Online Appendix for "Development or Rent-Seeking? How Political Influence Shapes Public Works Provision in India"

This material is intended for online publication only.

A Appendix

A.1 Description of the Reliability of the Data Source

The data on road provision used in this paper were scraped from the Online Management, Monitoring and Accounting System (OMMAS) of the PMGSY.[50] A bureaucrat at the district level - the PIU - is responsible for updating the data online on a monthly basis and the online system is actively monitored by the NRRDA officials at the central level[51]. Notably, the data on the online system are used as a basis for releasing funds to the state and district (ibid., PMGSY Scheme and Guidelines, Section 16) and are also used by bank branches as a basis for disbursing payments (ibid., PMGSY Scheme and Guidelines, Section 18). Our interviews showed that district bureaucrats are often held to task by officials in the NRRDA to make sure that the data are entered and updated in a timely manner.[52] Moreover, the data entered are verified by independent monitors who regularly visit the road construction sites.[53] Thus, although there are sometimes clerical errors arising from the fact that the

[50] The data were downloaded from `omms.nic.in`.

[51] Interview with PMGSY Official, NRRDA, New Delhi, December 2015; Interview with PMGSY Executive Engineer, Uttar Pradesh, December 2015.

[52] Interview (on behalf of the author) with Assistant Engineer, Bihar; Interview with Executive Engineer, Uttar Pradesh.

[53] Author Interview with NRRDA Official, New Delhi, December 2015; Author Interview with PMGSY Assistant and Executive Engineer, Uttar Pradesh, December 2015, Interviews with PMGSY contractor staff and laborers, Uttar Pradesh, December 2015.

data are entered with a bit of a time lag[54], it appears that the data reflect the actual on the ground implementation of the PMGSY at the local level with a reasonable degree of accuracy. Field visits to three PMGSY construction sites in Uttar Pradesh also verified that the information on the online system with regard to the locations of the road projects and the stage of completion were also accurate.

With that said, the information on expenditures may often not reflect 'productive' expenditures. In particular, bureaucrats may have incentives to find ways to allocate more expenditure on projects than is actually deserved, to make payments against fake invoices submitted by contractors, or to otherwise allocate expenditures on a given project to unproductive rather than productive uses. Indeed, these types of behaviors form the premise behind the measures of spending leakages that are employed in the analyses.

A.2 Description of Data Collection and Matching Procedure

The initial dataset included all projects sanctioned under the PMGSY from 2000 until the time of data collection in October 2014 from the seven states that are the focus of this research - Bihar, Chattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh and Uttarakhand.

To match the individual road projects from the Online Monitoring System of the PMGSY to

[54] Interview (on behalf of the author) with Assistant Engineer, Bihar

individual assembly constituencies, information obtained from the online system on which habitation(s) each road benefited was utilized. Information from the National Habitation Survey published in 2003 by the Ministry of Drinking Water and Sanitation was then used to locate each habitation within a village. Incidentally, this was the same survey used by PMGSY officials to identify and locate habitations.[55] To match the habitation names, a program for fuzzy matching developed in R was used that matched the habitation name contained in the PMGSY online monitoring system to the habitation name in the National Habitation Survey containing information on the villages to which the habitations belonged.[56] Matching of habitations was done by block and district. Where there was more than one benefited habitation listed on the website, the program looped through each of the names to obtain a match. If there was more than one match obtained, only the first match on the list of benefited habitations was used. Thus, each road project is assigned to only one constituency. Section A.18 presents additional analyses showing, however, that the main results are not an artifact of this assignment procedure.

While the fuzzy matching program was used to generate the initial matches, the matches were manually checked and retained only if they were accurate. A conservative approach was used whereby matches were discarded if there were doubts about the similarity of the names or because there was more than one habitation within the block and district that bore the same name. The remaining accurate matches then provided information on the villages in which the relevant roads were located. This list of village names was then matched with a list of

[55]Interview (on behalf of the author) with PMGSY Assistant Engineer, Bihar, December 2015.

[56]Where there were no benefited habitations listed, the name of the road was used to provide information on the benefited habitations.

census villages geocoded by MLInfomaps. Using GIS maps of state assembly constituencies also provided by MLInfomaps, each of the villages was located in the relevant assembly constituencies. The procedure yields accurate results because, although the information on roads was available by habitation and not village, assembly constituency boundaries do not cut across village boundaries. Using this procedure, 74% of the total roads in the sample could be identified in terms of their village location. Figure A1 shows how the road projects whose village location could be identified are distributed across constituencies and states.

For the remaining roads whose village location could not be identified, GIS maps of 2001 block boundaries were used to examine the overlap between the block in which the road was located and the assembly constituencies. While there is in general a relatively weak overlap between administrative blocks and assembly constituencies, some blocks are almost perfectly contained by a single assembly constituency. By selecting those blocks whose areas overlapped with a single state assembly constituency by at least 99%, an additional 11% of road projects were matched to state assembly constituencies.

In addition to information on roads, this dataset included information on 525 bridges which were excluded from the sample. The dataset also included duplicate entries for road projects in cases where more than one contractor was assigned to an initial road project. While this information is taken into account for the *Total Contract Value Won by Contractor Won by Contractor* variable below, the duplicate entries were otherwise removed from the analyses. The analyses in the paper are restricted to the road projects in the seven states that took place in the time period before the first state elections under the newly delimited state electoral boundaries took place. In this sample, the state assembly constituency location of

85% road projects could be identified.

To match individual road projects to time-varying characteristics such as the partisan identity of the legislator in the constituency, information on the fiscal year in which the road was sanctioned and on the month and year in which the state election took place was used. If the fiscal year in which the road was sanctioned occurred during an election year, the road was assigned to the electoral term that had the greatest overlap with the fiscal year.[57] Using this procedure, each of the roads was matched with constituency level electoral information. While the partisan affiliations of the individual legislators were available from the Election Commission of India[58], the identification of which legislators were ministers required additional data collection as described in Section A.5. Since a key component of the research design is to isolate the effect of the partisan alignment of legislators while holding other confounding factors constant, most of the analyses in the paper are restricted to elections in the time period before constituency boundaries were redrawn in India. Section A.3 describes the constituencies, states and years included in the analysis.

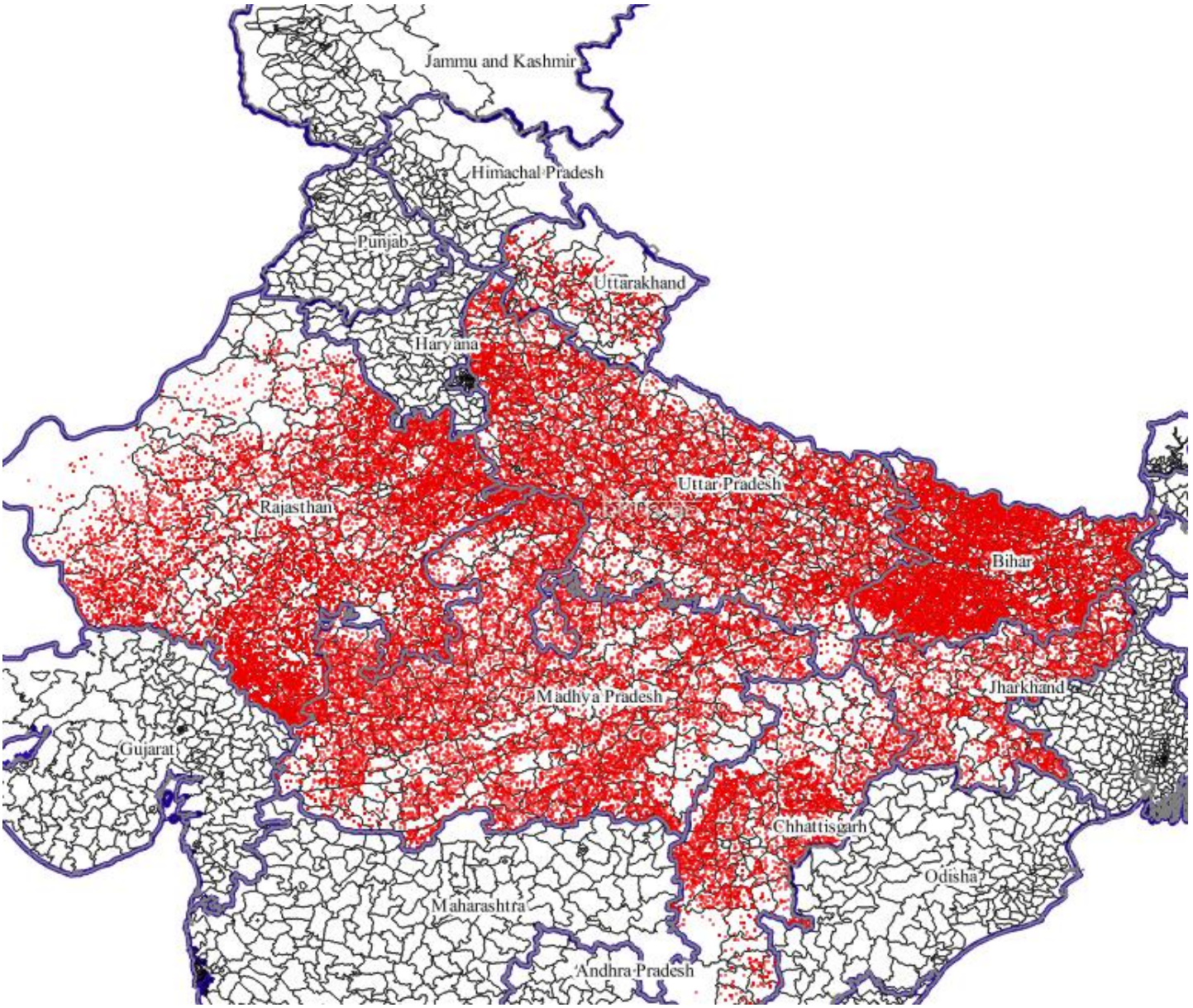
A.3 Data Description

The first set of results in the paper pertain to data that is aggregated at the level of the constituency-electoral term. The table below shows how the sample used in the first differenced results (i.e. Table A9) are broken down by state and election year. Note that since the

[57]For example, suppose a road was built in the fiscal year 2002-2003, and an election was held in August of 2002. Since the Indian fiscal year begins on April 1st, the road would be assigned to the legislator that took office after the July 2002 election and not before.

[58]Data from the Election Commission of India were compiled by the Bhavnani State Election Dataset.

Figure A1: Road Projects Sanctioned under the PMGSY Development Scheme in the BIMARU states



Note: Each red dot in the above figure represents the village location (the centroid of the village polygon) of the first listed habitation benefited by a road project sanctioned under the PMGSY scheme between 2000 and 2014. Each road project pertains either to a new road or an upgrade to an existing road that is in need of repair. The figure represents 74% of the road projects whose village location could be determined in Bihar, Chattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh and Uttarakhand. The polygons outlined in black are the state assembly constituencies.

goal is to identify the effects of alignment and ministerial status while holding constituency level factors constant, the analysis is limited to the time period before the first election in the state held under newly delimited constituency boundaries. This delimitation of constituencies took effect in 2008 and elections in all states in the sample held after 2008 used the newly constituency boundaries with the exception of the election in Jharkhand in 2009 which used the old constituency boundaries.

