Better Rivals, Better Politicians? How electoral competition improves political performance and economic outcomes

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Abstract

This paper aims to investigate the effect of political competition on economic development and the underlying mechanisms, using constituency-level data from Indian state elections between 1992 and 2021. To address potential endogeneity concerns, I employ three separate quasi-experimental strategies. My main analysis uses the vote shares of party-switching candidates (turncoats) as an instrument, arguing that high support for turncoats reflects a focus on personal traits over party platforms, raising entry barriers in politics. The supplementary regressions are an RDD-approach of an Indian government intervention that increased minority political participation, as well as an alternative instrument based on increased running costs for politicians. All estimation strategies yield consistent results. Specifically, using satellite-derived nightlight intensity as an proxy for economic activity, I find that greater political competition boosts economic growth. This effect appears to operate through two main channels: (a) improved political selection, as more competitive constituencies tend to elect politicians that are more educated and that have fewer criminal charges; and (b) increased political effort, as evidenced by increased public goods provision measured by the completion of road infrastructure projects. Importantly, these effects are not driven by strategic state-level spending aimed at swaying swing constituencies in favor of the ruling party. Overall, the study provides evidence that political competition enhances economic development by incentivizing better leadership and more effective governance.

JEL Codes: D72, H11, O43, P16

1 Introduction

Does political competition incentivize better governance or breed inefficiencies? This is one of the most contentious debates in political economy that becomes ever more important, looking at the decline of political competition around the globe marked by the erosion of free elections, suppression of opposition, and historically low voter

turnout (Solijonov, 2016; IDEA, 2024; V-Dem-Institute, 2025). This paper aims to provide empirical and causal evidence to aid in answering this fundamental question, showing whether and how political competition matters for economic governance, using local electoral data from India.

The theoretical predictions on this issue are rather mixed. The Chicago School of political economy argues that competition enhances the accountability of politicians, by increasing the risk of electoral replacement, thereby discouraging rent-seeking behavior and enhancing government efficiency (e.g., Stigler, 1972; Barro, 1973; Ferejohn, 1986; Besley and Preston, 2002; Acemoglu and Robinson, 2006). In contrast, the Virginia School offers a more skeptical perspective. It highlights the role of informational asymmetries, arguing that when voters lack the ability to distinguish between competent and incompetent politicians, electoral incentives may induce inefficient behavior (e.g.: Nelson, 1976; Gordon, 1983; Coate and Morris, 1995). For example, Coate and Morris (1995) argue that under competition low-quality politicians may adopt costly and opaque policies, instead of direct corruption, to mask their type and avoid electoral sanction. A common supporting argument is that multi-party governments, which are typically associated with more competitive democracies, are less likely to implement needed reforms, because of opposition and infighting in the coalition (e.g., Roubini and Sachs, 1989; Alesina and Drazen, 1991; Perotti and Kontopoulos, 2002).

While the theoretical models yield divergent predictions, empirical evidence mostly points to political competition having a positive impact on an array of economic factors. Cross-country evidence shows that countries characterized by greater political competition, tend to enjoy greater long-term income levels (Leonida et al., 2015), better public service provision (Lake and Baum, 2001), greater human capital accumulation (Pinto and Timmons, 2005), as well as lower levels of corruption (Montinola and Jackman, 2002). At the local level, higher political competition has been linked to better fiscal performance (Ariza Marín et al., 2021; Yu et al., 2022), increased public goods provision (Arvate, 2013), along with greater human capital attainment and a reduced employment share in the agricultural sector (Acemoglu et al., 2014).

Beyond correlational studies, several papers establish causal links between political competition and beneficial economic outcomes. For instance, Besley et al. (2010) exploit the abolishment of anti-voting policies in the US to show that a lack of political competition leads to anti-growth policies such as lower public spending and higher taxes. Similarly, De Paola and Scoppa (2011) show that greater political competition leads to more competent politicians.

India provides particularly fertile grounds for such analysis. At the state level, increased competition has been associated with improvements in HDI (Dash and Mukherjee, 2015) and economic performance (Ghosh, 2010). Famously, Besley and Burgess (2002) find that greater political competitiveness leads to better government responses to disasters. Finally, Mitra and Mitra (2015) show that competition in local elections leads to a decrease in income inequality, while Kailthya and Kambhampati (2022) find improvements in the visibility, but not effectiveness of public health services.

Yet, much of the existing literature relies on correlational evidence. Greater political competition may not cause better outcomes but rather co-occur with other favorable conditions. For instance, faster-growing regions may naturally attract more political engagement due to greater rent-seeking opportunities. Alternatively, robust institutions may simultaneously foster both political competition and superior development outcomes. These scenarios illustrate the endogeneity concerns in estimating the causal relationship between competition and economic outcomes.

To establish a causal link between the two, this paper addresses endogeneity concerns using three distinct quasi-experimental designs: two instrumental variable approaches and a regression discontinuity design. The primary instrument follows Kailthya and Kambhampati (2022) and uses the vote share of "political turncoats", a terminology for politicians that switched their parties before an election. The intuition being that voting for turncoats reflects an affinity for mechanical voting i.e. that voters do not care for the political agenda of politicians (as the politician has recently switched party allegiance), but only for their characteristics (e.g. gender, caste, personality, religion, etc.). I argue, mostly consistent with the Chicago school, that electoral competition enhances governance through two mechanisms, namely (a) improved political selection due to a greater supply of politicians and (b) greater political effort, driven by a higher risk of replacement. Both mechanisms are expected to result in higher economic growth and better economic outcomes.

To estimate the impact of political competition on economic growth, I utilize satellite-based nightlight data spanning from 1992 to 2021. The results suggest that more politically competitive constituencies experience higher growth rates in luminosity, suggesting a positive relationship between competition and economic activity. To investigate the underlying mechanisms, I draw on two additional data sources: candidate affidavits, which disclose information such as politicians' criminal histories as well as education, and implementation data from the PMGSY, a major rural

road infrastructure program. According to my hypothesis, increased competition should improve the selection of politicians, resulting in fewer candidates with criminal charges, higher levels of education and incentivize greater effort from elected officials, reflected in greater public goods provision. The empirical evidence supports both mechanisms. Importantly, these effects do not appear to be driven by strategic targeting from ruling parties in closely contested constituencies or by strategic selection of the parties putting up better-suited politicians in competitive constituencies. This suggests that political competition leads to aggregate welfare gains, rather than just redistribution of resources between constituencies.

To address concerns about the endogeneity of my main instrument I employ two alternative quasi-experimental designs. First, I adopt another IV similar to Corduneanu-Huci et al. (2021), exploiting increased costs for independent candidates. Second, I implement a regression discontinuity design inspired by Khan and Ritadhi (2025), based on an Indian government program that increased political participation in districts with minority populations exceeding 25%. Both strategies corroborate the main findings, showing that increased competition improves politician quality, public goods provision, and economic growth.

The remainder of this paper will proceed as follows. Section 2, covers the theoretical framework linking electoral competition to economic outcomes. Section 3 will proceed with covering the origin of the used data sources. In Section 4, my instrument and empirical strategy will be explained, while in Section 5 the results will be demonstrated. Section 6 will consist of the two alternative estimation strategies. In the section 7, the results will be discussed, while Section 8 concludes the paper.

2 Theoretical Framework

The core theoretical premise underpinning this paper is that electoral competition improves governance quality and, through it, local economic performance. This effect operates primarily through two mechanisms: (i) improved selection of politicians, and (ii) increased effort exerted by incumbents in office. These mechanisms are broadly consistent with models of political agency (e.g.: Ferejohn, 1986; Besley, 2005).

2.1 Mechanism 1: Political Selection

In competitive constituencies, the likelihood of electoral turnover increases. This dynamic may positively affect the selection of politicians elected to office via two

channels: party-driven strategic nomination and an expanded candidate pool.

First, political parties internalize the increased probability of electoral loss and respond by nominating higher-quality candidates, those with stronger reputational capital, cleaner records, or higher expected performance, because these individuals are more electorally viable in closely contested races. This argument is supported by models of strategic party behavior under competition (e.g., Galasso and Nannicini, 2009; Shaukat, 2019; Crutzen and Sahuguet, 2023).

Second, higher electoral contestability lowers the entry barrier for non-incumbent candidates. In first-past-the-post systems such as India's, where victory requires only a plurality, the fragmentation of votes in competitive constituencies makes it more feasible for challengers to mount viable campaigns. This can expand the effective supply of candidates, increasing the likelihood that voters are presented with higher-quality choices (Dal Bo and Finan, 2018; Yu and Ash, 2021). Voters, in turn, can exert greater selection power, rewarding competence and punishing criminality or incompetence when alternatives exist.

Together, these effects imply that competitive constituencies will, on average, elect politicians who are expected to be more capable, more accountable, and potentially less involved in criminal or rent-seeking behavior, based on the observable characteristics. However, this process requires the public to receive some signals of a candidate's quality, such as through media coverage or publicly disclosed affidavits.

2.2 Mechanism 2: Political Effort

Beyond selection, electoral competition is expected to discipline incumbent behavior. Classical agency models argue that when voters are sufficiently informed and re-election is uncertain, politicians have incentives to exert higher effort to signal their competence and avoid being replaced (Ferejohn, 1986; Lake and Baum, 2001; Besley and Preston, 2002; Acemoglu and Robinson, 2006).

The intuition is straightforward: politicians in competitive constituencies face a higher probability of losing their seats if they underperform. This induces greater investment in constituency services, public goods provision, and project implementation during their term. However, this effect is contingent on voters being sufficiently informed and politically active.

2.3 Testable Implications

Taken together, these mechanisms yield three central testable implications:

(A) **Improved Political Selection:** Competitive elections should result in the election of higher-quality candidates, either through strategic nomination by political parties or via voter selection from a broader candidate pool.

(B) **Increased Political Effort:** Incumbents in competitive constituencies will exert greater effort in office, knowing that failure to perform increases their risk of electoral defeat.

(C) **Enhanced Economic Performance:** If higher-quality politicians and increased effort translate into better governance, constituencies with greater electoral competition should experience superior economic outcomes, conditional on local politicians having sufficient administrative discretion and budgetary control to affect change during their tenure.

3 Data Sources

In the following section the different origins and limitations of the datasets will be discussed. All of the used datasets as well code to webscrape newer versions, will be uploaded for transparency [1].

