. Major parties are defined as INC, BJP, and the top two parties in each state (exclude INC and BJP). Major parties - other are defined as the major parties excluding the incumbent party and the strongest opposition party. Small parties are defined as all remaining parties. All regressions contain constituency and state-year fixed effects. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Table 9: Voter Mobilization

	Dep. Variable: Voter Turnout	
	(1)	(2)
	OLS	2SLS
Panel A:		
Competition	0.000	0.002
	(0.003)	(0.013)
Mean dep. var.	0.66	0.66
Controls	Yes	Yes
F-stat excluded instrument		199.54
Number of clusters	2902	2795
Obs	9046	8939
	(1)	(2)
	OLS	2SLS
Panel B:		
Dispersion	-0.006	0.019
	(0.005)	(0.054)
Mean dep. var.	0.66	0.66
Controls	Yes	Yes
F-stat excluded instrument		36.38
Number of clusters	2902	2795
Obs	9046	8939

Notes: This table estimates the effect of electoral competition on voter turnout. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. Sample period is 1989-2008, excluding baseline election year. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Table 10A: Incumbent Performance, Economic Indicators

	Ln. Employment Growth		Ln. Lights Growth		Ln. Total New Road Length	
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS
Panel A:						
Competition	0.006	-0.012	-0.012	-0.109	-0.024	-0.451
	(0.005)	(0.020)	(0.020)	(0.079)	(0.108)	(0.293)
Mean dep. var.	0.03	0.03	0.04	0.04	3.10	3.10
Baseline dep. variable	Yes	Yes	Yes	Yes	No	No
F-stat excluded instrument		56		111		107
Number of clusters	2271	1732	2187	2096	2134	1610
Obs	4003	3464	5046	4955	3839	3315
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS
Panel B:						
Anticipated Competition	-0.005	-0.017	0.024	0.100	-0.976	-1.250
	(0.013)	(0.020)	(0.022)	(0.092)	(1.717)	(2.036)
Mean dep. var.	0.02	0.02	0.03	0.03	2.67	2.67
Baseline dep. variable	Yes	Yes	Yes	Yes	No	No
F-stat excluded instrument		45		140		5
Number of clusters	2132	641	2112	1891	1701	130
Obs	2773	1282	4378	4157	1831	260

Notes: This table estimates the effect of electoral competition on incumbent performance using three economic indicators: employment growth, night lights growth, and public goods provision. Competition is defined as 1 minus the margin between the incumbent and her strongest opponent in the year the incumbent was elected. Anticipated competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent in the upcoming election year. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Table 10B: Incumbent Performance, Economic Indicators

	Ln. Employment Growth		Ln. Lights Growth		Ln. Total New Road Length
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS
Panel C:					
Competition	-0.004	-0.025	-0.006	-0.103	-0.001
	(0.015)	(0.023)	(0.026)	(0.110)	(1.375)
Anticipated Competition	-0.007	-0.024	0.021	0.058	-0.910
	(0.015)	(0.021)	(0.024)	(0.112)	(1.854)
P-val, $\beta_1 = \beta_2$	0.83	0.98	0.33	0.10	0.65
Mean dep. var.	0.02	0.02	0.03	0.03	2.67
Baseline dep. variable	Yes	Yes	Yes	Yes	No
F-stat excluded instruments		26		24	
Number of clusters	2131	640	2111	1889	1700
Obs	2771	1280	4375	4153	1830

Notes: This table estimates the effect of electoral competition on incumbent performance using three economic indicators: employment growth, night lights growth, and public goods provision. Competition is defined as 1 minus the margin between the incumbent and her strongest opponent in the year the incumbent was elected. Anticipated competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent in the upcoming election year. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

APPENDIX A

Appendix Table 1: Average Standard Deviation of Competition (within constituency, across years)