Note that the differences in the number of constituencies between elections for Bihar, Madhya Pradesh and Uttar Pradesh reflect the fact that the states Chhattisgarh, Jharkhand and Uttarakhand were carved out of these states in 2000. There were 90 constituencies in Madhya Pradesh that became part of Chhattisgarh in 2000 and there were 81 constituencies in Bihar that became part of Jharkhand in 2000. Since the boundaries of these constituencies remained unchanged, these constituencies could be treated as single units comparable across multiple electoral terms. Thus, the first-differences analysis compared the data for the constituencies Chhattisgarh (Jharkhand) after 2000 with the same constituencies that were part of Madhya Pradesh (Bihar) prior to 2000. For Uttarakhand, however, the number of constituencies significantly increased and, thus, the constituencies in Uttarakhand in 2002 were not comparable to the constituencies in Uttar Pradesh in 1996. Thus, the data for Uttarakhand in the electoral term beginning in 2002 are omitted from the first differences analysis. They are, however, included in the other analyses.

Table A1: States and Election Years in the Sample

State	Start of Electoral Term	Number of Constituencies
Bihar	2000	324
Bihar	2005*	243
Chhattisgarh	2003	90
Jharkhand	2005	81
Madhya Pradesh	1998	320
Madhya Pradesh	2003	230
Rajasthan	1998	200
Rajasthan	2003	200
Uttar Pradesh	1996	424
Uttar Pradesh	2002	403
Uttar Pradesh	2007	403
Uttarakhand	2002	70
Uttarakhand	2007	70

∗:There were two elections held in Bihar in 2005 - one in February and one in October. This paper uses the data from the election in October 2005.

A.4 State-Level Ruling Parties

One of the key foci of the empirical analyses is to examine the effect of a representative's alignment with the chief minister's party or another party in the governing coalition at the state level. Figure A2 provides information on how the identity of these parties varied in each state across the time period included in the sample. The same figure also provides information on the ruling parties at the national level. The figure clearly shows that the sample includes state ruling parties that were linked with the national government during the time they were in power as well as those that were not. This chart increases confidence that the results are not solely driven by the links that state ruling parties enjoyed with national governments.

Figure A2: Ruling Parties at the State and National Level

State	Years	Chief Minister's Party	Other Parties in the State Governing Coalition	Prime Minister's Party During the Time Period	State Governing Parties Represented in National Coalition
Bihar	2000-2005	RJD	INC, KSP, BSP	BJP (until 2004), INC (2004 onwards)	RJD (2004 onwards)
Bihar	2005-2010	JD(U)	BJP	INC	
Chhattisgarh	2000-2003	INC		BJP	
Chhattisgarh	2003-2008	BJP		BJP (until 2004), INC (2004 onwards)	
Jharkhand	2000-2005	BJP	UGDP, SAP, JD(U), AJSU	BJP (until 2004), INC (2004 onwards)	JD(U) and SAP (until 2004)
Jharkhand	2005-2006	BJP	NCP, AIFB, AJSU, JKP, JMM	INC	
Jharkhand	2006-2008	JMM*	UGDP	INC	
Jharkhand	2008-2009	JMM	UGDP, RJD, NCP, JKP	INC	
Madhya Pradesh	1998-2003	INC	RPI	BJP	
Madhya Pradesh	2003-2008	BJP		BJP (until 2004), INC (2004 onwards)	
Rajasthan	1998-2003	INC		BJP	
Rajasthan	2003-2008	BJP		BJP (until 2004), INC (2004 onwards)	
Uttar Pradesh	2000-2002	BJP	LCP, JBSP, SAP, JD (R)	BJP	
Uttar Pradesh	2002-2003	BSP	BJP, RLD	BJP	
Uttar Pradesh	2003-2007	SP	ABLTC, INC, JD(U), JP, RLD, RKP, RPD, SJP (R)	BJP (until 2004), INC (2004 onwards)	JD(U) (until 2004)
Uttar Pradesh	2007-2012	BSP		INC	BSP (until 2008)
Uttarakhand	2000-2002	BJP		BJP	
Uttarakhand	2002-2007	INC		BJP (until 2004), INC (2004 onwards)	
Uttarakhand	2007-2009	BJP	UKKD	INC	

* The chief minister of Jharkhand during this time was himself elected as an independent but drew his support from the JMM during this period

ABLTC: Akhil Bharatiya Loktantric Congress; AIFB: All India Forward Bloc; AJSU: All Jharkhand Students Union; BJP: Bharatiya Janata Party; BSP: Bahujan Samaj Party; INC: Indian National Congress; JBSP: Janatantrik Bahujan Samaj Party; JD(U): Janata Dal (United); JMM: Jharkhand Mukti Morcha; LCP: Loktantrik Congress Party; NCP: National Congress Party; RPD: Rashtriya Parivartan Dal; SAP: Samata Party; SJP (R): Samajwadi Janata Party (Rashtriya); SP: Samajwadi Party; UGDP: United Goans Democratic Party; UKKD: Uttarakhand Kranti Dal. *Sources: News Archives Accessed Through Factiva Database and http://www.worldstatesmen.org/India_states.html and*

A.5 Variable Descriptions and Sources - Constituency Level Variables

A.5.1 Variables used in the RDD Analyses in Table 1

Total Road Completed in Term: This variable is calculated by summing up the road lengths for all individual road projects in the constituency that were sanctioned during the relevant electoral term and that had a completion date prior to the end of the electoral term in question. Source: Constructed from PMGSY Monitoring System. See Section A.2 for details.

CM Party Alignment: This variable is coded 1 if the winner of the most recent election in the constituency was aligned with the chief minister's party for the majority of the electoral term, and 0 otherwise. Source: Election Commission of India as compiled by Bhavnani (2014). Information on Chief Ministers and their parties was obtained from `http://www.worldstatesmen.org/India_states.html`.

Forcing: This variable is equal to the vote margin of the candidate from the chief minister's party in the constituency in the most recent state election as a proportion of the total votes in the constituency in the most recent state election. The variable is positive if the candidate from the chief minister's party won the election in the constituency and negative if the candidate from the chief minister's party was the runner-up in the election in the constituency. It is missing if a candidate from the chief minister's party was neither the winner nor the runner up in the constituency in the most recent election. Source: Election Commission of India.

New Connectivity Proportion: The proportion of road projects in the constituency sanctioned in the given electoral term that involved establishing new connectivity rather than upgrades of existing roads. Source: PMGSY monitoring system.

Domestic Collab. (Proportion): The proportion of road projects in the constituency sanctioned in the given electoral term that involved a domestic collaboration rather than a collaboration with an international agency such as the World Bank. Source: PMGSY Monitoring System.

Village Illiteracy (Average): The average illiteracy rate in the villages that were served by the road projects in the given constituency and the given electoral term. Source: Census of India (2001).

SC/ST Proportion (Average): The proportion of Scheduled Caste and Scheduled Tribe population in the habitations that were served by the road projects in the given constituency

and the given electoral term. Source: National Habitation Survey (2010).

Habitation Size (Average): The average population size (in thousands) of the habitations that were served by the road projects in the given constituency and the given electoral term. Source: National Habitation Survey (2010)

State-Electoral Term: A dummy for the state and electoral term to which the given constituency-electoral term belongs. Source: Constructed.

Average Sanction Year: The average of the sanctioning year of the road projects allocated in the given constituency and electoral term (rounded). Source: PMGSY Monitoring System.

A.5.2 Other Variables

Forcing C: This variable is equal to the vote margin obtained by the candidate in the constituency from a party in the state governing coalition as a proportion of the total votes in the constituency in the most recent state election. It is positive if a candidate from the governing coalition in the constituency won the most recent state election and negative if a candidate from the governing party in the constituency was the runner-up in the most recent state election. The variable is missing if a candidate from the governing coalition was neither the winner nor the runner up in the constituency. Source: Election Commission of India.

Ruling Coalition Alignment: This variable is coded 1 if the winner of the most recent election in the constituency was aligned with either the chief minister's party or another party in the governing coalitionfor the majority of the electoral term, and 0 otherwise. Source: Election Commission of India as compiled by Bhavnani (2014). Information on Chief Ministers and their parties was obtained from `http://www.worldstatesmen.org/India_states.html`.

Minister: A dummy variable coded 1 if the winner of the most recent election in the constituency belonged to the state council of ministers for more than one year during the electoral term, and 0 otherwise. Source: Coded by the Author Based on Information from State Government Website Archives and News Sources.

Total Amount Sanctioned for Road Projects: The total value of road projects 'sanctioned' or approved in the constituency during the current electoral term. Source: PMGSY monitoring system.

State Ruling Party in Constituency (Previous Term): A dummy indicating whether the winning candidate in the constituency in the previous electoral term was aligned with the chief minister's party. Source: Election Commission of India.

State Ruling Coalition in Constituency (Previous Term): A dummy indicating whether the winning candidate in the constituency in the previous electoral term was aligned with the chief minister's party or another party in the governing coalition. Source: Election Commission of India.

Total Road Completed in Constituency (Previous Term): The total length of PMGSY road projects in the constituency that were sanctioned and completed in the previous electoral term. Source: PMGSY monitoring system.

Total Road Sanctioned in Constituency (Previous Term): The total length of PMGSY road projects in the constituency that were sanctioned during the previous electoral term. Source: PMGSY monitoring system.

Total Amount Sanctioned in Constituency (Previous Term): The total amount of funds sanctioned for PMGSY road projects in the constituency during the previous electoral term. Source: PMGSY monitoring system.

Total Expenditure in Constituency (Previous Term): The total expenditure incurred on PMGSY road projects in the constituency during the previous electoral term. Source: PMGSY monitoring system.

Vote Margin in Constituency (Previous Term): The difference in vote share between the winning candidate and the runner-up candidate in the state assembly constituency in the state election prior to the most recent state election. Source: Election Commission of India.

Winning Vote Share in Constituency (Previous Term): The vote share received by the winning candidate in the state assembly constituency in the state election prior to the most recent state election. Source: Election Commission of India.

Illiteracy Rate of Overlapping Block: The proportion of illiterate adults in the population as reported in the 2001 Census in the administrative block most closely overlapping the relevant state assembly constituency. Source Census of India 2001 and MLInfoMaps.

Rural Population of Overlapping Block: The rural population as reported in the 2001 Census in the administrative block most closely overlapping the relevant state assembly constituency. Source Census of India 2001 and MLInfoMaps.

Δ CM Party Alignment: The variable is equal to 1 if *CM Party Alignment* changed from 0 in the previous electoral term to 1 in the current electoral term, it is equal to -1 if *CM Party Alignment* changed from 1 in the previous electoral term to 0 in the current electoral term and is equal to 0 if there was no change in *CM Party Alignment*. Source: Constructed.

Δ Ruling Coalition Alignment: This variable is analogous to the one above but is based on the variable *Ruling Coalition Alignment* which is coded 1 if the winner of the most recent

election in the constituency was aligned with either the chief minister's party or another party in the governing coalition for the majority of the electoral term, and 0 otherwise. Source: Constructed.

Δ Ministerial Status: This variable is equal to 1 if the variable *Minister* described above changed from 0 in the previous electoral term to 1 in the current electoral term, it is equal to -1 if *Minister* changed from 1 in the previous electoral term to 0 in the current electoral term and is equal to 0 if there was no change in the variable *Minister*. Source: Coded by the Author Based on Information from State Government Website Archives and News Sources.

Δ Total Road Completed in Term: The difference between the value of the variable *Total Road Completed in Term* in the constituency for the current electoral term and its value in the constituency for the previous electoral term. Source: Constructed.