3.1 Satellite Nightlight Data

Nightlight satellite imagery has become an increasingly prominent proxy for measuring economic activity and development in empirical research (e.g., Sutton et al., 2007; Chen and Nordhaus, 2011; Henderson et al., 2012). The earliest satellite-based nightlight data were collected by the U.S. Air Force's Defense Meteorological Satellite Program (DMSP), with data being publicly available from 1992 onward. In 2012, the launch of the Suomi NPP satellite introduced the Visible Infrared Imaging Radiometer Suite (VIIRS), a more advanced sensor that offers significant improvements over DMSP, including higher spatial resolution, better calibration, and the ability to detect low-intensity lighting from small settlements.

Despite their widespread use, nightlight data face several limitations. First, they are an inherently noisy measure of economic activity, partly due to light pollution and partly due to saturation thresholds in DMSP sensors, leading to underestimation of highly illuminated areas. Second, they may be biased by factors unrelated to economic output, such as variations in electricity access or supply. Third, DMSP sensors suffer

[1] Available under my GitHub-Account: https://github.com/Econ379

from inconsistent calibration across time and satellites. Lastly, the spatial resolution, particularly the resolution of DMSP, can be too coarse for analyses requiring finer geographic granularity (Addison and Stewart, 2015; Gibson et al., 2020; Huber and Mayoral, 2024).

To address some of these challenges, I utilize the harmonized nightlight dataset by Li et al. (2020), which spans from 1992 to 2021. This dataset offers two critical advantages for my analysis. First, it provides inter-satellite calibration and filters out non-economic light sources such as solar flares and cloud contamination, thereby reducing noise. Second, the harmonized dataset enables comparison between DMSP and VIIRS nightlight data, helping to overcome challenges posed by the 2008 redistricting of India's assembly constituencies[2]. Estimating constituency-level luminosity growth requires five years of data. However, DMSP ends in 2013, restricting analysis to the 2008 elections while VIIRS data only begins in 2012. This would leave a gap from 2009-2011 that limits most constituencies to a single post-delimitation observation, preventing the use of constituency fixed effects. The harmonized dataset bridges this gap by ensuring comparability across satellites, allowing the inclusion of 2009–2011 data. This provides at least two post-2008 observations per constituency, enabling their inclusion and nearly doubling usable observations.

Coming to the issue of granularity, while I use the Nightlight data to proxy subnational level economic output I use it on the Assembly Constituency level that on average have an area of 746 km^2, with a median of 517 km^2 far surpassing the critical levels of 25 km^2 or even the more conservative 7 km^2 below which analysis would become problematic(Elvidge et al., 2013; Gibson et al., 2025).

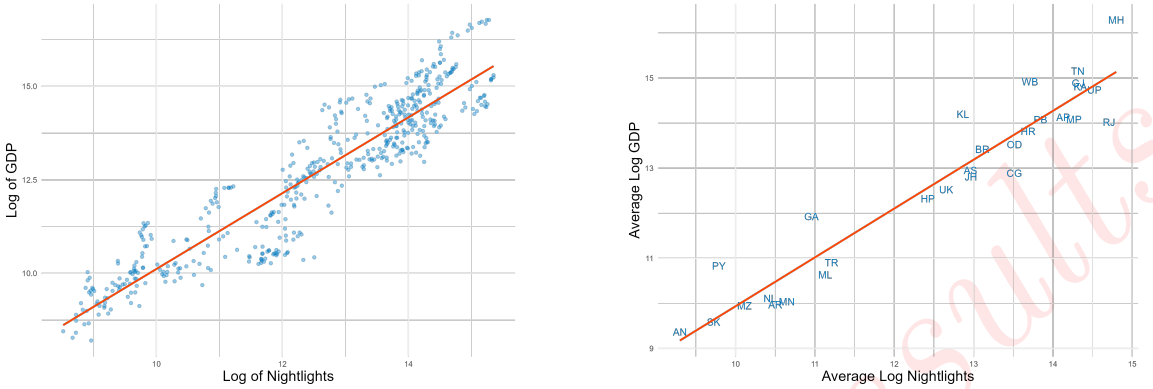
Finally, although nightlights remain an imperfect and sometimes controversial proxy for economic output, they are especially valuable in contexts where reliable subnational economic data are scarce or unavailable. In India, for instance, official GDP data are only available at the state level. Even these figures may be inconsistent; Subramanian (2019) estimates that national GDP is overreported by approximately 2.5 percentage points. Therefore, even if district- or constituency-level GDP data were available, their reliability would remain questionable and it would be unclear which measure is more unreliable.

In the Indian context, nightlight data have been successfully employed and validated repeatedly across several studies (Asher and Novosad, 2017; Prakash et al.,

[2]In 2008, the boundaries of Indian constituencies were redrawn based on the 2001 population census to better reflect demographic changes.

Figure 1. Log GDP vs Log Nightlights

Panel A: State-Year Scatterplot *Panel B: State-Level Averages*



Notes: The graphs are showing the log of GDP against the log of the sum Nightlights from 2003-2020 for each states (excluding Jammu & Kashmir due to its split in 2019). Panel A shows all observations as a scatterplot, while Panel B shows the averages over the time period. The red line is the regression of log Nightlights on log GDP, with a coefficient of 0.51, a se of 0.05, and a R^2 of 0.97.
Sources: The GDP data stems from the Ministry of Statistics, while the Nightlight data is derived from Harmonized Nightlight dataset of Li et al. (2020).

2019; Baskaran et al., 2024). As an example Asher and Novosad (2017) find that variation in luminosity is not systematically driven by electricity supply constraints. Moreover, there appears to be a strong correlation between reported state-level GDP and nightlight intensity (see Figure 1), further supporting the validity of this proxy in capturing regional economic output.

In conclusion, despite acknowledged limitations, nightlight data offers a critical solution to the challenges of measuring subnational economic output in India. The harmonized calibration, empirical consistency with state-level GDP trends, and prior validation in similar contexts collectively render nightlights as a credible alternative, particularly in the absence of viable alternatives.

I use spatial datasets of Indian Assembly constituencies from both before and after the 2008 delimitation, calculating the annual sum of nighttime lights, as a proxy for aggregate GDP-levels. To measure the growth rate in each electoral term, I compute the difference of log luminosity between the beginning and the end of a term. The average 5-year luminosity growth rate is estimated at 34% (See Table A8).

3.2 Election Data

The election data used in this paper stems from the Trivedi Centre for Political Data, a comprehensive and detailed Database for Indian state and national elections,

provided by the Ashoka University[3]. The database contains all state/union territories elections for the legislative assembly from 1962 to 2023[4]. I restrict my analysis to state legislative assembly elections beginning in 1992, as this is the first year for which nightlight data is available.

The dataset includes information such as the candidate's name, number of votes received, party affiliation, gender, election year, type of reservation[5], and personal ID for every individual who ran for election in one of the 4,123 constituencies in India. Every election is identifiable by a unique ID. This information allows me to match individual election results to their respective constituencies before and after delimitation.

3.3 Affidavits

Following a 2003 Supreme Court order, all candidates running for office are required to submit an affidavit. Politicians must disclose information about their education, age, assets, profession, and most importantly criminal charges. While politicians are barred from contesting elections after being convicted, they are permitted to run while facing charges. However, due to the long average time between being charged and convicted[6], politicians can run for and hold public office despite overwhelming evidence against them. A famous example would be Mukhtar Ansari, a politician from Uttar Pradesh who had already been charged with four murders by 2005, yet continued to contest elections and hold a seat in the state assembly until 2022, only being convicted in 2023 for one of these murders.

This context provides a unique opportunity to assess the quality of political selection. Existing research shows clearly that politicians with pending criminal charges tend to perform worse in office (Prakash et al., 2019), and that voters respond negatively to the revelation of such charges (Ferraz and Finan, 2008). Similarly, higher education of politicians is associated with improved development outcomes (Jain et al., 2023)

[3]Available at: https://tcpd.ashoka.edu.in/data/

[4]I omit observations from Bihar, Madhya Pradesh, and Uttar Pradesh prior to their partition in 2001, which created three additional states. My available data-sources did not allow me to match them with certainty to their geographical location. After the partition, both the original and newly formed states are included in the analysis.

[5]In India, some seats are reserved for marginalized communities, namely Scheduled Castes and Scheduled Tribes

[6]More than 10% of Indian Criminal Cases take more than 10 years to resolve, while more than 30% take at least 5.

Accordingly, I exploit variation in electoral competition to examine whether greater contestation improves candidate quality, proxied by (i) the presence of pending criminal charges, and (ii) years of formal education. Since both measures are publicly observable due to affidavit disclosures and are known to influence economic outcomes. In the sample, the average educational attainment among elected politicians is 13.4 years, while approximately 34 percent of all winners report one or more pending criminal charges (see Table A4).

The data I use stems from the nonprofit MyNeta of the Association for Democratic Reforms[7]. While they have an interactive website, there is no ability to export the data. I therefore constructed a custom dataset by scraping candidate-level information from the website. Candidate-level information was then merged with my election dataset using year, constituency, and election results as key identifiers.

For winning candidates, the match is exact. For non-winning candidates, I match records based on candidate names within each constituency-year pair[8]. In approximately 23% of observations, name spelling differed across datasets, in these cases, I employed a fuzzy matching algorithm. However, since my main analysis relies solely on data using election winners, the potential introduction of noise due to the fuzzy matching is not a concern.

3.4 Roads Construction (PMGSY)

In order to assess the level of Public Good Provision of politicians, I employ the data of the Pradhan Mantri Gram Sadak Yojana (PMGSY). Launched in 2000, PMGSY is a national program aimed at connecting rural villages to the larger road network. Since its inception, 182,445 new roads have been constructed with the total length reaching 779,498km roughly 12% of India's total paved road length. Described as "the largest rural infrastructure program in the world" (Aggarwal, 2018), PMGSY has been widely used in academic studies as a proxy for public goods provision and politician efficiency (e.g.: Prakash et al., 2019; Baskaran et al., 2024).

I scraped yearly district-level data from 2000 to 2024 from the National Rural Roads Development Agency (NRRDA) website[9]. A key challenge in using district-level data is the splitting of districts and the difficulty of matching assembly constituencies (ACs) to them. To match ACs to districts, I use geographical boundaries

[7]Accessible at: https://www.myneta.info/

[8]I, therefore, had to remove observations in which two or more individuals running for office had identical names (roughly 0.7%)

[9]Available at: https://omms.nic.in

and include only those constituencies with at least 80% spatial overlap (see Figure A1). Moreover, to address district splits, I include only districts whose boundaries have remained unchanged since 2001. This restriction is necessary because district splits occur independently of election cycles, making accurately matching impossible. Although block-level[10] data is available and would allow for more granular and robust analysis, collecting them would exceed the scope of this dissertation[11].