	Competition	Predicted Competition	Dispersion	Predicted Dispersion
	(1)	(2)	(3)	(4)
Andhra Pradesh	0.21	0.08	0.09	0.02
Assam	0.20	0.11	0.10	0.05
Bihar	0.25	0.17	0.16	0.08
Delhi	0.11	0.01	0.04	0.01
Goa	0.23	0.12	0.13	0.04
Gujarat	0.18	0.04	0.06	0.01
Haryana	0.39	0.21	0.23	0.11
Himachal Pradesh	0.18	0.09	0.04	0.02
Karnataka	0.29	0.19	0.17	0.07
Kerala	0.18	0.29	0.09	0.17
Madhya Pradesh	0.11	0.07	0.04	0.01
Maharashtra	0.28	0.09	0.16	0.04
Manipur	0.36	0.20	0.22	0.08
Meghalaya	0.14	0.08	0.07	0.04
Orissa	0.28	0.15	0.10	0.08
Pondicherry	0.25	0.12	0.15	0.10
Punjab	0.18	0.09	0.06	0.02
Rajasthan	0.15	0.09	0.05	0.03
Sikkim	0.24	0.23	0.10	0.06
Tamil Nadu	0.30	0.16	0.16	0.04
Tripura	0.06	0.02	0.05	0.03
Uttar Pradesh	0.24	0.15	0.13	0.05
West Bengal	0.26	0.25	0.24	0.19

Notes: This table reports the (1) average standard deviation of competition (actual and predicted) and (2) average standard deviation of dispersion (actual and predicted) within a constituency across election years for each state. The table shows that on average, constituencies in most states experience considerable variation in competitiveness across election years.

Appendix Table 2: Candidate Turnover (No Party Fixed Effects)

	Dep Variable: New Candidate				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	-0.064***	-0.066	0.229	0.014	0.025
	(0.011)	(0.054)	(0.196)	(0.109)	(0.063)
Mean dep. var.	0.75	0.75	0.39	0.77	0.92
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	No	No	No	No	No
F-stat excluded instrument		219.43	84.59	228.48	156.43
Number of clusters	3013	3010	2370	2466	2826
Obs	30183	30180	6811	7246	15102
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	-0.048**	0.442	1.249*	-1.080	-0.414
	(0.021)	(0.296)	(0.723)	(0.747)	(0.342)
Mean dep. var.	0.75	0.75	0.39	0.77	0.92
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	No	No	No	No	No
F-stat excluded instrument		28.91	21.39	15.70	17.12
Number of clusters	3013	3010	2370	2466	2826
Obs	30183	30180	6811	7246	15102

Notes: This table estimates the effect of electoral competition on whether a candidate running for office also ran in the previous election in the same constituency. The specification is the same as in Table 3, but without party fixed effects. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Appendix Table 3A: Candidate Demographics, Gender

	Dep Variable: Female Candidate				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	-0.007	0.012	0.182	0.129**	-0.078
	(0.007)	(0.031)	(0.193)	(0.057)	(0.048)
Mean dep. var.	0.06	0.06	0.06	0.06	0.05
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		221.28	18.06	214.74	152.00
Number of clusters	3013	3010	2370	2466	2826
Obs	30183	30180	6811	7246	15102
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	-0.012	0.004	-0.205	0.112	0.065
	(0.013)	(0.149)	(0.287)	(0.395)	(0.245)
Mean dep. var.	0.06	0.06	0.06	0.06	0.05
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		29.37	20.12	15.15	17.91
Number of clusters	3013	3010	2370	2466	2826
Obs	30183	30180	6811	7246	15102

Notes: This table estimates the effect of electoral competition on the gender of a candidate. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Dispersion is defined as 1 minus the HHI. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

Appendix Table 3B: Candidate Demographics, Age

	Dep Variable: Candidate Age				
	All Parties		Incumb. Party	Opp. Party	Other Parties
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel A:					
Competition	0.825*	-1.431	-2.741	-1.363	-3.997*
	(0.441)	(1.572)	(6.855)	(2.632)	(2.381)
Mean dep. var.	48.39	48.39	50.89	49.50	46.61
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		712.29	40.35	231.71	320.30
Obs	7879	7879	1852	2103	3971
	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS
Panel B:					
Dispersion	1.481*	-9.214	-7.773	-5.087	-15.834*
	(0.793)	(6.496)	(13.281)	(10.467)	(9.461)
Mean dep. var.	48.39	48.39	50.89	49.50	46.61
Controls	Yes	Yes	Yes	Yes	Yes
Party Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-stat excluded instrument		142.92	35.65	39.75	70.78
Obs	7879	7879	1852	2103	3971

Notes: This table estimates the effect of electoral competition on a candidate's age at the time of declaring candidacy. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. Specifications include party fixed effects, baseline year competition controls, and state-year fixed effects. Standard errors are clustered by constituency. Sample period is 2004-2017. Constituencies in 2004-2007 and 2008-2017 are stacked since the 2008 delimitation prevents comparison across these periods. Dispersion is defined as 1 minus the HHI. Vote shares rescaled to sum to 1.