Δ Total Expenditure in Term: The difference between the total expenditure incurred on PMGSY road projects in the constituency sanctioned and completed during the current electoral term and the total expenditure incurred on PMGSY road projects in the constituency sanctioned and completed during the previous electoral term. Source: Constructed.

Δ Total Sanctioned Cost: The difference between the total amount sanctioned for PMGSY road projects in the constituency during the current electoral term and the total amount sanctioned for PMGSY road projects in the constituency during the previous electoral term. Source: Constructed.

Δ Total Expenditure to Date: The difference between the total expenditure incurred on PMGSY road projects in the constituency sanctioned during the current electoral term and the total expenditure incurred on PMGSY road projects in the constituency sanctioned during the previous electoral term. Source: Constructed.

Δ New Connectivity Proportion: The difference between the value of the variable *New Connectivity Proportion* in the constituency for the current electoral term and its value in the constituency for the previous electoral term. Source: Constructed.

Δ Domestic Collab. (Proportion): The difference between the value of the variable *Domestic Collab. (Proportion)* in the constituency for the current electoral term and its value in the constituency for the previous electoral term. Source: Constructed.

Δ Village Illiteracy (Average): The difference between the value of the variable *Village Illiteracy (Average)* in the constituency for the current electoral term and its value in the constituency for the previous electoral term. Source: Constructed.

Δ SC/ST Proportion (Average): The difference between the value of the variable *SC/ST Proportion (Average)* in the constituency for the current electoral term and its value in the constituency for the previous electoral term. Source: Constructed.

Δ Habitation Size (Average): The difference between the value of the variable *Habitation Size (Average)* in the constituency for the current electoral term and its value in the constituency for the previous electoral term. Source: Constructed.

Δ Vote Share: The difference between the vote share of the winning candidate in the constituency in the current electoral term and the vote share of the winning candidate in the constituency in the previous electoral term. Source: Constructed.

Δ Vote Margin: The difference between the vote margin of the winning candidate in the constituency in the current electoral term and the vote margin of the winning candidate in the constituency in the previous electoral term. Source: Constructed.

Δ MP State Government Alignment: An Indicator for whether the Member of Parliament (National Legislator) whose constituency encompasses the relevant state constituency shares the same party as the Chief Minister. Source: Same as Above.

Δ MP National Government Alignment. An Indicator for whether the Member of Parliament (National Legislator) whose constituency encompasses the relevant state constituency shares the same party as the Prime Minister. Source: Same as Above.

A.6 Variable Descriptions and Sources: Individual Road Project Variables

Total Value of Contracts Won by Contractor in State: The variable pertains to the contractor hired to execute the given road project. It is calculated by adding up the sanctioned cost for each road project won in the state prior to delimitation by the contractor hired for the given road project. The variable is missing in cases where the name of the hired contractor is missing. Source: PMGSY Monitoring System.

Road Quality Rating: The variable reflects the rating of the quality of the road project done by an independent monitor - either the State Quality Monitor or the National Quality Monitor. In cases where ratings by both monitors exist, the rating of the State Quality Monitor is used. The variable is coded 1 if the road is rated as being "Satisfactory" and 0 if the road is rated as 'Unsatisfactory' or 'Required Improvement'. Source: PMGSY Monitoring System.

Expenditure- Unproductive Project: This variable records the total expenditure incurred on a given road project until data collection in lakhs of Indian rupees[59] for projects that were sanctioned at least five years prior to data collection but that remained incomplete at the time of data collection. The variable is missing for projects that were complete at the time of data collection and for projects that were sanctioned less than five years prior to

[59] 1 lakh is equal to a 100,000

Table A2: Summary Statistics - Constituency Level Variables

Variable	Obs	Mean	Std. Dev.	Min	Max	Median
Variables used in RDD Analysis						
Total Road Completed in Term	1977	10.69	30.469	0	413.77	0
CM Party Alignment	1977	.572	.495	0	1	1
Forcing	1977	.022	.129	-.79	.543	.019
New Connectivity Proportion	1632	.807	.249	0	1	.911
Domestic Collab. (Proportion)	1632	.853	.29	0	1	1
Village Illiteracy (Average)	1583	.577	.109	.218	.936	.573
SC/ST Proportion (Average)	1631	.313	.227	0	1	.25
Habitation Size (Average)	1631	1.032	.768	.015	6.049	.879
Average Sanction Year	1632	2003.772	3.291	2000	2012	2004
Ruling Coalition Alignment	1977	.619	.486	0	1	1
Total Amount Sanctioned for Road Projects	1977	1097.638	1697.65	0	13311.91	395.33
State Ruling Party in Constituency (Previous Term)	1031	.481	.5	0	1	0
State Ruling Coalition in Constituency (Previous Term)	1059	.639	.48	0	1	1
Total Road Completed in Constituency (Previous Term)	1059	5.138	9.423	0	86.5	0
Total Expenditure in Constituency (Previous Term)	1059	641.302	846.886	0	9819.38	378.22
Total Road Sanctioned in Constituency (Previous Term)	1059	34.002	35.026	0	308.307	24.73
Total Amount Sanctioned in Constituency (Previous Term)	1059	691.173	906.757	0	9043.37	410.43
Vote Margin in Constituency (Previous Term)	1800	.108	.095	0	.758	.084
Winning Vote Share in Constituency (Previous Term)	1800	.423	.097	.205	.827	.416
Illiteracy Rate of Overlapping Block	1581	.561	.096	.279	.83	.561
Rural Population of Overlapping Block	1622	.875	.258	0	1	1
Variables used in First Differences Analysis						
Δ Total Road Completed in Term	1799	10.282	33.715	-77.945	413.77	0
Δ CM Party Alignment	1799	.023	.685	-1	1	0
Δ Ruling Coalition Alignment	1799	.054	.698	-1	1	0
Δ Ministerial Status	1799	-.037	.577	-1	1	0
Δ New Connectivity Proportion	1461	.033	.29	-1	1	0
Δ Domestic Collab. (Proportion)	1461	-.233	.318	-1	.333	-.083
Δ Village Illiteracy (Average)	1391	.004	.062	-.25	.329	.003
Δ SC/ST Proportion (Average)	1457	.016	.149	-.877	1	.009
Δ Habitation Size in Thousands (Average)	1457	-.266	.62	-5.337	3.154	-.178
Δ Vote Margin	1799	-.011	.112	-.622	.392	-.007
Δ Vote Share	1799	-.019	.096	-.361	.268	-.019
Δ Total Expenditure in Term	1799	201.869	570.611	-2176.68	5382.34	0
Δ Total Sanctioned Cost	1799	1150.176	2301.761	-8101.15	14449.02	816
Δ MP National Gov't Alignment	1799	-.202	.697	-1	1	0
Δ MP State Gov't Alignment	1799	.057	.624	-1	1	0
Average Sanction Year	1493	2006.417	2.453	2003	2012	2006

Note: The above table shows the summary statistics for the constituency level analyses in the paper. The unit of analysis is constituency electoral term. Note that, for the RDD analyses, the constituencies in which a ruling party candidate was neither the winner nor the runner-up are omitted as are ministers' constituencies. For the first differences analysis, the variables involve taking a difference between the current and lagged values of the relevant variables. Thus, the variables are missing for the first electoral term in the sample.

data collection. Source: PMGSY Monitoring System.

Minister: An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency belonged to the state's council of ministers. This variable is coded 1 even if the representative resigned from her ministerial position in the middle of the fiscal year. Source: Author's Coding based on Fisman et. al. (2014) and State Government Website Archives and News Sources.

Member of Chief Minister's Party: An indicator for for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency was a member of the chief minister's party. If the chief minister changed during a given legislator's electoral term, alignment is coded according to the chief minister that was in office during the majority of the electoral term. Election Commission of India.

Road Length (Kms): The length of road in Kilometers sanctioned under the road project. Source: PMGSY Monitoring System.

Sanction Year: The year in which the road project was sanctioned. Source: PMGSY Monitoring System.

Sanctioned Cost: The total amount allocated for the road project in lakhs of Indian rupees. 1 lakh is equal to a 100,000. Source: PMGSY Monitoring System.

Total Expenditure till Present: The total expenditure actually incurred on the given road project until data collection in 2014 in lakhs of Indian rupees. 1 lakh is equal to a 100,000. Source: PMGSY Monitoring System.

Habitation Size: The total population (in thousands) of the habitation connected by the road project. Source: National Habitation Survey (2010).

State Assembly Constituency: The name of the state assembly constituency in which the road project is located. Source: Constructed by author from information in the PMGSY Monitoring System, the National Habitation Survey and Assembly Constituency Shapefiles from MLInfoMaps.

Vote Share: The vote share received by the winning candidate in the state assembly constituency in the most recent state election. Source: Election Commission of India.

Vote Margin: The vote margin share received by the winning candidate in the state assembly constituency in the most recent state election. Source: Election Commission of India.

Time to Completion: The number of years between the year the road project was initially sanctioned and the year it was completed. Source: PMGSY Monitoring System.

New Connectivity: An indicator for whether the road project provides new connectivity

as opposed to being an upgrade of an already existing road. Source: PMGSY Monitoring System.

Illiteracy of Village: The proportion of illiterate adults in the village connected by the road project. Source: Census of India 2001 as made availably by MLInfoMaps.

Years Since Sanctioned: The number of years between the year the road project was initially sanctioned and the year of data collection (i.e. 2014). Source: PMGSY Monitoring System.

Domestic Collaboration: An indicator for whether the road project involves a domestic collaboration rather than a collaboration with an international agency. Source: PMGSY Monitoring System.

SC/ST Proportion: The proportion of members of Scheduled Caste and Scheduled Tribe in the habitation connected by the road project. Source: National Habitation Survey (2010).

State Electoral Term: A string variable listing the name of the state in which the road project is located and the year of the most recent state election prior to the year in which the road project is sanctioned. The variable is used to create state-electoral term dummies used in the analyses. Source: Constructed based on PMGSY Monitoring System.

Chief Minister: An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency was the state's chief minister. This variable is coded 1 even if the representative resigned from her position in the middle of the fiscal year. Source: Author's Coding based on Fisman et. al. (2014) and State Government Website Archives and News Sources.

Road Works Minister: An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency was a minister associated with a department that was either partially or wholly responsible for rural roads provision under PMGSY in the state. The relevant departments in each state were identified through a perusal of PMGSY websites for the given states and through interviews with PMGSY officials. To guard against misattribution of expenditures (since these are not available by fiscal year), the variable captures only those road works ministers who remain in their position for more than two years. The departments include the PWD (Public Works department), Rural Development and Rural Engineering Services. Source: Author's Coding based on State Government Website Archives and News Sources.

Electronic Procurement: An indicator for whether the state had rolled out electronic procurement at the time the road project was sanctioned. Source: Lewis-Faupel et. al. (2015).

MP in PM's party: An indicator for whether the state assembly constituency in which the road project was located was part of a national parliamentary constituency for which the

MP was a member of the Prime Minister's party at some point during the electoral term in which it was sanctioned. Source: Election Commission of India. Information on boundaries of state assembly constituencies and parliamentary constituencies were obtained using maps from MLInfoMaps.

MP in CM's party: An indicator for whether the state assembly constituency in which the road project was located was part of a national parliamentary constituency for which the MP was a member of the state chief minister's party at some point during the electoral term in which it was sanctioned. Source: Election Commission of India. Information on boundaries of state assembly constituencies and parliamentary constituencies were obtained using maps from MLInfoMaps.