To assess the performance of politicians I calculate the percentage of achieved road construction during a politician's term. This is measured as the ratio of the actual constructed road length to the sanctioned road length. Although the program is implemented by bureaucrats and not politicians, they can influence the allocation of the contracts (Lehne et al., 2018), as well as the completion of the projects (Prakash et al., 2019; Baskaran et al., 2024). Therefore, the PMGSY serves as a useful proxy for evaluating politicians' efficiency in delivering public goods.

3.5 Additional Data Sources

In addition to the previously mentioned sources, I use data from the Population Census and the Economic Census [12]. I further draw on data from the Development Datalab by Asher et al. (2019), specifically their constituency-level estimates of the Population and Economic Censuses. Finally, I use spatial datasets from Sukhtankar (2011) for pre-delimitation constituency boundaries and rely on spatial data from ArcGIS[13] for post-delimitation borders.

4 Empirical Strategy

The following section begins by explaining why an instrumental variable approach is necessary. Afterwards I will explore the chosen instrument of political turncoats.

[10] A block is an administrative unit in India that falls below the district level. One AC typically comprises several blocks.

[11] The portal only provides yearly block-level data one block at a time, while District-level data can be acquired for all districts in a state. Scraping data on block-level would require me to scrape yearly data for each Block totaling to 174,144 single datasets (7256blocks × 24years), instead of 864 (36states × 24years), which already took 22 hours of continuous running time.

[12] Avalaiable at: https://censusindia.gov.in and https://www.mospi.gov.in

[13] Available at: www.arcgis.com/home/item.html?id=51aab23b0e3e4ac88f0eda8307cb223c

4.1 Setting the Stage

India is a large federal republic characterized by a competitive political landscape, with elections held at both the national and state levels. State elections, in particular, are marked by significant turnover, with incumbents facing a high likelihood of electoral defeat. Studies indicate that incumbents in state elections are less likely to retain their positions and are more prone to losing to opposition candidates (Uppal, 2009). India's first-past-the-post electoral system intensifies competition between candidates. Further, voters select individual candidates rather than party lists, again strengthening the individual contest for office (Crutzen and Sahuguet, 2023). On average, each election sees nearly nine candidates vying for a single seat, with voter turnout averaging approximately 70% (see Table A4).

I focus my analysis on state elections instead of national Lok Sabha elections, as state legislators in India play a significantly greater role in shaping the economic conditions of their constituencies than members of the Lok Sabha. They wield considerable authority over a range of policy areas, including tax policy (Khemani, 2004), the provision of public goods such as education and healthcare (Kaushik et al., 2016), and the allocation of federal development funds (Gupta and Mukhopadhyay, 2014). Additionally, they wield significant lobbying power to influence regulatory decisions in industries such as mining, including the granting or denial of permits (Asher and Novosad, 2017). These factors underscore the importance of state politics in shaping local economic outcomes. Given the highly competitive nature of Indian elections and the considerable policy-making power vested in state legislators, India offers a unique context for examining the relationship between political competition and economic growth.

Measuring political competition, however, presents substantial challenges. While many studies in two-party systems use the margin of victory as a proxy for competition (e.g., Besley et al., 2010), I follow Dash et al. (2019) in utilizing the *Effective Number of Parties* (ENP) as a more comprehensive measure. The ENP is defined as $ENP = \frac{1}{\sum_{i=1}^{n} p_i^2}$, where p_i denotes the vote share of each party. This measure is the inverse of the Herfindahl-Hirschman Index and reaches its maximum when all parties receive an equal share of the vote, indicating a highly competitive election. The key advantage of using the ENP, as opposed to the margin of victory, is that it captures the level of competition among multiple parties rather than just focusing on the winner and the runner-up. Thus, the ENP offers a more appropriate measure of political competition in multi-party systems.

However, the relationship between political competition and economic growth is further complicated by endogeneity. In particular differences in the characteristics of constituencies may likely influence both economic growth, as well as political competition. For example, institutional quality can affect both economic growth (Acemoglu et al., 2001) and political competition (Emanuele et al., 2023). While one may argue that fixed effects mitigate such concerns for some outcomes (e.g.: Ghosh, 2010; Ariza Marín et al., 2021), for economic growth such an argument cannot be made. Generally, if the extraction and rent-seeking possibilities are greater, political competition is increased (e.g Wick and Bulte, 2006; Ogwang et al., 2019). Consequently, constituencies with higher expected growth should experience greater political competition. This creates a problem of simultaneity bias, which cannot be resolved through fixed effects alone. To address this, I employ an instrumental variable approach.

4.2 Instrument Variable Approach

Identifying valid instruments for political competition is an inherently complex endeavor. While several have been employed, most seem rather unconvincing. Rezki (2022) used lagged values of political competition to instrument current ones. For this instrument to be valid the lagged outcome variable would need to be independent from the current one (Bellemare et al., 2015). In the case of economic performance, this seems rather unlikely. Shaukat (2019) employs a shift-share instrument, using changes in aggregate state-level party population to instrument constituency-level competition. For this instrument to be valid, the shocks must be exogenous (Borusyak et al., 2022) or the initial shares need to be exogenous (Goldsmith-Pinkham et al., 2020). Both options appear to be implausible. For example, the missteps of a political party that triggered a recession will affect both future growth and party popularity, making shocks prone to simultaneity bias and therefore endogenous. Similar, the initial shares would be affected by level of education, income, caste structure etc., making also the intial shares endogenous.

Among existing strategies, the most credible instrument appears to be the one proposed by Kailthya and Kambhampati (2022). Similar to their approach, I exploit the vote share of *Political Turncoats* (TC) as an instrument[14]. TC describes candidates that switched their party allegiance before an election. The identifying

[14]While KK use the rank of TCs as an instrument, I instead use their vote share, as (a) it offers greater variation, strengthening the instrument; and (b) when multiple TCs contest in a single AC, using only the lowest rank may fail to capture the overall extent of non-programmatic voting.

assumption is that variation in electoral support for such candidates reflects underlying voter tendencies toward non-programmatic, or mechanical, voting behavior (Wantchekon, 2003; Adida et al., 2017). Specifically, when turncoats receive higher vote shares, it suggests that electoral choices are less influenced by ideological or policy-based considerations and more by candidate-specific attributes such as personality, caste, religion, or gender. Such an environment can raise barriers to political entry, as electoral success becomes increasingly contingent on identity-based appeal rather than political platform. Conversely, lower support for turncoats may indicate a voter preference for programmatic representation, thereby reducing entry barriers for candidates advancing distinct policy platforms.

One potential concern regarding the relevance of this instrument could be the variability of the instrument across elections, resulting in too little explanatory value. However, this is not the case in my sample: in 35% of elections, at least one candidate is a TC (see Table A4), ensuring sufficient variation in the instrument. Moreover, the first-stage F-statistic depending on the sample size being between 80 and 120 comfortably exceeds conventional thresholds, suggesting the instrument is sufficiently strong.

To estimate the causal impact of political competition on electoral outcomes, I employ a two-stage least squares (2SLS) approach. In the first stage, I use the vote share of turncoats (VS-TC) to predict the level of electoral competition (ENP) in each constituency. The predicted values of ENP from the first stage serve as the instrumented variable in the second-stage regression.

Formally, the first-stage regression is given by:

$$\widehat{ENP}_{i,t} = \alpha_i + \pi_1 \text{VS-TC}_{i,t} + \gamma Z_{i,t} + \delta_t + \mu_s + \theta_{s,t} + \epsilon_{i,t} \tag{1}$$

where $\widehat{ENP}_{i,t}$ represents the predicted values of electoral competition for constituency i in year t and $\text{VS-TC}_{i,t}$ is the vote share of political turncoats.

In the second stage, I regress the outcome variable, $X_{i,t}$, on the predicted values of ENP obtained from the first stage. The second-stage regression is specified as follows:

$$X_{i,t} = \lambda_i + \beta \widehat{ENP}_{i,t} + \rho Z_{i,t} + \eta_t + \nu_s + \phi_{s,t} + u_{i,t} \tag{2}$$

The dependent variable, X_{it}, represents various outcomes, including the five-year growth rate of nightlight luminosity, the likelihood of the winner being charged with a crime, or the percentage of completed projects under the PMGSY for constituency i in year t. The model includes a set of fixed effects to control for unobserved het-

erogeneity and time-varying shocks. Specifically, α_i and λ_i capture time-invariant differences across constituencies (e.g., population structure), while ζ_t accounts for aggregate shocks affecting all constituencies, such as the COVID-19 pandemic. Additionally, the interaction of state and time fixed effects, $\theta_{s,t}$ and $\phi_{s,t}$, allows for the control of time-variant differences across states, which may arise from significant regional events, such as the implementation of the National Register of Citizens (NRC) in Assam, which stripped nearly two million inhabitants of their rights, including voting and property rights, likely having profound effects on both electoral competition and political outcomes. Furthermore, μ_s and ν_s control for time-invariant differences between states.

Finally, $Z_{c,t}$ represents a vector of time-varying covariates, such as whether a seat is reserved for Scheduled Castes (SC) or Scheduled Tribes (ST), and whether the elected politician belongs to the ruling party, which helps account for constituency-specific characteristics that could influence electoral outcomes. In an ideal setting, one would additionally control for socioeconomic characteristics such as literacy rates, caste composition, or employment structure, which may be correlated with both political competition and economic outcomes. However, such data is not consistently available at the necessary spatial and temporal resolution. While Asher et al. (2019) provide imputed constituency-level socioeconomic indicators using data from the Population and Economic Censuses, their coverage is incomplete[15] and temporally sparse, with observations available only every 8 to 10 years. Incorporating these variables would reduce the sample size by approximately 20%, and the long lags between data collection risks introducing measurement error and noise. Given these constraints, I do not include these socioeconomic variables directly. Instead, I rely on a combination of constituency and time fixed effects.

4.3 Validity of Political Turncoats

The main concern regarding the validity (or exogeneity) of my instrument is twofold: (a) constituencies with a higher number of Turncoats, or greater support for them, may differ systematically in their characteristics from those that do not, and (b) Turncoats themselves may differ significantly in their characteristics from "ordinary" politicians who have not switched parties. I will address both of these potential concerns to the validity of my instrument in the following subsections.