Appendix Table 4: State Resource Allocation, Power Supply

	Dep Var: Ln Lights			
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS
Competition	0.025**	0.026	0.037**	0.025
	(0.011)	(0.043)	(0.017)	(0.045)
Competition x Pre-Election Year	-0.030***	0.073***	-0.034***	0.050
	(0.008)	(0.019)	(0.013)	(0.031)
Competition x Aligned			-0.020	-0.001
			(0.017)	(0.048)
Competition x Pre-Election Year x Aligned			0.008	0.052
			(0.015)	(0.037)
Pre-Election Year x Aligned			-0.015	-0.043*
			(0.010)	(0.022)
Aligned			0.021*	0.010
			(0.012)	(0.029)
Pre-Election Year	-0.108***	-0.149***	-0.103***	-0.131***
	(0.011)	(0.012)	(0.012)	(0.018)
P-val, $\beta_1 + \beta_2 = 0$	0.646	0.027	0.492	0.293
P-val, $\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$			0.434	0.027
Mean dep. var.	2.809	2.809	2.811	2.811
Baseline dep. var	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of clusters	2300	2300	2258	2258
Obs	9516	9516	9430	9430

Notes: This table estimates the effect of electoral competition on power supply measured by the log of total light emissions before and after an election. Sample is restricted to the years preceding and following an election year. Aligned constituencies are those where the incumbent is a member of the party or coalition in control of the state government. Competition is defined as 1 minus the expected margin between the incumbent and her strongest opponent. All regressions contain constituency and state-year fixed effects. Standard errors clustered by constituency. Vote shares rescaled to sum to 1.

APPENDIX B

This section illustrates the difference between standard shift-share instruments, which are constructed by computing the inner product of shifts and shares, and the instrument used in this setting, which is constructed by computing a non-monotonic function of shifts and shares. Consider a simple example with two shares and one time period in a single state. Following the framework used in Goldsmith-Pinkham et al. (2018), the standard shift-share (Bartik) instrument is defined as:

$$B_c = z_{1c} g_1^{-c} + z_{2c} g_2^{-c}$$

Since the shares, z_{1c} and z_{2c}, sum to 1, the instrument can be re-written as:

$$B_c = g_2^{-c} + (g_1^{-c} - g_2^{-c}) z_{1c}$$

The first stage equation regressing the endogenous regressor, x_c, on the instrument is given by:

$$\begin{aligned} x_c &= \gamma B_c + \epsilon_c \\ &= \gamma g_2^{-c} + \gamma (g_1^{-c} - g_2^{-c}) z_{1c} + \epsilon_c \end{aligned}$$

This equation shows that using the shift-share instrument is numerically equivalent to using the first share, z_{1c} as an instrument. The only difference between the two approaches is that the shift-share instrument rescales the first stage coefficient by the difference in growth rates, $\frac{1}{g_1^{-c} - g_2^{-c}}$. In either case, however, the predicted regressor is the same.

In contrast to the standard shift-share, my instrument for competition is given by:

$$PredictedCompetition_c = 1 - |(z_{1c} + g_1^{-c}) - (z_{2c} + g_2^{-c})|$$

Since the shares sum to 1, the instrument can be re-written as:

$$PredictedCompetition_c = 1 - |2z_{1c} + g_1^{-c} - g_2^{-c} - 1|$$

The first stage equation regressing actual competition, $Competition_c$ on the instrument, $PredictedCompetition_c$,

is given by:

$$
\begin{aligned}
Competition_c &= \gamma PredictedCompetition_c + \epsilon_c \\
&= \gamma\Big[1 - |2z_{1c} + g_1^{-c} - g_2^{-c} - 1|\Big] + \epsilon_c \\
&= \begin{cases} (2 - g_1^{-c} + g_2^{-c} - 2z_{1c})\gamma + \epsilon_c, & \text{if } z_{1c} \geq 0.5 - \frac{g_1^{-c} - g_2^{-c}}{2} \\ (g_1^{-c} - g_2^{-c} + 2z_{1c})\gamma + \epsilon_c, & \text{if } z_{1c} < 0.5 - \frac{g_1^{-c} - g_2^{-c}}{2} \end{cases}
\end{aligned}
$$

Here, the shift-share instrument is not equivalent to using the shares as instruments. This equation shows that changes in the relative growth rates, $\frac{g_1^{-c} - g_2^{-c}}{2}$, lead to changes in predicted competition depending on the share, z_{1c}.