Minister (CM's party): An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency belonged to the state's council of ministers and was a member of the chief minister's party. This variable is coded 1 even if the representative resigned from her ministerial position in the middle of the fiscal year. Source: Author's Coding based on Fisman et. al. (2014) and State Government Website Archives and News Sources.

Minister (Coalition Partner): An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency belonged to the state's council of ministers and was a member of a party other than the chief minister's party. This variable is coded 1 even if the representative resigned from her ministerial position in the middle of the fiscal year. Source: Author's Coding based on Fisman et. al. (2014) and State Government Website Archives and News Sources.

Administrative District of Road Works Minister (CM's Party): An indicator for whether the road project is located in an administrative district that contained a constituency of a road works minister belonging to the chief minister's party at some point during the electoral term during which the road was sanctioned. The variable is coded as 1 only if the road works minister remained in her position for at least two years.Source: Author's Coding based on State Government Website Archives and News Sources.

Administrative District of Road Works Minister: An indicator for whether the road project is located in an administrative district that contained a constituency of a road works minister at some point during the electoral term during which the road was sanctioned. The variable is coded as 1 only if the road works minister remained in her position for at least two years.Source: Author's Coding based on State Government Website Archives and News Sources.

Member of Coalition Partner: An indicator for for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency was a member of a party that was a coalition partner in the state government (but not the chief minister's party). Source: Election Commission of India. Information on Membership in the Governing Coalition coded from news sources.

Expenditure Premium: The expenditure incurred on the individual project over and above the sanctioned cost. If the expenditure incurred was less than or equal to the sanctioned cost, this variable is coded as 0. Source: PMGSY Monitoring System.

Cabinet Minister: An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency belonged to the state's council of ministers and was of cabinet rank. Source: Author's Coding based on State Government Website Archives and News Sources.

Opposition Party Constituency: An indicator for whether the road project located in constituency i was sanctioned in a fiscal year during which the representative in the constituency was a member of a party that did not belong to the state governing coalition. Source: Election Commission of India. Information on Membership in the Governing Coalition coded from news sources.

Completed: An indicator for whether the road project is recorded as having been complete at the time of data collection in 2014. Source: PMGSY Monitoring System.

Vote Margin Squared: The square of the variable *Vote Margin*. Source: Constructed.

Expenditure- Productive Project: This variable records the total expenditure incurred on a given road project until data collection in lakhs of Indian rupees[60] for projects that were completed at the time of data collection and that took two years or less to complete. The variable is missing for projects that were incomplete at the time of data collection and for projects that took more than two years to complete. Source: PMGSY Monitoring System.

Project in Multiple Habitations: An indicator for whether the road project is described as benefiting multiple habitations. Source: PMGSY Monitoring System.

A.7 (RD) Design: Additional Results

A.7.1 Additional RDD Plots

To evaluate the robustness of the RD design, this section explores alternative methods of generating the RD plots. Specifically, while Figure 1 in the main text shows the RD plot

[60] 1 lakh is equal to a 100,000

Table A3: Summary Statistics - Road Project Level Variables

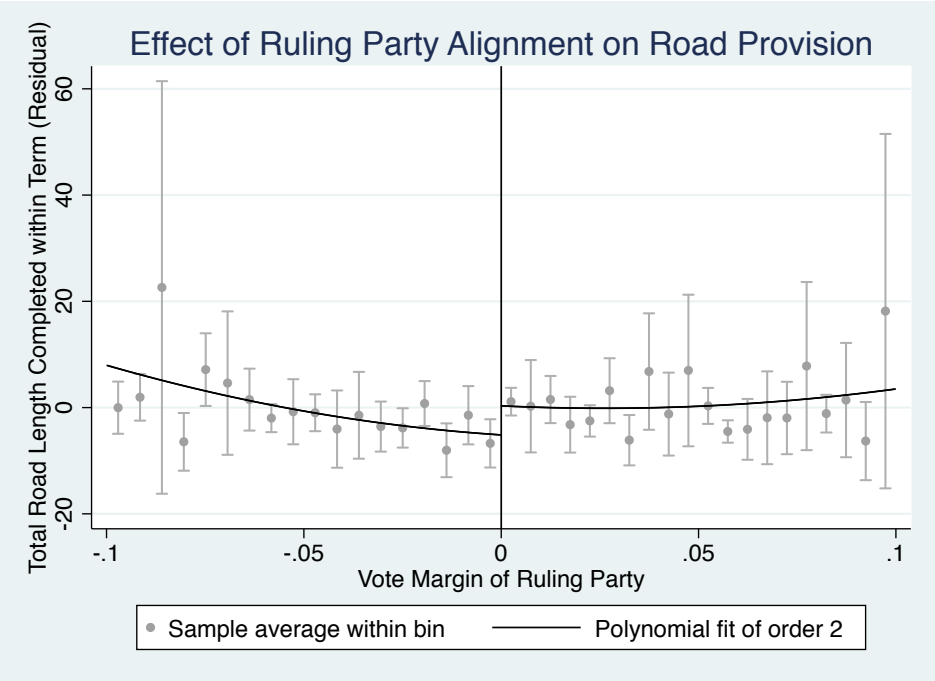
Variable	Obs	Mean	Std. Dev.	Min	Max	Median
Total Value of Contracts Won by Contractor in State	46027	4464.448	5231.179	0	36506.84	2353.38
Road Quality Rating	11957	.614	.487	0	1	1
Expenditure - Unproductive Project	2475	65.561	99.19	0	921.86	27.92
Minister	36059	.168	.374	0	1	0
Member of Chief Minister's Party	36058	.49	.5	0	1	0
Sanction Year	41279	2005.464	3.194	2000	2013	2006
Sanctioned Cost	36130	95.245	105.377	0	995.54	61.2
Road Length (Kms)	36162	3.781	4.825	0	255	2.6
Total Expenditure till Present	36151	75.965	91.616	0	992.37	47.53
Habitation Size	36030	1.026	1.255	.001	26.153	.702
Vote Share	36058	.407	.093	.163	.874	.397
Vote Margin	36058	.099	.087	0	.79	.077
Time to Completion	31941	3.944	2.467	-1	14	3
New Connectivity	36162	.802	.398	0	1	1
Illiteracy of Village	31629	.581	.139	.122	1	.576
Years Since Sanctioned	36162	4.064	2.495	0	14	3
Domestic Collaboration	36162	.866	.341	0	1	1
SC/ST Proportion	36030	.336	.325	0	1	.235
Project in Multiple Habitations	36166	.251	.433	0	1	0
Chief Minister	36059	.006	.078	0	1	0
Road Works Minister	36059	.012	.108	0	1	0
Electronic Procurement	41280	.073	.259	0	1	0
MP in PM's party	36162	.276	.447	0	1	0
MP in CM's party	36164	.394	.489	0	1	0
Minister (CM's Party)	36059	.119	.324	0	1	0
Minister (Coalition Partner)	36060	.048	.214	0	1	0
Administrative District of Roadworks Minister	41279	.054	.227	0	1	0
Member of Coalition Partner	36058	.056	.229	0	1	0
Expenditure Premium	41281	2.208	12.871	0	588.06	0
Cabinet Minister	36059	.093	.291	0	1	0
Administrative District of Road Works Minister (CM's Party)	41279	.04	.196	0	1	0
Opposition Party Constituency	36058	.455	.498	0	1	0
Completed	36162	.883	.321	0	1	1
Member of Chief Minister's Party * Vote Margin	36058	.055	.084	0	.665	0
Vote Margin Squared	36058	.017	.035	0	.623	.006
Expenditure - Productive Project	9489	51.674	60.536	0	707.08	35.37

Note: The above table shows the summary statistics for the project-level analyses in the paper and the online appendix. Since there are sometimes multiple contractors assigned to a given road project, the unit of analysis for the variable *Total Value of Contracts Won by Contractor in State* is the road project-contractor. The unit of analysis for the rest of the variables is the road project.

with a fourth-order polynomial, Figure A3 shows that we continue to observe a discontinuous jump at the cutpoint when we use a second order polynomial.

Figure A4 shows a comparison of the RD Plot with the "residualized" dependent variable and the RD plot with the "raw" dependent variable. The figure reveals a discontinuous jump at the 0% vote margin in both plots, although the jump is somewhat larger in the case

Figure A3: (RD) Design: The Effect of Ruling Party Alignment on Road Length Sanctioned and Completed within Term (Second Order Polynomial)

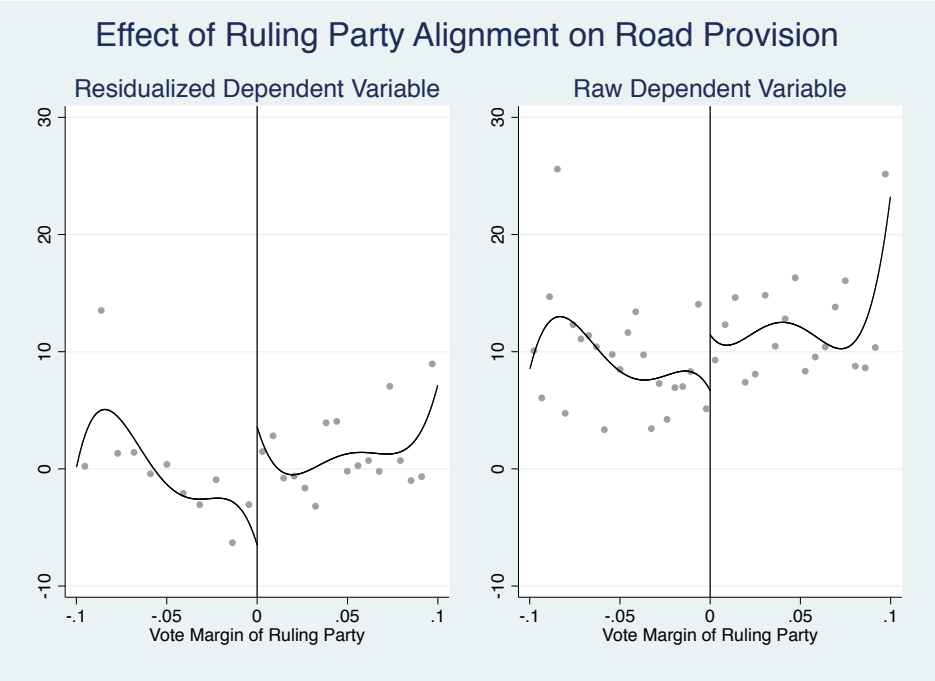


The figure shows an RDD plot generated using the data-driven method recommended by Calonico, Cattaneo and Titiunik (2015). The x-axis shows the vote-margin of the ruling party in the given constituency in the most recent election - constituencies where the ruling party was neither the winner nor the runner-up are omitted. The y-axis shows the residuals of a regression of the total length of road completed in the constituency during the relevant electoral term on control variables described in the text. Bars shown are 90% confidence intervals.

of the plot with the residualized dependent variable. Moreover, as expected, the sampling variability is substantially higher in the plot showing the raw dependent variable than in the plot showing the residualized dependent variable.