[15] Of the 4,123 Indian constituencies, data is available for only 3,280 from the Population Census and 3,274 from the Economic Census.

4.3.1 Turncoats the result of constituency differences?

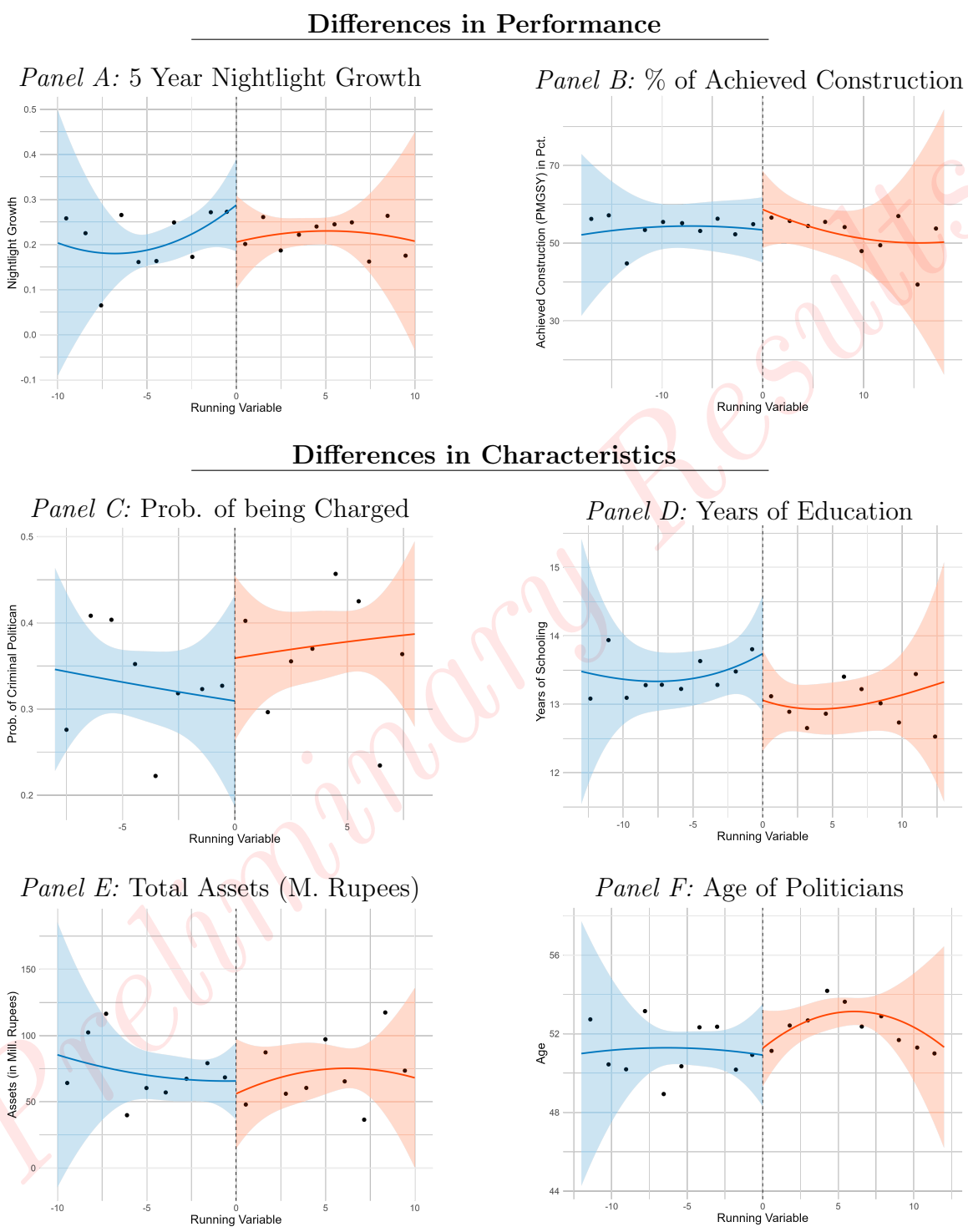
The central assumption of the instrumental variables strategy employed in this study is the exogeneity of the vote share of Turncoats with respect to the outcomes of interest, such as economic growth. A potential concern might be that TC vote share reflects underlying constituency-level characteristics that independently influence both political preferences and economic performance. For example, differences in population composition, institutional quality, or human capital across constituencies could plausibly shape both electoral outcomes and development trajectories, thereby violating the exclusion restriction.

Given India's diversity, substantial subnational heterogeneity renders this concern particularly salient. However, the empirical specification includes a rich set of fixed effects, which collectively address a wide range of potential confounders (see Sec. 4.2). Therefore, for the instrument to be invalid, it must correlate with time-varying, constituency-specific characteristics that simultaneously affect economic outcomes. While this remains a theoretical possibility, several empirical and conceptual considerations make it unlikely. First, demographic variables such as population structure (e.g., caste composition) tend to evolve slowly and are unlikely to drive sharp constituency-level changes over the relatively short panel period studied. Moreover, changes in human capital or institutional quality typically occur at broader spatial scales and are shaped by state-level education, governance, or infrastructure policies, precisely the kind of variation absorbed by the state-by-year fixed effects.

To empirically test whether TC vote share is systematically related to local characteristics, I regress it on a range of constituency-level covariates, stemming from the population and economic census. These include population composition (shares of Scheduled Castes and Tribes), human capital (literacy rates), and proxies for economic development (non-farm employment rates and nighttime light intensity). As reported in Table A2, none of these observables predict TC vote share, indicating that the instrument is orthogonal to observable determinants of economic outcomes.

These results suggest that constituency-level heterogeneity, at least for observables, is unlikely to confound the estimated relationship between Turncoat vote share and economic or political outcomes.

Figure 2. RDD Turncoats vs. Non-Switchers: Performance and Characteristics



Notes: This figure presents regression discontinuity (RD) estimates comparing Turncoat (TC) candidates who narrowly won elections against non-switching candidates, the estimator proposed by Calonico et al. (2014). The running variable is the TC vote margin relative to the closest non-switcher competitor. Panels A and B examine differences in performance, measured by five-year luminosity growth and the percentage of completed PMGSY projects. Panels C through F assess differences in candidate characteristics, including probability of criminal charges, years of education, declared assets (in million rupees), and age. Confidence intervals are plotted at 95%. The plotted bandwidth is chosen for clarity, and smaller then the used for estimation.

4.3.2 Turncoats vs. Non-switchers

Another potential threat to the validity of the instrument arises from the possibility that Turncoats systematically differ in quality or behavior from non-switching politicians. Prior literature suggests that party switching is often driven by ambition, opportunism, or political strategy (Tavits, 2009; Fraenkel, 2012). If such characteristics translate into greater effectiveness in office via increased effort, superior strategic acumen, or other factors, a high TC vote share, indicating that a TC won, would be associated with better developmental outcomes independent of changes in political competition. In such a case, the exclusion restriction would be violated, as the instrument would affect outcomes through a direct channel unrelated to the measure of political competition.

To address this concern, I implement a regression discontinuity design comparing Turncoat candidates and non-switchers, who narrowly won elections against their respective counterparts. I restrict my analysis to winning candidates, as those who lose have no capacity to affect constituency outcomes, regardless of their ambition or ability. Thus, only significant differences in outcomes between TC and non-switcher winners would indicate that the TC vote share influences the outcome variables regardless of political competition, while differences among losers wouldn't matter.

I use the robust bias-corrected RD-estimator with optimal bandwidth selection proposed by Calonico et al. (2014). I examine both candidate characteristics (age, education, criminal charges, declared assets) and policy outcomes (luminosity growth and PMGSY project completion). The results, presented in Figure 2 and Table A3, show no statistically significant differences across any of these dimensions at the RDD cutoff.

These null results suggest that Turncoat candidates do not differ systematically from non-switchers in terms of observable characteristics, nor do they generate superior policy outcomes conditional on winning. Therefore, while Turncoats may be more ambitious, this does not appear to influence their policies or political performance, nor do they seem to differ in qualities that would affect performance. This may be because, unlike in many countries, part-switching in India is far more prevalent and often not driven by ambition, but by necessity, such as when their party didn't nominate them or their party decided not to contest the constituency (Kakati, 2021).

In sum, the RDD results show that Turncoats differ neither in observable characteristics nor in performance. This reinforces the credibility of the exclusion restriction

and strengthens the case for using TC vote share as a valid instrument for ENP.

4.3.3 Potential Endogeneity Concerns: A Final Assessment

While the preceding subsections test whether a range of observable characteristics might invalidate my instrument, potential endogeneity due to unobserved factors remains a concern. For instance, factors such as institutional trust could plausibly influence both the success of Turncoats and local economic outcomes. Such unobserved traits are typically correlated with observables like income or education (Hakhverdian and Mayne, 2012). However, previously I showed that TC-voteshare exhibits no systematic relationship with proxies of these variables (see Table A2).

Similarly, if Turncoats possessed systematically greater political savvy or ambition, we would expect these traits to be reflected in observable measures such as their wealth, education levels, or electoral performance. Yet, the RDD reveals no such differences.

In conclusion, no instrument can be proven exogenous beyond doubt; there is always the possibility that unobserved factors correlate with both the instrument and the outcome variables. However, the combination of extensive fixed effects, no correlation between observables and TC-Voteshare, and empirical tests showing balance across observable traits between politician types and their outcomes provides credible support for the exclusion restriction.

5 Results

This section assesses the impact of political competition on luminosity growth, the quality of politicians (measured in terms of human capital, and criminality), and their exerted effort, as reflected in public goods provision.

5.1 Effect on Luminosity Growth

The central implication of my theory is that increased political competition enhances the quality and effort of elected officials, which in turn should lead to higher economic growth. As we can see in Table 1, an increase in political competition leads to a large and significant increase of luminosity growth by approximately 19 percentage points per number of effective party over a period of 5 years. Based on my regression of Nightlights on state-level GDP output (See: 1) this would roughly translate to a 9 p.p. greater increase in GDP over 5 years. While this effect size appears large, it is

Table 1. IV: Effect of ENP on Luminosity growth

	(1)	(2)	(3)	(4)	(5)
ENP	0.191*	0.185*	0.191*	0.185*	0.180*
	(0.106)	(0.104)	(0.106)	(0.104)	(0.095)
ENP × Ruling Party[a]					0.012
					(0.010)
Ruling Party		0.034**		0.034**	
		(0.015)		(0.015)	
SC Reserved			-0.425	-0.437	-0.154
			(0.935)	(0.930)	(0.184)
ST Reserved			-0.162	-0.156	-0.431
			(0.163)	(0.163)	(0.420)
F-stat (1st stage)	116.357	121.512	116.524	121.676	99.236
Wu-Hausman Test (p-val)	0.042	0.045	0.041	0.045	0.084
Observations	17,930	17,930	17,930	17,930	17,930

Notes: This table presents the IV-estimates for the effect of political competition, measured by the Effective Number of Parties (ENP), on the 5-year growth rate of nighttime luminosity. ENP is instrumented using the vote share of political turncoats. The regressions include constituency, year, state, and state-by-year fixed effects. Standard errors in parenthesis are clustered at the constituency level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
[a]Instrumented by Voteshare-TC × Ruling Party (F-statistic: 1,797.7)

important to consider that the standard deviation of ENP in the sample is 0.92 A4. Thus, a one-unit increase in ENP represents a substantial change in local political competition. Similarly, nightlight data is inherently noisy, potentially overstating the effect.

To determine whether the estimated effect of political competition reflects unrelated correlated trends, I perform a placebo test using population growth as the outcome, as shown in Table A5, instrumented ENP has no effect on it, supporting the validity of the main results.

While the coefficients are not significant at the 5% level with p-values ranging from 7.5% to 5.8%, this is likely due to the noisy nature of the nightlight data, increasing the standard errors and decreasing significance (As discussed in Sec. 3.1).

Moreover, in column (5) we can see that this increase is not driven by ruling parties distributing more money to constituencies they narrowly won in order to consolidate their slim electoral margins ahead of the next election, as suggested by prior studies (Rosenzweig, 2015; Kaushik et al., 2016; Shaukat, 2019). This underscores that the observed gains are not merely the result of redistribution from uncompetitive to competitive constituencies, which would imply that political competition has only redistributive effects. Rather, the results suggest that competition may enhance overall welfare.

5.2 Effect on the Quality of Politicians

As discussed in my theoretical framework, I argue that this increase in economic growth is to some degree attributable to positive selection effects. Specifically, in more competitive constituencies, a larger pool of viable candidates may allow voters to elect higher-quality representatives, or parties may strategically nominate more competent candidates to improve their chances of winning.

This in fact holds true. Table 2, shows that the quality of elected politicians in both their education-levels as well as their likelihood of being charged are positively impacted. While a one-unit increase of the effective number of parties (roughly one std.dev.) is associated with a drop of roughly 25% in the probability of an elected politician being charged with a crime[16], the years of schooling increased by approximately two years.

To assess whether this pattern is merely the result of strategic candidate placement by political parties, I include two supplementary regressions. First, if parties systematically assign better candidates to more competitive races, we should observe interaction effects between political competition and the two major national parties: the Bharatiya Janata Party (BJP) and the Indian National Congress (INC). Columns (3) and (7) of Table 2 show no evidence that the candidate quality of these parties increases with competition. This suggests that the observed effects are not driven by the strategic behavior of dominant parties.

Second, if all parties deploy their strongest candidates in highly contested constituencies, then even losing candidates should exhibit higher quality in these settings. Yet, columns (4), (5), (8) and (9) provide no support for this hypothesis: political competition does not significantly predict the education or criminality of losing candidates, be it of candidates from all parties or just the BJP and INC. This further weakens the case for strategic placement as the primary mechanism.

A potential counterargument may be that parties engage in strategic avoidance, choosing not to field a strong candidate when a rival party has already nominated a highly qualified opponent. However, this logic implies that the average quality of both losers and candidates given a specific party should still increase in competitive constituencies, which is not the case. Such a null effect would only occur if parties deliberately fielded lower-quality candidates in constituencies where an opposing party had nominated a strong one. This strategy seems both unlikely and inconsistent with

[16] Has to be interpreted with caution, as it is a linear probabilistic model. The logit-model reports a 93% drop in the likelihood of being charged for each ENP

Table 2. IV: Effect of ENP on Candidate Quality

	Prob. of being Charged					*Years of Schooling*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ENP	-0.248**	-0.248**	-0.260**	0.013	0.071	2.124**	2.161**	1.996**	0.383	0.282
	(0.116)	(0.116)	(0.132)	(0.045)	(0.120)	(1.024)	(1.034)	(1.017)	(0.488)	(1.065)
ENP × BJP[a]			-0.017					0.133		
			(0.019)					(0.155)		
ENP × INC[b]			-0.027					0.265		
			(0.020)					(0.162)		
SC Reserved		-0.002	-0.056				3.241***	3.411***		
		(0.102)	(0.116)				(0.762)	(0.858)		
ST Reserved[c]		—	—				—	—		
F-stat (1st stage)	83.277	83.380	27.196	334.312	74.923	102.553	101.059	39.918	334.312	74.923
Wu-Hausman (p-val)	0.042	0.042	0.219	0.198	0.335	0.048	0.047	0.197	0.489	0.934
Observations	14,294	14,294	14,294	62,706	11,502	15,800	15,800	15,800	62,706	11,502
Only Loosers[d]	×	×	×	All Parties	BJP & INC	×	×	×	All Parties	BJP & INC

Notes: This table presents the IV-estimates for the effect of political competition, measured by the Effective Number of Parties (ENP), on the quality of elected politicians measured by the probability of being charged (Columns 1–5) and the years of schooling (Columns 6–10). ENP is instrumented using the vote share of political turncoats. The regressions include constituency, year, state, and state-by-year fixed effects. Standard errors in parentheses are clustered at the constituency level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

[a]Instrumented by TC-Voteshare × BJP (F-stat (Charged): 511.6 / F-stat (YoS): 625.9)

[b]Instrumented by TC-Voteshare × INC (F-stat (Charged): 464.8 / F-stat (YoS): 577.5)

[c]In 8 states, only 2–3 seats are reserved for Scheduled Tribes leading to very limited variation. As a result, ST-reservation had to be excluded due to collinearity. For instance, in 25 state elections, no ST politician was charged with a crime, and in 8 all had the same number of years of schooling.

[d]This is an alternative dataset looking at loosers instead of winners. The reasoning being is that if the cause of better politicians is not selection by the public, but by parties we should see a decrease of criminality and increase in years of schooling, regardless of whether a politician won or lost an election. We take a look at two different subsets, in column (4) and (9) we only use politicians that are member of a party, while in column (5) and (10) a subset of politicians is used that are members of the BJP or INC.

rational electoral behavior. In such cases parties should rather not field any candidate, to not run the risk of reputational damage and losing the deposit of roughly 120USD[17].

Taken together, the evidence suggests that the primary channel is voter-driven selection facilitated by a greater candidate pool, rather than strategic candidate placement by parties. Increased political competition characterized by a broader supply of candidates, enables voters to elect more competent and less criminally tainted representatives. This serves as one of the two key mechanisms of how competition fosters economic growth.

Table 3. IV: Effect of ENP on Achieved PGMSY Construction

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ENP	9.019**	8.957**	8.975**	8.913**	8.493**	7.302	7.576
	(4.226)	(4.207)	(4.179)	(4.159)	(4.170)	(4.786)	(4.784)
ENP × Ruling Party[a]					0.779		
					(0.496)		
Ruling Party		1.148		1.145			
		(0.730)		(0.729)			
SC Reserved			35.411**	35.347**	36.141**		
			(15.457)	(15.401)	(15.523)		
ST Reserved			8.413	8.456	9.357		
			(7.147)	(7.159)	(7.203)		
Years of Schooling							-0.076
							(0.092)
Case							0.717
							(0.801)
F-stat (1st stage)	99.113	101.064	99.805	101.773	57.190	63.543	54.008
Wu-Hausman (p-val)	0.013	0.013	0.013	0.013	0.031	0.122	0.108
Observations	10,888	10,888	10,888	10,888	10,888	6,998	6,998
Only Affidavit data	×	×	×	×	×	✓	✓

Notes: This table presents the IV-estimates for the effect of political competition, measured by the Effective Number of Parties (ENP), on effectiveness of public goods provision, measured by the achieved construction of cleared PMGSY projects. ENP is instrumented using the vote share of political turncoats. The regressions include constituency, year, state, and state-by-year fixed effects. The column 6-7 are calculated by a smaller dataset, in which we have data for Affidavits. As the measurement of achieved construction is one district level, the standard errors are clustered at the District-level as well. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
[a] instrumented by Voteshare-TC × Ruling Party (F-statistic: 592.2)

[17] This deposit is forfeited only if a candidate receives less than one-sixth of the vote. However, this is not an unlikely outcome if a party deliberately fields unqualified candidates while its competitors nominate particularly strong ones.

5.3 Effect on Public Goods Provision

Apart from the positive impacts on economic growth stemming from better selection, the theoretical framework also predicts a positive effect on exerted effort. The argument being that a higher risk of electoral defeat incentivizes politicians to work harder to deliver results, thereby improving their chances of re-election.

Empirical support for this channel is presented in Table 3, which estimates the effect of political competition on the achieved construction of the PMGSY. The results indicate a large and statistically significant increase in the proportion of sanctioned road projects that are successfully completed. The IV estimates imply that increasing ENP by one (roughly one std. dev.) leads to an approximately 9 percentage point increase in achieved construction. As with economic output, this effect is not driven by preferential treatment toward constituencies narrowly won by the ruling party (see column (5)).

This effect is substantial despite the problems of attenuation bias arising from spatial mismatch, given that the PMGSY data is only recorded at the district level. To account for this mismatch and ensure valid statistical inference, standard errors are clustered at the district level.

One potential concern may be that these effects are attributable to improved selection rather than increased effort. However, if this were true, after controlling for politicians' characteristics, we should see a depression of the impact of competition towards zero. As shown in columns (6) and (7), this is not observed, in fact, the coefficient slightly increases. Although statistical significance declines due to reduced sample size[18] the point estimates remain robust in direction and magnitude. This pattern supports the interpretation that observed improvements in public goods delivery are driven, at least in part, by increased political effort rather than selection alone. This underscores that, beyond improved selection, increased effort is a relevant mechanism through which political competition enhances economic growth in constituencies.

6 Alternative Estimation-Strategies

To assess the robustness of the main findings and alleviate concerns regarding the validity of the instrumental variable, I implement two complementary empirical strategies. First, I employ an alternative instrument based on a policy shock that raised

[18] Affidavit data is only available starting in 2004

costs for independent candidates to run for office. Second, I exploit the arbitrary administrative threshold of a minority-targeted credit expansion, which increased minority political participation, as the basis for a regression discontinuity design. Both approaches yield results consistent with the main specification, reinforcing the conclusion that greater political competition enhances economic performance and governance quality.