Interestingly, note that both plots show that the treatment effect at the cut-point is shaped in part by the fact that constituencies of opposition legislators who won against a ruling party candidate by a small margin experienced a decline in their access to completed roads during the electoral term. The evidence therefore is suggestive of manipulation on the part of the state government to 'tie the hands of' opposition party legislators in close races. The

Figure A4: (RD) Design: The Effect of Ruling Party Alignment on Road Length Sanctioned and Completed within Term



The figure shows two RDD plots generated using the data-driven method recommended by Calonico, Cattaneo and Titiunik (2015) with a fourth order polynomial. The x-axis shows the vote-margin of the ruling party in the given constituency in the most recent election - constituencies where the ruling party was neither the winner nor the runner-up are omitted. The y-axis on the first graph shows the residuals of a regression of the total length of road completed in the constituency during the relevant electoral term on control variables described in the text. The y-axis on the second graph shows the "raw" dependent variable - that is, the total length of road completed in the constituency during the relevant electoral term. The dots represent the mean of the residuals within bins of the forcing variable whose widths are chosen by the evenly spaced bin selection method recommended by Calonico, Cattaneo and Titiunik (2015).

results are similar to those of Brollo & Nannicini (2012) who find that central governments manipulate transfers to municipal governments in a way that ties the hands of municipal mayors who are aligned with opposition parties.

Table A4: The Effect of Alignment with Chief Minister's Party on Completed Roads (Residualized)

Method	Est. Treatment Effect	P-Value	Chosen Bandwidth	Obs (L),(R)
Conventional, IK Bandwidth	5.62	0.009	11.14	
Conventional, CCT Bandwidth	5.81	0.011	9.7	773, 1260
Robust, CCT Bandwidth	6.16	0.022	9.7	773, 1260

The first row shows the estimates using the Imbens and Kalyanaraman (2011) optimal bandwidth. The results are estimated using the *rd* program in STATA developed by Nichols (2014). The second and third rows show the estimates using the Calonico, Cataneo and Titiunik (2014) optimal bandwidth and are estimated using the *rdrobust* package in STATA developed by the same authors. The bandwidth refers to the width of the vote margin share used. (L) and (R) refer to the number of observations to the left and right of the cut-point respectively.

A.7.2 RDD: Non-Parametric Estimates

Table A4 shows the non-parametric estimates of the treatment effect from the (RD) Design. The first row shows the estimates using the Imbens and Kalyanaraman (2011) optimal bandwidth. The results are estimated using the *rd* program in STATA developed by Nichols (2014). The second and third rows show the estimates using the Calonico, Cataneo and Titiunik (2014) optimal bandwidth and are estimated using the *rdrobust* package in STATA developed by the same authors. The bandwidth refers to the width of the vote margin share used. (L) and (R) refer to the number of observations to the left and right of the cut-point respectively.

A.8 RDD: Balance Tests and Tests of Strategic Sorting

As recommended by Imbens and Lemieux (2008) and as implemented by Lee, Morelli and Butler (2004), the validity of the RDD design is examined by investigating whether there

is a significant difference in the pre-determined characteristics of "treated" and "control" constituencies - i.e. those with and without a ruling party aligned legislator respectively. Table A5 displays tests for differences in a host of covariates including several characteristics of road projects in the given constituency during the *previous* electoral term such as the length of road completed, the length of road sanctioned, the expenditure incurred and the amount of funding sanctioned. The table also examines difference in pre-treatment covariates that capture the previous political situation in the constituency such as whether it had a legislator aligned with the chief minister's party and the vote share obtained by the winning candidate in the election prior to the most recent one. Finally, covariates capturing socio-economic features that could affect rural roads provision - the level of illiteracy and the percentage of rural population - as measured by the 2001 Indian census are also included. Since census data only report socio-economic variables by administrative block, these factors are examined as they pertain the block that most closely overlaps with the given constituency.

Table A5 shows the results obtained when estimating the effect of alignment with the chief minister's party substituting the dependent variable of interest with each covariate. In each case, the estimates fail to reject the null hypothesis of no difference between the treated and control groups. These results are similar to what we would observe if the assignment of ruling party alignment across constituencies across the threshold in our sample were random and provide increased confidence in the assumptions underlying our RD design.

As a final check on the validity of our identifying assumption, the McCrary test (McCrary 2008) is conducted to check whether there is a systematic difference in the density of our forcing variable around the threshold. As noted by McCrary (2008), such evidence would

Table A5: The Effect of Alignment with Chief Minister's Party on Covariates: Balance Tests

Name of Covariate	Estimated Effect	P-Value	Optimal Bandwidth
Road Length Completed During *Previous* Term	1.96	0.14	8.06
Road Length Sanctioned During *Previous* Term	5.11	0.28	9.66
Expenditure Incurred During *Previous* Term	120.46	0.25	8.03
Total Amount Sanctioned During *Previous* Term	173.77	0.13	9.89
Alignment of Representative with Chief Minister's Party During *Previous* Term	−0.04	0.57	10.85
Maximum Vote Share in Constituency in Previous Election	0.008	0.52	5.75
Illiteracy Rate of Block Most Closely Overlapping with Constituency	0.006	0.58	10.55
% Rural Population of Block Most Closely Overlapping with Constituency	0.03	0.28	13.01

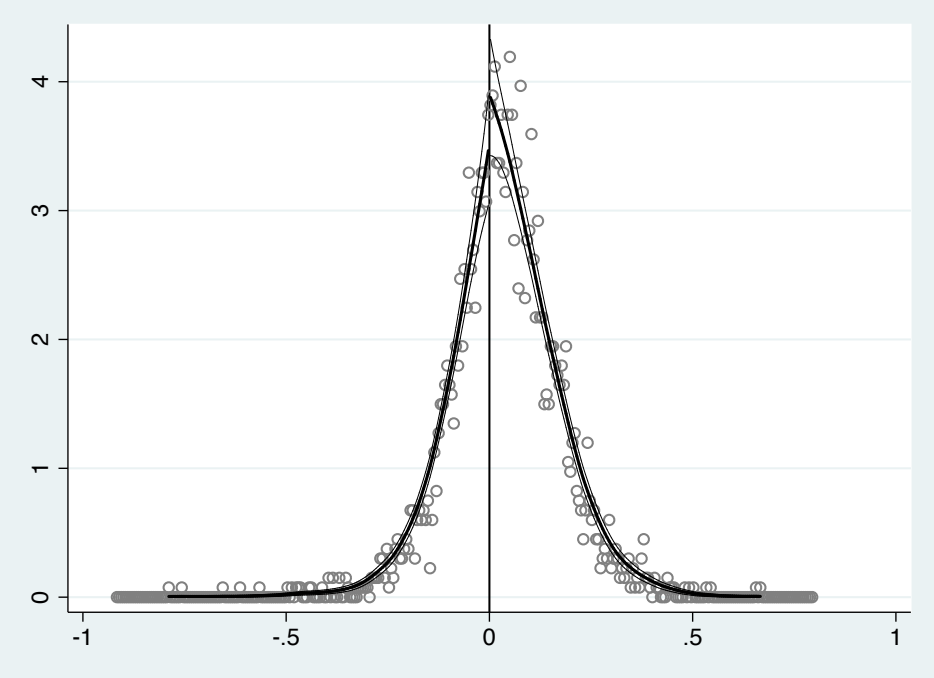
Note: The estimates use the Imbens and Kalyanaraman (2011) optimal bandwidth and are estimated using the *rd* program in STATA developed by Nichols (2014).

indicate the possibility that certain types of legislators in close races can strategically manipulate their vote margins to facilitate their electoral victories. Figure A5 however shows no evidence of strategic sorting at the cutpoint, thus further increasing confidence that the observed results are not driven by the ability of certain politicians to manipulate their chances of victory in close races.

A.8.1 RDD Results by Party

Figures A6, A7 and A8 show RDD plots broken down by party: the BJP (A6), the Indian National Congress (A7) and other parties grouped together. While each plot reveals somewhat different patterns, each shows a discontinuity at the 0% vote margin in the direction predicted by H1.

Figure A5: (RD) Design: Density Test by McCrary (2008)

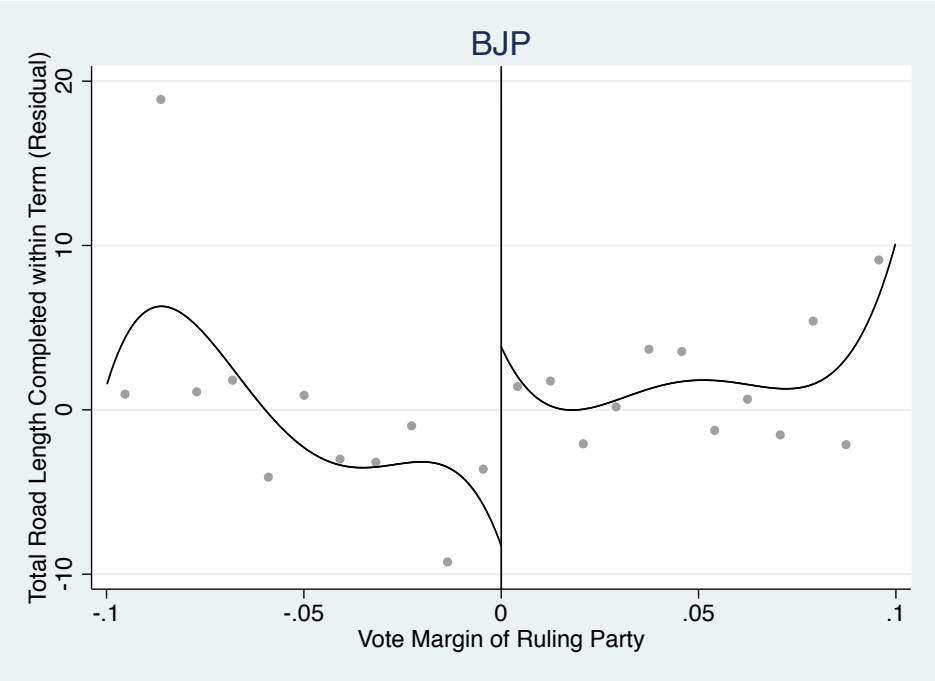


The figure shows the density test of the forcing variable recommended by McCrary (2008) as implemented by the STATA command *DCdensity* by the same author.

A.9 RDD Results: The Effect of Alignment with the Chief Minister's Party on Sanctioned Amount

Table A6 shows the results of analyses using an RD design similar to those in Table 1 in the main text, but examining the effect of alignment with the chief minister's party on the total amount sanctioned for road projects in the constituency during the electoral term. Similar to the analyses in Table 1 in the main text, the forcing variable *Forcing* is the vote margin of the candidate from the chief minister's party in the constituency in the most recent election. The results in Table A6 show that the effect of alignment with the chief minister's party on the total amount sanctioned for road projects is positive across all specifications but

Figure A6: (RD) Design: The Effect of Ruling Party Alignment on Road Length Sanctioned and Completed within Term (BJP)



The figure shows an RDD plot generated using the data-driven method recommended by Calonico, Cattaneo and Titiunik (2015) for the constituencies in which either the winner or the runner-up belonged to the BJP. The x-axis shows the vote-margin of the ruling party in the given constituency in the most recent election - constituencies where a ruling party candidate was neither the winner nor the runner-up are omitted. The y-axis shows the residuals of a regression of the total length of road completed in the constituency during the relevant electoral term on control variables described in the text. The dots represent the mean of the residuals within bins of the forcing variable whose widths are chosen by the evenly spaced bin selection method recommended by Calonico, Cattaneo and Titiunik (2015).