6.1 Alternative IV: Running-Cost increases

To validate my results, I draw on a policy shock implemented between 1996 and 1998, during which the Indian government significantly increased the electoral deposit required to contest elections, from $250 Rs.$ to $10000 Rs.$. This reform imposed a higher financial burden on candidates who failed to secure at least one-sixth of the vote share, disproportionately affecting independent candidates. While party-affiliated candidates were shielded from the financial repercussions, as parties typically cover deposit fees, independent candidates, who bear campaign costs personally, faced greater disincentives to run for office.

Following Corduneanu-Huci et al. (2021), I exploit this policy as a source of quasi-exogenous variation in political competition. Specifically, I construct a measure capturing the number of independent candidates in a constituency who contested elections prior to 1998 and failed to reach the one-sixth vote share threshold. The intuition is that constituencies with more marginal independent candidates experienced a sharper decline in candidate entry after the reform, leading to a greater reduction in electoral competitiveness.

The first-stage specification is as follows:

$$\widehat{ENP}_{i,t} = \alpha_i + \pi_1(IndCandpre98 \times Post98) + \gamma Z_{i,t} + \delta_t + \mu_s + \theta_{s,t} + \epsilon_{i,t} \quad (3)$$

The second stage remains structurally identical to the baseline model. Since the treatment effect of this policy likely attenuates over time, I restrict the sample to elections immediately before and after the reform. As a result, only nightlight data can be used as the outcome, since candidate affidavits and PMGSY implementation data are unavailable for this narrower time window.

The results of this regression (see Table 4) reaffirm the main finding: increased political competition, leads to statistically significant gains in economic activity, as proxied by satellite-based nightlight intensity. These findings are consistent with the main IV results and strengthen the causal interpretation by leveraging a distinct

Table 4. Alternative IV: ENP on Luminosity Growth

	(1)	(2)	(3)
ENP	0.076**	0.078**	0.076**
	(0.029)	(0.027)	(0.030)
ENP × Governing Party[a]			0.000
			(0.015)
Governing Party		0.024	
		(0.018)	
F-stat (1st Stage)	53.0	53.1	28.2
Wu-Hausman p-val	0.173	0.174	0.372
Observations	5,169	5,169	5,169

Notes: This table presents the IV-estimates for the effect of political competition, measured by ENP, on the 5-year growth rate of nighttime luminosity. ENP is instrumented using the pre1998 number of Independent Candidates having received under one-sixt of the vote. The regressions include constituency, year, state, and state-by-year fixed effects. Standard errors in parenthesis are clustered at the constituency level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
[a] Instrumented by, instrument ×Ruling Party (F-statistic: 86.2)

policy shock.

6.2 RDD: RBI-Minority-Intervention

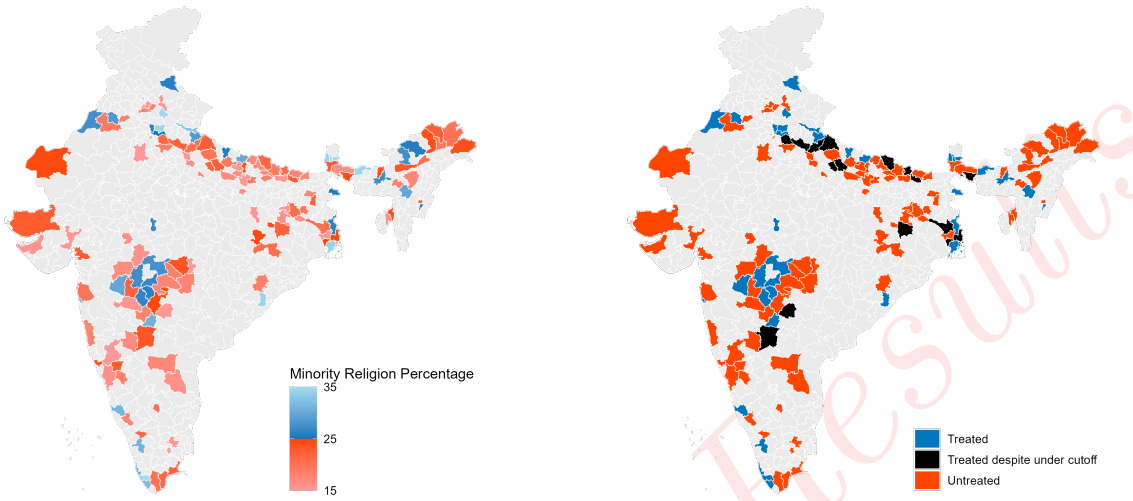
The second robustness check addressing concerns over endogeneity in the instrumental variable strategy employs a RDD that exploits an arbitrarily determined threshold in the allocation of a central government credit support program. This approach follows the design proposed by Khan and Ritadhi (2025), who documents that the program, although economic in nature, led to a significant increase in political participation among religious minorities in treated districts.

The intervention aimed to expand lending to minorities, such as by supporting and facilitating Self-Help Groups (SHGs) in districts where the minority population exceeded 25%, as measured by the 2001 Population Census. Minorities are officially defined as Muslims, Sikhs, Christians, Zoroastrians, Buddhists, and Jains. The stated goal of the program was to improve access to credit among underrepresented groups. However, as Khan and Ritadhi (2025) argues, the program plausibly affected political participation through three mechanisms: (a) alleviating credit constraints that may have prevented minority candidates from contesting elections; (b) strengthening intra-community cohesion and identity through SHGs, thereby increasing political awareness and engagement; and (c) improving minorities' economic standing, enabling some to (financially) support peers seeking political office.

Of the 121 districts that received the program, 103 were treated solely on the

Figure 3. Minority shares and Treatment of RBI-Program

Panel A: Minority shares by district *Panel B: Treatment of Districts*



Notes: Panel A displays the minority population shares across Indian districts. Panel B displays the treatment of districts. For better clarity, shares and treatment are only plotted for districts that fall around the RDD-relevant cutoff of approximately 10% (most estimatiosn have an optimal bandwith of 5% to 12%). Minorities are defined according to the Indian government as Muslims, Sikhs, Christians, Zoroastrians, Buddhists, and Jains. Minority shares for the states of Jammu and Kashmir, Punjab, Meghalaya, Mizoram, Nagaland, and Lakshadweep are not plotted, as these states were excluded from the program.

basis of exceeding the 25% minority threshold, while an additional 18 districts were selected on unspecified criteria. I focus on the threshold-based assignment, matching assembly constituencies to treated districts using an 80% geographic overlap rule (see Figure A1). Given the arbitrary inclusion of the 18 non-threshold-based districts, I employ a fuzzy RDD design, using the discontinuity in minority population share as an instrument for actual treatment. Treatment status is displayed in Figure 3.

I do not run any regressions on luminosity growth as the credit-program stimulates economic output, therefore any observed increases of growth cannot reasonably be attributed to an increase in political competition. However, the programme is unlikely to affect any of my other outcome variables except trough political competition.

While RDDs do not require controlling for covariates, I include controls for constituency-level reservation status and district-level characteristics for the PMGSY regressions to improve precision. I restrict district-level controls to PMGSY, as it is the only outcome variable measured at the district level, and I want to avoid introducing any noise in the constituency regressions.

Table 5 reports the post-treatment results. Consistent with the argument that increased minority political participation enhances overall electoral competitiveness, I find a significant increase in the effective number of parties following the intervention.

Table 5. Fuzzy RDD POST

	ENP		Case		Years of Schooling		PMGSY	
Treatment	4.202***	3.176***	-1.284***	-1.323***	0.601**	0.947***	49.644*	45.271**
	(1.225)	(0.842)	(0.321)	(0.284)	(0.265)	(0.286)	(26.244)	(21.522)
First Stage: Minority Share	0.147	0.181	0.275	0.267	0.346	0.356	0.391	0.495
F-statistic	11.9	18.7	32.6	38.7	51.8	60.1	7.2	19.2
Controls Reservation	×	✓	×	✓	×	✓	×	×
Covariates District	×	×	×	×	×	×	×	✓
Optimal Bandwidth	2.66	2.85	3.49	3.42	4.51	5.11	12.97	13.01
Observations	317	320	346	339	367	437	176	177

Notes: Fuzzy RD estimates from local linear regression with robust bias-corrected inference and optimal bandwidth selection by (Calonico et al., 2014). First stage shows the effect of crossing the threshold on treatment status. The constituencies have been matched to districts based on 80% area overlap. As the PMGSY data is on district-level, it is directly matched to treated districts. Reservation controls include SC and ST reservation dummies. District covariates include (where applicable) log of marginal workers, log of service sector workers, log of literate population, SC share, and ST share. All standard errors are clustered at district level e.g. level of treatment. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

This confirms that the program induced meaningful changes in local political dynamics. Furthermore, I document a decline in the probability of elected candidates being charged with a crime, as well as an increase in their years of schooling, both consistent with improved political selection. Finally, I find that treated constituencies exhibit significantly higher achieved construction percentages of the PMGSY infrastructure program, suggesting increased political effort.

A critical concern with any RDD is the possibility that the discontinuity captures pre-existing differences rather than causal effects. To assess this, Table A6 reports pre-treatment estimates and shows no effect at all. As an additional robustness check, I estimate a sharp RDD by excluding all districts that received treatment despite falling below the 25% threshold. The results from this more restrictive specification (Table A7) align with those from the fuzzy RDD, reinforcing the credibility of the approach.

7 Discussion

This is one of the few papers investigating the causal impact of political competition on economic growth, as well as the mechanisms behind it. Using nearly three decades worth of constituency-level data from the world's largest democracy, and its three independent quasi-experimental empirical strategies, the paper stands out with its strong internal validity. I am able to show that higher political competition has a large and significant impact on the local economic growth rates.

The analysis identifies two primary mechanisms through which political competition enhances development outcomes: improved politician selection and increased political effort. In more competitive constituencies, elected officials are systematically less likely to have criminal records and are more educated. This effect appears not to be driven by strategic candidate nomination by parties but by a larger and more diverse candidate pool. In addition, competitive constituencies exhibit greater public goods provision. Likely the case due to the disciplining effect of electoral threat, which incentivizes politicians to exert greater effort to signal performance. These results are not driven by strategic state-level spending aimed at expanding the narrow lead of the ruling party in swing constituencies it won. Although I cannot rule out the possibility that other channels also contribute to the observed increase in economic performance, nor can I precisely determine the relative contribution of either mechanism, prior studies suggest that both are likely to have substantial effects (Prakash et al., 2019; Asher and Novosad, 2020; Jain et al., 2023).

A notable finding is that the effects of political competition do not stem from redistribution across constituencies, whether in terms of politicians' quality or state resources. The results suggest that the positive impacts stem organically only from the competition itself. This would suggest that political competition not only leads to aggregate welfare improvements, but also likely results in Pareto improvements as non-competitive constituencies do not appear to be worse off.

Despite the strength of the identification strategies and the large sample, the broader applicability of these findings should be treated with caution. The external validity may be contingent upon specific institutional and informational features of India's political system. These contextual factors are central to understanding when and why political competition enhances development outcomes.

India offers a unique and fertile ground for studying the impact of political competition for several reasons. First, its first-past-the-post electoral system inherently creates stronger individual-level incentives for political performance than proportional representation systems, where party lists often dilute accountability. This makes the disciplining mechanism more effective (Crutzen and Sahuguet, 2018, 2023).

Second, India's multi-party system facilitates a wider range of candidate supply. This is particularly important, as positive selection effects appear to be driven by a greater pool of candidates, allowing voters to choose more suitable representatives. This mechanism is less plausible in two-party systems such as the United States, where voters can usually only choose between two candidates.

Third, Indian state politicians wield substantial discretionary power (e.g.: Khemani, 2004; Gupta and Mukhopadhyay, 2014; Kaushik et al., 2016; Asher and Novosad, 2017). In institutional environments where politicians possess less autonomy over budgetary and administrative decisions, the marginal effect of improved selection or greater effort on economic outcomes is likely to be muted.

Beyond these specific political characteristics, another key component is the level of voter information that is necessary to facilitate any of these benefits. The effectiveness of political competition in enhancing governance relies on voters' ability to observe and respond to politician quality. In India, mandated candidate affidavits provide a formal mechanism through which voters can learn about politicians' criminal records, education and financial assets. Nonetheless, the effective use of this information hinges on a functioning media ecosystem. As Ferraz and Finan (2008) and Banerjee et al. (2011) show, despite criminal histories being publicly available, they often do not influence voter behavior due to a lack of awareness. Similarly, Bhattacharyya and Hodler (2015) find that political competition and media coverage act as complementary forces in reducing corruption. Reinikka and Svensson (2005), show that a newspaper campaign in Uganda not only reduces corruption by officials but also increases public goods provision. This shows that without credible and independent media, the disciplining effect of competition is weakened, as voters are less likely to observe and sanction underperformance (Gottlieb and Kosec, 2019).

Furthermore, India's relatively strong electoral and legal institutions facilitate the positive effects of competition in the first place. Incidents of large-scale electoral fraud or systematic vote buying, while not absent, are less prevalent than in many developing democracies (Anderson et al., 2015). The institutional integrity of the electoral process is crucial: if elections are not free and fair, or if clientelistic practices dominate, then competition may exist in form but not in substance. In such contexts, increasing political competition may not yield the same beneficial effects. Worse, as noted by Keefer (2007) and Fjelde (2020), greater competition in fragile institutional settings can exacerbate corruption, violence, and pandering to special interest groups.

These factors suggest that neither the Chicago School's optimistic view of electoral incentives nor the Virginia School's skepticism holds universally. Rather, the effects of political competition are likely contingent on institutional quality, access to information, and media freedom.

The policy implications are, therefore, twofold. First, while promoting political competition remains a worthwhile objective, its success depends on complementary

reforms aimed at enhancing transparency and media freedom, such as the introduction of mandatory candidate affidavits, as implemented in India. Second, reforms must focus on building institutional capacity to ensure accountability, electoral integrity, and administrative autonomy. Without these foundational elements, calls for greater political competition may yield limited results, or worse, invite unintended consequences.

Assuming this framework exists and holds, several low-cost and effective policies can help foster political competition. A straightforward way to increase public political participation is to simplify the voting procedure, for example, by expanding access to mail and internet voting, both policies known to increase voter turnout (Kousser and Mullin, 2017; Goodman and Stokes, 2020). Voting by mail, appears especially promising, as it also reduces administrative costs (Lamb, 2021), though without adequate safeguards it may increase the risk of electoral fraud (Lott, 2020). Another viable reform would be to lower barriers to entry into politics, such as reducing the required election deposit. Finally, civic education has been shown to increase multiple forms of participation, including voting and party membership (Galston, 2001).

In sum, this paper shows clearly that political competition improves economic outcomes. However, these effects are likely dependent on the institutional and informational environments. The Indian case illustrates the powerful potential of electoral competition while underscoring the conditions necessary for its success. Without these enabling features, calls for more competition may remain symbolic or worse, counterproductive.

8 Concluding Remarks

This paper establishes one of the few causal relationships between political competition and economic growth, using detailed constituency-level data from India. I am able to show that more competitive elections lead to improved economic outcomes, primarily through two mechanisms associated with the Chicago School, namely enhanced political selection and greater political effort. Politicians in competitive constituencies are less likely to have criminal backgrounds, possess higher educational qualifications, and are more effective in delivering public goods.

The empirical strategy is notably robust, combining an instrumental variable approach with two complementary identification strategies. Across all approaches, the findings consistently indicate a positive and significant impact of political competi-

tion on economic growth via an improved selection and increased effort. Importantly, since these results are not driven by redistribution from less competitive to more competitive constituencies, either by parties or the government, they suggest that increased political competition may not only lead to aggregate welfare gains, but also to pareto improvements.

While these results are compelling, their magnitude may depend on specific features of the Indian context, such as strong political power, a multi-party system, and relatively independent media and institutions, that facilitate the translation of competition into improved outcomes. In settings lacking these conditions, the effects may be weaker or less consistent.

Nonetheless, the findings highlight the potential positive impact of electoral competition, particularly when supported by institutions that enable it to function effectively. Strengthening both political competition and the institutional conditions under which it operates offers a promising path to improved governance and sustained economic performance.

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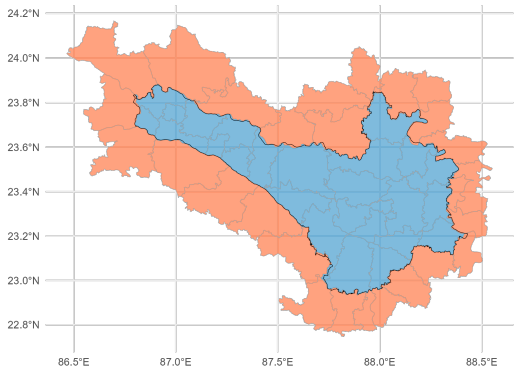
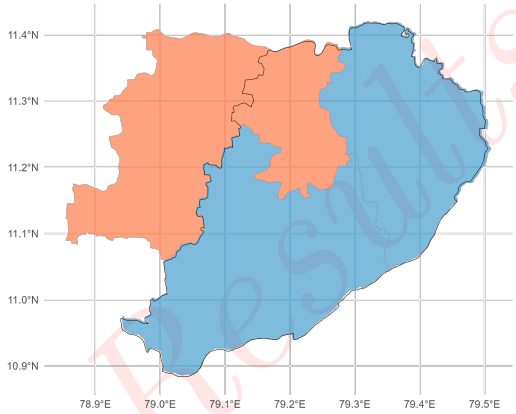
A Appendix

Figure A1. Matching Constituencies to Districts

District of Barddhaman



District Ariyahur



Notes: The figure depicts the spatial mapping of Assembly Constituencies to Districts based on geographic overlap. Constituencies are assigned to a district if over 80 percent of their area lies within it. Matched constituencies are plotted in blue; unmatched constituencies in red. The borders of the District are plotted in black, and the borders of constituencies in grey. Barddhaman illustrates a close correspondence between constituency and district boundaries, while Ariyahur exemplifies substantial overlap of one consticuency without a formal match.

Table A1. OLS estimations

	Nightlight Growth		Prob. of Case		PMGSY	
ENP	0.111***	-0.007	0.006	-0.025***	0.675	-0.121
	(0.007)	(0.008)	(0.005)	(0.009)	(0.567)	(0.353)
Intercept	0.027		0.321***		54.199***	
	(0.020)		(0.015)		(2.008)	
Observations	17,930	17,930	14,371	14,371	10,913	10,913
Fixed effects	×	✓	×	✓	×	✓

Notes: Table regresses the ENP, on the outcome variables of interest. Where applicable the regressions include constituency, year, state, and state-by-year fixed effects. Standard errors in parenthesis are clustered at the constituency level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2. Estimation of AC Characteristics on Voteshare of TC

	(1)	(2)	(3)	(4)
log(Total SC)	-0.019	-0.011	-0.484	-1.437
	(1.267)	(1.272)	(1.377)	(1.231)
log(Total ST)	-0.062	-0.061	0.019	-0.002
	(0.314)	(0.314)	(0.318)	(0.318)
Share Illiterate		1.516	5.350	5.067
		(6.492)	(6.714)	(6.752)
log(Non-farm employment)			-0.198	-0.221
			(0.475)	(0.477)
log(Nightlights)				-0.056
				(0.254)
R-squared	0.522	0.522	0.524	0.524
Observations	17,295	17,295	16,582	16,460

Notes: Table regresses the instrument, the TC-voteshare, on a list of covariates. The regressions include constituency, year, state, and state-by-year fixed effects. Standard errors in parenthesis are clustered at the constituency level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3. RDD: Turncoats vs. Non-Switchers

	Nightlights			Prob. Case			PMGSY		
Turncoats	-0.092	-0.090	-0.089	0.045	0.054	0.036	5.514	5.405	3.204
	(0.074)	(0.074)	(0.066)	(0.080)	(0.078)	(0.072)	(4.549)	(4.751)	(2.363)
Cont. Reservation	×	✓	✓	×	✓	✓	×	✓	✓
Fixed-Effects	×	×	✓	×	×	✓	×	×	✓
Optimal Bandwidth	13.69	13.82	12.64	14.89	14.7	11.87	22.06	19.64	13.73
Observations	2434	2443	2322	1647	1642	1444	1534	1456	1215