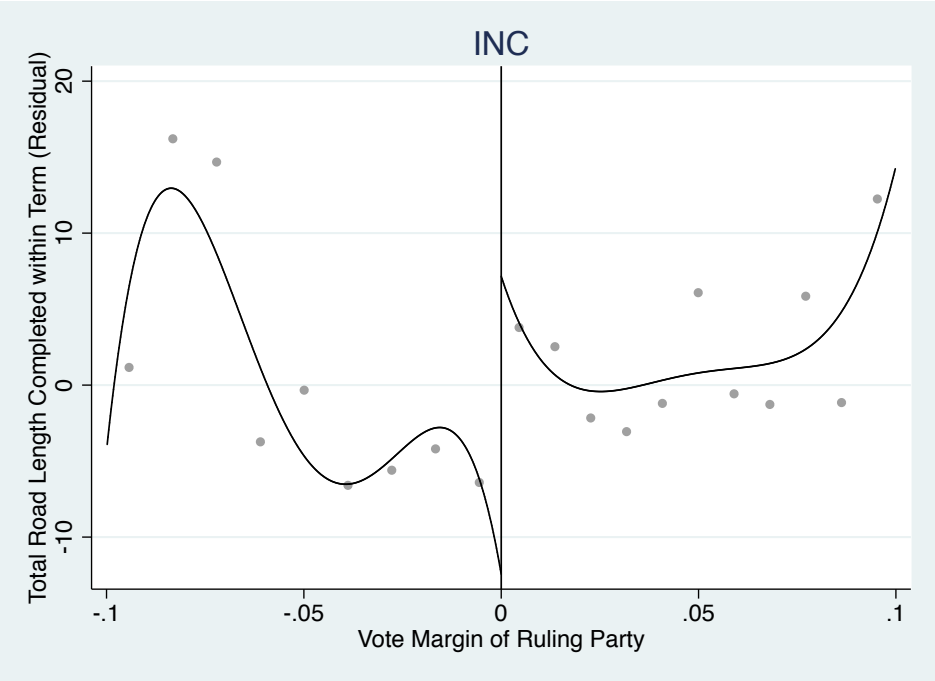
statistically significant only in one of the specifications. Thus, the effect of alignment with the ruling party on the total amount sanctioned for road projects is similar to its effect on the length of road completed but somewhat less robust. These results are consistent with the theoretical argument which emphasizes how alignment with the chief minister's party should have the greatest influence on the *implementation* of road projects rather than the initial allocation of funds.

Table A6: The Effect of Ruling Coalition Alignment on the Total Cost Sanctioned for Road Projects During the Electoral Term

Dependent Variable: Total Cost Sanctioned for Road Projects During Term				
	(1) Margin=5% No Controls	(2) Margin=5% Controls	(3) Margin=2.5% Controls	(4) Polynomial Controls
CM Party Alignment	81.20	129.86	184.65*	125.35
	(109.53)	(87.82)	(107.27)	(138.84)
New Connectivity Proportion		540.58***	422.15**	369.67***
		(165.10)	(187.87)	(111.58)
Domestic Collab. (Proportion)		−341.86	242.64	−251.16
		(491.89)	(520.96)	(316.26)
Village Illiteracy (Average)		538.39	95.22	944.27***
		(475.99)	(582.05)	(327.15)
SC/ST Proportion (Average)		1161.80***	1928.75***	1002.80***
		(279.10)	(403.46)	(184.27)
Habitation Size (Average)		−74.23	−44.57	−94.89**
		(57.72)	(62.71)	(39.28)
Forcing				503.65
				(2885.48)
Forcing^2				14868.72
				(22877.08)
Forcing^3				45183.12
				(56474.78)
Forcing^4				36568.86
				(41481.82)
Forcing* CM Party				98.85
				(4366.62)
Forcing^2* CM Party				−22591.48
				(34571.19)
Forcing^3* CM Party				−38446.94
				(100067.74)
Forcing^4* CM Party				−29107.93
				(77597.40)
Constant	992.27***	−50.92	−394.14	−316.25
	(76.49)	(571.39)	(626.08)	(410.68)
Sanction Year Fixed Effects	No	Yes	Yes	Yes
State-Electoral Term Fixed Effects	No	Yes	Yes	Yes
Observations	839	685	367	2033

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the assembly constituency electoral term. *Forcing* refers to the forcing variable which is the vote margin of the candidate from the chief minister's party. Constituencies where a candidate from the chief minister's party was neither the winner nor the runner-up are dropped. Since Columns 2 and 3 include control variables that measure the characteristics of road projects in a constituency, constituency-electoral terms that do not have any road projects are dropped in these specifications. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

Figure A7: (RD) Design: The Effect of Ruling Party Alignment on Road Length Sanctioned and Completed within Term (INC)

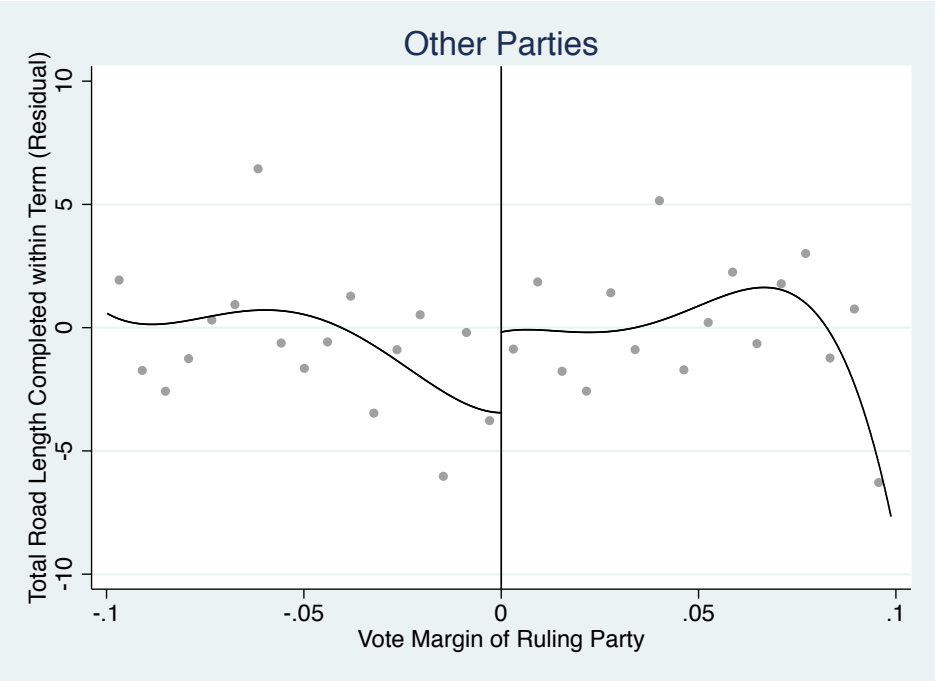


The figure shows an RDD plot generated using the data-driven method recommended by Calonico, Cattaneo and Titiunik (2015) for the constituencies in which either the winner or the runner-up belonged to the Indian National Congress. The x-axis shows the vote-margin of the ruling party in the given constituency in the most recent election - constituencies where a candidate from the ruling party was neither the winner nor the runner-up are omitted. The y-axis shows the residuals of a regression of the total length of road completed in the constituency during the relevant electoral term on control variables described in the text. The dots represent the mean of the residuals within bins of the forcing variable whose widths are chosen by the evenly spaced bin selection method recommended by Calonico, Cattaneo and Titiunik (2015).

A.10 RDD Results: The Effect of Alignment with the Ruling Coalition on Completed Roads

Table A7 shows the results of analyses using an RD design similar to those in Table 1 in the main text, but examining the effect of alignment with any party in the state's ruling coalition rather than alignment with just the party of the chief minister. This RD design involves comparing constituencies in which a candidate from a party in the ruling coalition

Figure A8: (RD) Design: The Effect of Ruling Party Alignment on Road Length Sanctioned and Completed within Term (Other Parties)



The figure shows an RDD plot generated using the data-driven method recommended by Calonico, Cattaneo and Titiunik (2015) for the constituencies in which either the winner or the runner-up belonged to a party other than the Indian National Congress or the BJP. The x-axis shows the vote-margin of the ruling party in the given constituency in the most recent election - constituencies where a candidate from the ruling party was neither the winner nor the runner-up are omitted. The y-axis shows the residuals of a regression of the total length of road completed in the constituency during the relevant electoral term on control variables described in the text. The dots represent the mean of the residuals within bins of the forcing variable whose widths are chosen by the evenly spaced bin selection method recommended by Calonico, Cattaneo and Titiunik (2015).

just won the most recent election to constituencies in which a candidate from a party in the ruling coalition just lost the most recent election. Thus, the forcing variable $ForcingC$ is the vote margin of the candidate from the ruling coalition in the constituency. Constituencies where a candidate from the ruling coalition was neither the winner nor the runner-up were dropped from the analysis. The results in Table A7 show that the effect of alignment with the ruling coalition is positive and statistically significant across all specifications and fairly similar in magnitude to the effects found in Table A7. Thus, the effect of alignment on road

provision appears to be similar regardless of whether we consider alignment with just the chief minister's party or alignment with any party in the ruling coalition (including the chief minister's party).

A.11 Constituency-Level Analysis: Effect of Ministerial Status and Alignment on Road Provision

A.11.1 Constituency Level OLS Analysis

Table A8 shows the results of examining the effect of ministerial status and alignment on road provision using a simple OLS model with constituency fixed effects. Since the unit of analysis is the constituency-electoral term, the inclusion of the constituency fixed effects helps to control for unobserved constituency characteristics that remain fixed over time. Thus, the results show the effect of variations in ministerial status and alignment on variations in road provision within a constituency over time. Column 1 shows the results without controls while Column 2 includes controls for electoral competitiveness which could confound the effect of alignment and ministerial status on road provision.

Consistent with H1, the coefficient on the variable *Ruling Coalition Alignment* is positive and statistically significant across both specifications indicating that alignment with the ruling coalition is associated with significantly higher levels of road provision than alignment with a party that is not a member of the ruling coalition - that is, an opposition party.

Table A7: The Effect of Ruling Coalition Alignment on the Total Road Length Completed During the Electoral Term

Dependent Variable: Total Road Completed During Term				
	(1)	(2)	(3)	(4)
	Margin=5%	Margin=5%	Margin=2.5%	Polynomial
	No Controls	Controls	Controls	Controls
Ruling Coalition Alignment	3.32**	4.40***	3.87**	6.62***
	(1.46)	(1.52)	(1.66)	(1.85)
New Connectivity Proportion		0.35	0.97	−1.44
		(2.08)	(2.56)	(1.49)
Domestic Collab. (Proportion)		−19.23**	−12.22	−9.32
		(9.42)	(8.22)	(6.40)
Village Illiteracy (Average)		−0.54	−6.50	8.14
		(6.23)	(7.88)	(5.44)
SC/ST Proportion (Average)		7.94*	17.22***	−0.77
		(4.26)	(6.06)	(3.37)
Habitation Size (Average)		−0.54	0.79	−1.42**
		(0.78)	(0.79)	(0.60)
Forcing C				−148.88***
				(56.39)
Forcing C^2				−954.98**
				(403.10)
Forcing C^3				−2033.65**
				(929.58)
Forcing C^4				−1326.45**
				(650.82)
Forcing C* Ruling Coalition				142.80**
				(56.45)
Forcing C^2* Ruling Coalition				959.02**
				(405.59)
Forcing C^3* Ruling Coalition				2041.52**
				(934.07)
Forcing C^4* Ruling Coalition				1313.85**
				(665.27)
Constant	7.48***	19.55*	12.05	5.58
	(0.98)	(10.20)	(9.93)	(7.42)
Sanction Year Fixed Effects	No	Yes	Yes	Yes
State-Electoral Term Fixed Effects	No	Yes	Yes	Yes
Observations	959	800	437	2301

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the state constituency term. *ForcingC* refers to the forcing variable which is the vote margin of the candidate from the ruling coalition. Constituencies where a candidate from the ruling coalition was neither the winner nor the runner-up are dropped. Since Columns 2 and 3 include control variables that measure the characteristics of road projects in a constituency, constituency-electoral terms that do not have any road projects are dropped in these specifications. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

Since all ministers are by definition aligned with the ruling coalition, the coefficient on the variable *Minister* represents the effect of being a minister over and above the effect of being aligned with the ruling coalition. Across both specifications, we observe that while the effect of ruling coalition alignment on road provision is positive and significant in both specifications, there is no statistically significant *additional* effect of being a minister over and above the effect of alignment with the ruling coalition. These results are also consistent with H1 which posits that there should not be a substantial difference between ministers and aligned ordinary legislators in terms of road provision.