Continuation

	Years of Education			Assets in M. Rupees			Age		
Turncoat	-0.655	-0.626	-0.509	-9.488	-8.730	-0.424	0.109	0.562	1.373
	(0.576)	(0.579)	(0.532)	(25.884)	(25.666)	(25.887)	(1.657)	(1.576)	(1.663)
Cont. Reservation	×	✓	✓	×	✓	✓	×	✓	✓
Fixed-Effects	×	×	✓	×	×	✓	×	×	✓
Optimal Bandwidth	22.2	21.71	22.53	12.85	12.93	12.72	16.82	18.85	11.89
Observations	1994	1979	2001	1524	1529	1510	1743	1852	1447

Notes: RD estimates from local linear regression with robust bias-corrected inference and optimal bandwidth selection by (Calonico et al., 2014). Reservation controls include SC and ST reservation dummies. District covariates include (where applicable) log of marginal workers, log of service sector workers, log of literate population, SC share, and ST share. Standard errors are clustered at AC-level, while PMGSY is clustered at district-level, as the measurement of PMGSY is one district level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4. Summary Statistics of Indian Elections and Politicians

Variable	Min	Mean	Median	Std. Dev.	Max	Obs.
Elections						
Panel A: All Elections						
ENP	1.037	2.95	2.71	0.92	11.89	26,228
Turnout	3.06	69.20	69.86	12.48	99.94	26,189
Eligible Voters	2,904	179,127	178,294	90,045	1,593,907	26,189
Panel B: Elections with Turncoats						
ENP	1.048	3.09	2.89	0.96	11.89	9,179
Turnout	7.16	68.78	69.01	12.33	99.94	9,162
Eligible Voters	3,086	170,122	169,321	94,300	1,376,130	9,162
Politicians						
Panel C: All Politicians						
Voteshare	0	9.66	0.89	16.13	98.16	264,216
Age	18	45.48	44.00	11.49	546.00	113,762
Years of Schooling	0	11.70	12.00	4.29	20.00	113,762
Assets (INR million)	0	20.70	1.95	136.54	16,095.64	113,762
Prob. Charged	0	0.18	0.00	0.39	1.00	113,762
Number of Criminal Cases	0	0.48	0.00	1.92	211.00	113,762
Panel D: Winners						
Voteshare	13.63	45.97	46.75	9.68	98.16	26,228
Age	25	51.28	51.00	10.58	92.00	12,302
Years of Schooling	0	13.42	15.00	3.54	20.00	12,302
Assets (INR million)	0	70.84	14.34	299.57	14,138.00	12,302
Prob. Charged	0	0.35	0.00	0.48	1.00	12,302
Number of Criminal Cases	0	1.20	0.00	3.47	99.00	12,302
Panel E: Turncoats						
Voteshare	0.01	19.90	15.98	18.53	97.67	19.368
Age	23	51.69	51.00	10.51	89.00	7,976
Years of Schooling	0	12.57	15.00	4.01	20.00	7,976
Assets (INR million)	0	39.89	6.90	142.69	3,748.03	7,976
Prob. Charged	0	0.28	0.00	0.45	1.00	7,976
Number of Criminal Cases	0	1.06	0.00	2.94	52.00	7,976

Notes: This table reports summary statistics for Indian elections and politicians. The data for characteristic of Politicians is based on self-declared affidavit data submitted during candidacy filings between 2004 and 2023. Variables include age, years of education, declared assets (in million Indian rupees), and criminal background. "Prob. Charged" is a binary indicator for whether the candidate reported at least one pending criminal case. "Number of Criminal Cases" counts the total number of pending cases declared. The sample for politicians is disaggregated into three panels: all candidates, those who won at least one election, and "turncoats" defined as candidates who contested an election after switching parties.

Table A5. IV: Placebo - ENP on Population Growth

	(1)	(2)	(3)	(4)	(5)
ENP	-0.018	-0.018	-0.018	-0.018	-0.016
	(0.015)	(0.015)	(0.015)	(0.015)	(0.014)
ENP x Ruling Party[a]					-0.003
					(0.002)
Governing Party		-0.001		-0.001	
		(0.002)		(0.002)	
ST Reserved			0.023	0.023	0.022
			(0.030)	(0.030)	(0.030)
SC Reserved			0.018**	0.018**	0.018*
			(0.008)	(0.008)	(0.010)
F-stat (1st stage)	187.059	190.073	188.472	191.446	127.272
Wu-Hausman Test (p-val)	0.129	0.126	0.129	0.126	0.109
Observations	22,324	22,324	22,324	22,324	22,324

Notes: This table presents the IV-estimates for the effect of political competition, measured by the Effective Number of Parties (ENP), on the 5-year Population-Growth (proxied by eligible Electors). ENP is instrumented using the vote share of political turncoats. The regressions include constituency, year, state, and state-by-year fixed effects. Standard errors in parenthesis are clustered at the constituency level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
[a]Instrumented by Voteshare-TC × Ruling Party (F-statistic: 2,358.4)

Table A6. Fuzzy RDD PRE

	ENP		Case		No. Criminal Cases		PMGSY	
Treatment	0.284	0.481	-0.222	-0.223	-0.659	-0.746	-10.454	0.979
	(0.739)	(0.720)	(0.293)	(0.228)	(0.851)	(0.627)	(27.122)	(19.884)
First Stage: Minority Share	0.333	0.350	0.274	0.244	0.286	0.289	0.396	0.491
F-statistic	13.6	17.3	8.1	14.1	8.7	11.3	8.0	16.5
Controls Reservation	×	✓	×	✓	×	✓	×	×
Covariates District	×	×	×	×	×	×	×	✓
Optimal Bandwidth	5.6	5.27	5.39	7.25	5.42	5.11	13.06	11.82
Observations	453	431	355	468	355	338	178	151

Notes: Fuzzy RD estimates from local linear regression with robust bias-corrected inference and optimal bandwidth selection. First stage shows the effect of crossing the threshold on treatment status. The constituencies have been matched to districts based on 80% area overlap. As the PMGSY data is on district-level, it is directly matched to treated districts. Reservation controls include SC and ST reservation dummies. District covariates include (where applicable) log of marginal workers, log of service sector workers, log of literate population, SC share, and ST share. All standard errors are clustered at district level e.g. level of treatment. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A7. Sharp RDD Estimates: Pre- and Post-RBI Treatment

Panel A: Post-RBI Treatment								
	ENP		Case		No. Criminal Cases		PMGSY	
Treatment	0.336**	0.222*	-0.224***	-0.223***	-1.354**	-1.354**	10.684	15.311
	(0.141)	(0.130)	(0.087)	(0.085)	(0.537)	(0.536)	(15.279)	(14.967)
Controls Reservation	×	✓	×	✓	×	✓	×	×
Covariates District	×	×	×	×	×	×	×	✓
Optimal Bandwidth	2.62	2.06	2.91	3.01	3.26	3.32	7.55	7.3
Observations	221	169	194	199	222	222	68	65
Panel B: Pre-RBI Treatment								
	ENP		Case		No. Criminal Cases		PMGSY	
Treatment	0.119	0.069	-0.145	-0.143	-0.831	-0.752	12.280	12.359
	(0.233)	(0.244)	(0.103)	(0.096)	(0.618)	(0.615)	(15.383)	(15.361)
Controls Reservation	×	✓	×	✓	×	✓	×	×
Covariates District	×	×	×	×	×	×	×	✓
Optimal Bandwidth	6.41	6.19	4.96	5.31	5.03	5.66	7.78	7.66
Observations	374	367	163	181	163	192	71	71

Notes: RD estimates from local linear regression with robust bias-corrected inference and optimal bandwidth selection. The constituencies have been matched to districts based on 80% area overlap. As the PMGSY data is on district-level, it is directly matched to treated districts. Reservation controls include SC and ST reservation dummies. District covariates include (where applicable) log of marginal workers, log of service sector workers, log of literate population, SC share, and ST share. All standard errors are clustered at the district level. Significance denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A8. Summary Statistics of Growth and PMGSY Implementation by Region

Variable	Min	Mean	Median	Std. Dev.	Max	Obs.
Panel A: North						
Growth (Nightlights, 5-year)	-0.820	0.356	0.187	0.571	3.16	4312
% of Achieved Constr.	0	57.7	57.8	26.7	101.0	703
Constructed Roads (Km)	0	186.0	118.0	193.0	1473.0	816
Panel B: Northeast						
Growth (Nightlights, 5-year)	-0.812	0.493	0.315	0.718	3.15	1880
% of Achieved Constr.	0	52.2	49.1	25.4	131.0	334
Constructed Roads (Km)	0	142.0	91.6	146.0	833.0	364
Panel C: East						
Growth (Nightlights, 5-year)	-0.819	0.463	0.286	0.631	3.20	3234
% of Achieved Constr.	0	42.2	43.1	25.6	92.4	490
Constructed Roads (Km)	0	264.0	169.0	282.0	1575.0	490
Panel D: South						
Growth (Nightlights, 5-year)	-0.781	0.190	0.170	0.265	1.85	4872
% of Achieved Constr.	0	59.1	57.7	27.4	122.0	268
Constructed Roads (Km)	0	86.6	64.7	89.2	543.0	329
Panel E: West						
Growth (Nightlights, 5-year)	-0.746	0.171	0.150	0.289	2.92	2339
% of Achieved Constr.	0	54.4	68.5	39.1	103.0	234
Constructed Roads (Km)	0	118.0	64.6	147.0	821.0	259
Panel F: Central						
Growth (Nightlights, 5-year)	-0.787	0.647	0.446	0.730	3.13	933
% of Achieved Constr.	9.38	58.9	61.0	17.6	96.4	246
Constructed Roads (Km)	40.4	355.0	282.0	227.0	1299.0	246
Panel G: All India						
Growth (Nightlights, 5-year)	-0.820	0.335	0.213	0.536	3.20	17570
% of Achieved Constr.	0	53.5	54.7	27.8	131.0	2275
Constructed Roads (Km)	0	191.0	115.0	212.0	1575.0	2504

Notes: The table reports regional statistics on economic growth and rural road development in India. Growth is measured via satellite-derived nightlight intensity over five years. The percentage of achieved road construction and the kilometers of roads constructed over the same time period are derived from program data under the PMGSY. The regional classification follows standard administrative groupings: North (e.g., Uttar Pradesh, Punjab), Northeast (e.g., Assam, Sikkim), East (e.g., Bihar, Odisha), South (e.g., Tamil Nadu, Karnataka), West (e.g., Gujarat, Maharashtra), and Central (Madhya Pradesh, Chhattisgarh). Panel G aggregates data for all regions.