Meanwhile, the sum of the coefficient on the variable *Minister* and the coefficient on the variable *Ruling Coalition Alignment* represents the effect of being a minister relative to the effect of being aligned with an opposition party. Additional calculation shows that the sum of these coefficients across both specifications in Table A8 is positive and statistically significant at the 90% level in Column 1 and at the 95% level in Column 2. This result indicates as expected that ministerial status results in, on average, significantly higher levels of road provision than alignment with an opposition party.

A.11.2 Constituency Level First Differences Analysis

The first differences analysis involves estimating the following equation:

$$y_{i,\Delta t} = \alpha_0 + \alpha_1 Alignment_{i,\Delta t} + \alpha_2 Minister_{i,\Delta t} + \alpha_3 X_{i,\Delta t} + u_{s,t} + \epsilon_{i,\Delta t} (3)$$

Table A8: Constituency-Level Analysis: Effect of Alignment and Ministerial Status on Road Provision (OLS with Constituency Fixed Effects)

	(1)	(2)
	Dependent Variable: Total Road Completed in Term	
Minister	0.40	0.84
	(1.70)	(1.73)
Ruling Coalition Alignment	2.69*	3.23**
	(1.42)	(1.38)
Vote Margin		−29.10**
		(11.49)
Constant	7.90***	10.43***
	(0.80)	(1.37)
Constituency Fixed Effects	Yes	Yes
Observations	3310	3309

Significance levels : $*$: 10% $**$: 5% $***$: 1%. The unit of analysis is the constituency-electoral term. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

where i refers to the state assembly constituency, t refers to a given electoral term and Δt refers to the difference in the relevant variable in the electoral term t and the previous electoral term $t-1$. The dependent variable $y_{i,\Delta t}$ is the difference in the total length of road sanctioned and completed in constituency i between electoral term t and $t-1$. $Alignment_{i,t}$ is an indicator for whether the legislator in constituency i is aligned with a ruling party in electoral term t.[61] Thus, $Alignment_{i,\Delta t} = Alignment_{i,t} - Alignment_{i,t-1}$. While the main results focus on alignment with the chief minister's party in the state, some specifications also examine the results obtained when considering the effect of alignment with any party in the governing coalition. The other key independent variable is $Minister_{i,\Delta t} = Minister_{i,t} - Minister_{i,t-1}$ where $Minister_{i,t}$ is an indicator for whether the legislator in constituency i

[61] In cases where the chief minister's party changed during the course of the electoral term, the alignment of the legislator with the party to which the chief minister was aligned is captured for the majority of the electoral term.

was a minister during electoral term t.[62] Thus, the coefficient on $Minister_{i,\Delta t}$ represents the effect of being a minister over and above the effect of being an ordinary legislator aligned with the state ruling coalition.

The first differences analysis described above helps to control for unobserved constituency level characteristics that remain fixed across consecutive electoral terms. However, one potential issue with this estimation strategy is that it does not adequately deal with confounding factors that could lead to a change in alignment or a change in ministerial status and that could independently affect road provision. To address this issue, the above equation is estimated both with the full sample as well as with a sample restricted to constituencies where neither the incumbent herself nor her partisan affiliation changed across consecutive electoral terms. Thus, in this sample, any change in alignment or ministerial status is a result of a change in the partisan composition of the state government and not a result of changes internal to the constituency. Estimating the equation using this sample allows us to isolate the effect of ministerial status from the effect of constituencies in which ministers tend to run[63] and from the effect of candidate qualities associated with being a minister[64]. To control for electorally induced changes in the partisan composition of state government that could affect the state as a whole, $u_{s,t}$ represents dummies for each state s and electoral term t.

In each of the specifications, $X_{i,\Delta t} = X_{i,t} - X_{i,t-1}$ where $X_{i,t}$ refers to covariates pertaining to the constituency i during electoral term t. These variables capture the political charac-

[62]This variable is coded 1 as long as the legislator was a minister during electoral term t for a period of more than one year.

[63]Since we are taking first differences, this differences out any constituency specific effects.

[64]Since we are comparing the same representative in both electoral terms.

teristics of the constituency such as its electoral competitiveness and the alignment of its representative member of *national* parliament with the chief minister's party and the prime minister's party. In some specifications, variables capturing the average characteristics of road projects in the constituencies are also included. These specifications involve dropping constituencies in which no PMGSY road projects were sanctioned. Section A.5 contains a detailed description of the variables included in each specification and provides summary statistics.

Table A9 shows the results of the first differences analyses described above. Columns 1, 3 and 5 show the results based on the full sample while Columns 2, 4 and 6 show the results based on a restricted sample of constituencies where neither the incumbent herself nor her partisan affiliation changed across consecutive electoral terms. To separate the effects of alignment from the effects of ministerial status, Columns 3-6 consider the effect of being a minister separately by including the variable Δ *Ministerial Status*. The results in Columns 1 to 4 provide the effect of a change in alignment with the chief minister's party while the results in Columns 5 and 6 show the effect of a change in alignment with the ruling coalition. The coefficient on Δ *Ministerial Status* in Columns 5 and 6 represents the effect of being a minister over and above the effect of being aligned with a party in the ruling coalition.

Columns 1 to 4 of Table A9 show a positive and significant effect of alignment with the chief minister's party. This result is consistent with H1 and in line with the results of the RD design in Table 1. At the same time, also in line with H1, the lack of significance of the coefficient on Δ *Ministerial Status* indicates that there is no significant difference between ministers and ordinary legislators aligned with the chief minister's party when it comes to the

Table A9: The Effect of a Change in Alignment and Ministerial Status on the Change in the Total Road Length Completed During the Electoral Term

	Dependent Variable: Δ Total Road Completed in Term					
	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Full	Restricted	Full	Restricted	Full	Restricted
Δ CM Party Alignment	2.16**	6.07***	1.89**	5.63***		
	(0.93)	(1.75)	(0.94)	(1.99)		
Δ Ministerial Status			1.20	1.13	1.12	−0.16
			(1.13)	(2.13)	(1.17)	(2.63)
Δ Ruling Coalition Alignment					1.95*	7.71**
					(1.12)	(3.06)
Δ Vote Margin	−5.98	−18.17	−6.32	−18.55	−5.60	−15.95
	(11.60)	(28.87)	(11.64)	(29.18)	(11.66)	(28.95)
Δ Vote Share	−22.15**	−12.22	−22.33**	−11.96	−22.79**	−16.44
	(10.50)	(23.24)	(10.49)	(23.41)	(10.61)	(23.90)
Δ MP National Gov't Alignment	2.07*	2.21	2.08*	2.19	2.07*	2.01
	(1.14)	(2.46)	(1.13)	(2.46)	(1.13)	(2.45)
Δ MP State Gov't Alignment	−1.85*	1.60	−1.78*	1.62	−1.74*	1.40
	(1.00)	(3.98)	(1.00)	(3.97)	(0.99)	(3.87)
State-Electoral Term Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1799	468	1799	468	1799	468

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the constituency-electoral term. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

provision of completed roads in their constituencies. The coefficient on Δ *Ruling Coalition Alignment* is positive and significant in Columns 5 and 6.

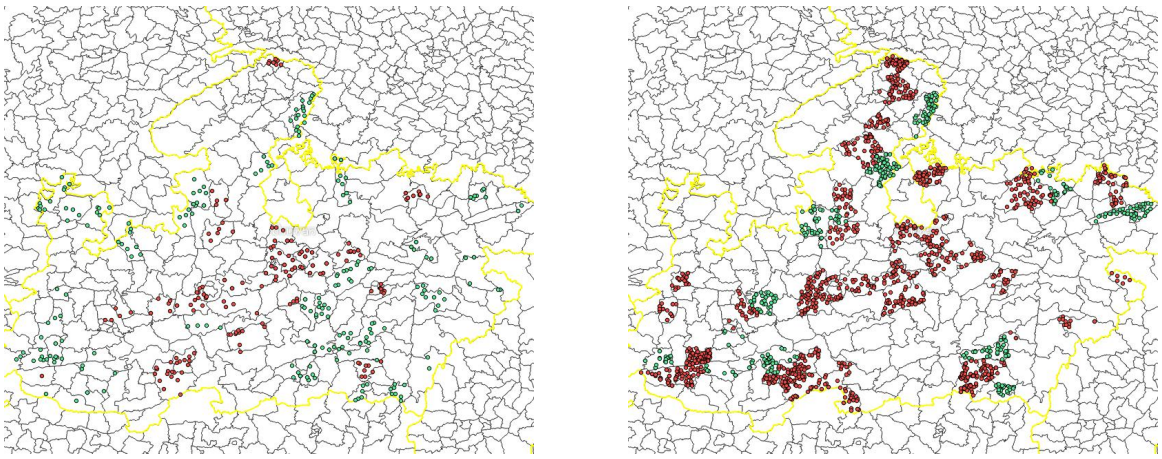
A.11.3 The Effect of a Change in Alignment on the Change in Roads Provision: A Visual Examination of the Raw Data

Figure A9 illustrates the first differences research design in the state of Madhya Pradesh. Each dot represents a village in which a road was sanctioned and completed during the relevant electoral term. The green dots represent villages that fell in the constituency of a legislator aligned with the Congress party and the red dots represent villages that fell in the

constituency of a legislator aligned with the BJP. The first column shows the roads that were sanctioned and completed during the electoral term marked by the 1998 assembly election during which he Congress party was the ruling party in the state. The second column shows the roads that were sanctioned and completed during the electoral term marked by the 2003 assembly election during which the BJP was the ruling party in the state. Consistent with the research design described in the previous section, the dots are depicted only for constituencies in which there was no change in the identity or partisan affiliation of the legislator from the 1998 electoral term to the 2003 electoral term.

If H1 is correct, we would expect that there should be a greater increase in the provision of roads from 1998 to 2003 for the BJP than for the Congress. Indeed, we observe that while there is a significant increase in the number of red dots (representing the BJP) between 1998 to 2003 there is comparatively much less of an increase in the number of green dots (representing the Congress) over the same time period. Moreover, since we are restricting attention only to cases where the identity of the legislator did not change across time periods, the results cannot be driven by changes in the quality of the representative or by changes in the partisan identity of the representative that, in turn, could be produced by other constituency specific confounding factors. Thus, the observed changes in road provision over time in the given constituencies are most likely causally related to a change in the alignment of the legislator with the state level ruling party.

Figure A9: Road Projects Sanctioned under the PMGSY Development Scheme in Madhya Pradesh



(a) 1998 to 2003 (State Ruling Party=INC) (b) 2003 to 2008 (State Ruling Party=BJP)

Note: Each dot in the figure represents a village in which a road project was newly sanctioned in the given electoral term. The black lines depict state assembly constituency boundaries. Green dots represent road projects sanctioned in constituencies where the legislator belonged to the Indian National Congress (INC) and red dots represent road projects sanctioned in constituencies where the legislator belonged to the Bharatiya Janata Party (BJP). The dots pertain only to those constituencies in which there was no change in either the identity or the partisan affiliation of the legislator in the constituency in both electoral terms.

A.11.4 The Effect of Ministerial Status and Alignment on the Efficiency of Road Production

Table A10 shows the results of the first differences analyses that probe the effect of alignment with the chief minister's party on *the efficiency of road production*. In particular, these specifications include controls for the actual expenditures on the road completed during the term, for the budgeted amount for the given road projects, as well as for several other road characteristics that could influence the cost of the road. In particular, a variable called *Sanctioned Cost* is included which reflects a technical evaluation of how much a given road should cost to construct from an engineering standpoint. This, since these specifications control for the expenditure on the roads as well as several other factors that could influence

the cost of the road, they shed light on how alignment and ministerial status affects the efficiency of road production during the electoral term.

Table A10, Columns 1 and 3 show the results based on the full sample while Columns 2 and 4 of the table show the results based on a restricted sample of constituencies where neither the incumbent herself nor her partisan affiliation changed across consecutive electoral terms. The table shows that, across all four columns, the coefficient on ministerial status is negative and statistically significant. Thus, the results indicate that a change in ministerial status within a constituency has a negative and statistically significant effect on the efficiency of road production even when we hold constant the identity and partisan affiliation of the incumbent. Table A10, Column 4 indicates that a change in ministerial status within a constituency lowers the efficiency of road production by an average of 2.4 kilometers even holding constant the expenditure on roads in the constituency and other factors influencing the cost of a road. If spending inefficiencies or leakages are indicative of the availability of rent-seeking opportunities, these results provide evidence in favor of H2 which suggests that rent-seeking opportunities should be more prevalent in ministers' constituencies than in the constituencies of ordinary legislators aligned with the ruling coalition party.

A.12 Control Variables used in Table 2

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To examine further evidence regarding H2, Table 2 examines additional observable implica-

Table A10: The Effect of a Change in Alignment and Ministerial Status on the Change in the Efficiency of Road Production

	Dependent Variable: Δ Total Road Completed in Term			
	(1)	(2)	(3)	(4)
Sample	Full	Restricted	Full	Restricted
Δ Ministerial Status	−1.5905**	−1.8704*	−1.6391**	−2.3937*
	(0.7140)	(1.1032)	(0.7412)	(1.3138)
Δ CM Party Alignment	0.9059*	1.1343		
	(0.4985)	(1.0176)		
Δ Ruling Coalition Alignment			0.9645	1.9371
			(0.5915)	(1.4414)
Δ New Connectivity Proportion	−3.5473***	−2.1615	−3.6047***	−2.4302
	(1.1558)	(1.6916)	(1.1574)	(1.7203)
Δ Domestic Collab. (Proportion)	−2.8173	−2.5028	−2.8693	−2.8654
	(2.5925)	(5.0530)	(2.6052)	(5.1279)
Δ Village Illiteracy (Average)	6.5610	3.4563	6.3283	4.6106
	(4.4340)	(7.2275)	(4.3951)	(7.5818)
Δ SC/ST Proportion (Average)	−0.4687	−3.2718	−0.5723	−3.8986
	(1.7527)	(2.9939)	(1.7572)	(2.9724)
Δ Habitation Size (Average)	0.6148	0.6838	0.5853	0.6440
	(0.4372)	(0.6912)	(0.4357)	(0.6593)
Δ Vote Margin	0.3273	3.8071	0.5584	4.0156
	(4.9273)	(9.4073)	(4.9095)	(9.3895)
Δ Vote Share	4.6381	−1.8076	4.5790	−3.1127
	(4.9126)	(9.2108)	(4.9414)	(9.6063)
Δ Total Expenditure in Term	0.0568***	0.0606***	0.0568***	0.0604***
	(0.0033)	(0.0041)	(0.0033)	(0.0041)
Δ Total Expenditure to Date	−0.0015*	−0.0043**	−0.0015*	−0.0043**
	(0.0008)	(0.0017)	(0.0008)	(0.0017)
Δ Total Sanctioned Cost	0.0001	0.0022*	0.0001	0.0022*
	(0.0006)	(0.0013)	(0.0007)	(0.0013)
Δ MP National Gov't Alignment	0.4710	−0.8633	0.4618	−0.9781
	(0.6059)	(1.1041)	(0.6062)	(1.1309)
Δ MP State Gov't Alignment	−0.3505	1.6329	−0.3362	1.4626
	(0.4404)	(1.6387)	(0.4404)	(1.6012)
Sanction Year Fixed Effects	Yes	Yes	Yes	Yes
State-Electoral Term Fixed Effects	Yes	Yes	Yes	Yes
Observations	1391	352	1391	352

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the constituency-electoral term. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

tions of rent-seeking at the level of the individual road project. TControls include measures of the electoral competitiveness in the constituency and electoral term - *Vote Margin* and *Vote Share* as well as indicators for whether the MP in the overlapping constituency is aligned with the Prime Minister's Party (*MPNationalRuling*) or the Chief Minister's Party (*MPStateRuling*). In addition to these variables capturing political factors, several control variables that could influence the cost of the road or the difficulty of executing the road project are included. Specifically, indicators for whether the road project provides new connectivity rather than an upgrade (*New*) and for whether it involves a domestic rather than international collaboration (*Domestic Collaboration*) and for whether it was introduced after the state had implemented electronic procurement of contracts (*EProcure*).[65] Also included are variables capturing the illiteracy level of the village in which the road is located (*Illiteracy*), the population size of the habitation that the road connects (*Habitation Size*) and the proportion of Scheduled Castes and Scheduled Tribes in the Habitation (*SC/ST Percentage in Habitation*). Finally, indicators for the status of completion of the road project (*Completed* and *NoProgress*) and a measure of the number of years since the project was sanctioned (*YearsSinceSanctioned*) are also included. Appendix Section A.6 provides further information on these variables and their sources.

[65]See Lewis-Faupel et al. 2016 for a discussion of electronic procurement. Note that this variable could not be included in the specifications with the quality ratings as a dependent variable since there were no quality rating observations available for periods after electronic procurement took effect.

A.13 Effect of Alignment and Ministerial Status on Rent-Seeking, Dropping Road Works Ministers and Chief Ministers.

Table A11 shows the results of the same specifications shown in the first three columns of Table 2, but with dropping road projects in constituencies in which the representative was a chief minister or a minister whose department was wholly or partially responsible for the provision of rural road works. As shown in Table A11, the sign and significance of the results in Table 2 are robust to the exclusion of these ministers.

A.14 The Effect of Alignment and Ministerial Status on Rent-Seeking, Conditional on Underlying Electoral Risk

As discussed in the main text, one observable implication of the argument as expressed in H3 is that ministers should have greater incentives to engage in electorally costly rent-seeking when they are subject to greater underlying electoral risk captured by narrow vote margins in the prior election. Table A12 , Column 1 provides a test of this argument by examining whether the level of expenditure on an unproductive project - an indication of an representative's willingness to engage in corruption at the cost of providing completed roads to voters - is greater when ministers' constituencies have previously experienced higher levels of electoral competition. In particular, Column 1 presents an analysis similar to that of Table 2 but includes an interaction of *Vote Margin* with the variable *Minister* and with the variable *Member of Chief Minister's Party* respectively. Consistent with H3, the results

Table A11: The Effect of a Alignment and Ministerial Status on Rent-Seeking: Analysis of Individual Road Projects (Dropping Chief Minister and Road Works Ministers)

	(1) Total Contract Value Won by Contractor	(2) Road Quality	(3) Expenditure Unproductive Project	Expenditure Unproductive Project
Minister	−571.49**	−0.09***	24.56	
	(259.53)	(0.03)	(16.63)	
Minister (CM's Party)				51.23**
				(23.39)
Member of Chief Minister's Party	365.15	0.03	−30.99**	−35.38**
	(225.42)	(0.02)	(14.91)	(15.81)
Minister (Coalition Partner)				24.48
				(24.55)
Cabinet Minister				−36.15
				(25.06)
Member of Coalition Partner	82.18	0.00	−31.74*	−29.17
	(401.78)	(0.02)	(17.84)	(18.05)
Electronic Procurement	1433.59***		86.63	87.17
	(299.12)		(60.34)	(59.80)
Vote Margin	−881.30	−0.16	−68.85	−69.65
	(1753.68)	(0.15)	(91.44)	(95.93)
Vote Share	654.60	0.06	33.22	21.69
	(1963.42)	(0.16)	(123.38)	(131.13)
Road Length (Kms)	−42.71**	−0.01*	4.35*	4.28*
	(17.43)	(0.00)	(2.49)	(2.52)
MP in CM's party	−134.38	−0.02	−25.95*	−20.52
	(214.00)	(0.02)	(14.45)	(15.85)
MP in PM's party	−1013.88***	0.02	−33.71*	−34.25**
	(201.60)	(0.03)	(18.30)	(17.36)
Total Expenditure till Present	−1.37	0.00***		
	(0.96)	(0.00)		
Sanctioned Cost	6.00***	−0.00	0.24***	0.24***
	(0.94)	(0.00)	(0.07)	(0.07)
Illiteracy of Village	−222.44	0.01	−28.45	−26.33
	(248.25)	(0.05)	(22.40)	(22.09)
Habitation Size	28.97	0.00	0.67	0.76
	(31.08)	(0.01)	(1.42)	(1.43)
SC/ST Proportion	316.91***	0.01	9.45	10.29
	(108.78)	(0.02)	(6.91)	(6.93)
New Connectivity	1731.91***	0.06	11.42	12.77
	(194.55)	(0.04)	(10.43)	(10.96)
Domestic Collaboration	−369.27**	−0.05	12.22	12.79
	(147.32)	(0.04)	(25.03)	(23.53)
Completed	−278.25	0.06***		
	(203.69)	(0.02)		
Years Since Sanctioned	−123.74***	0.01	−24.23***	−24.27***
	(24.70)	(0.01)	(4.80)	(4.80)
Unit Fixed Effects	Constituency	District	Constituency	Constituency
State-Electoral Term Fixed Effects	No	Yes	Yes	Yes
State Fixed Effects	Yes	No	No	No
Sanction Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	40109	5792	2089	2089

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the individual road project. Column (2) includes all road projects in the sample for which a quality rating either by a state monitor or a national monitor is available. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

show that the interaction of *Vote Margin* and *Minister* is negative and statistically significant indicating that ministers are significantly less likely to incur expenditure on unproductive projects when they face a lower *underlying* electoral risk (i.e. higher vote margins in the previous election).

The results in Table A12, Column 1 can also be used to examine one plausible alternative explanation for the observed differences between ministers and ordinary legislators in terms of their propensity to engage in rent-seeking. As discussed in the main text, it is possible that the results are driven by the fact that ministers face, on average, less intense electoral competition in their constituencies than ordinary legislators. Indeed, the median vote margin in the sample in ministers' constituencies is 8.5% while the median vote margin in the constituencies of ordinary legislators is 6.7%. However, the results in Table A12, Column 1 show that the interaction of *Vote Margin* and *Member of Chief Minister's Party* is not significant at conventional levels indicating that the prior level of underlying electoral risk does not exert a modifying effect on the effect of ruling party alignment of ordinary legislators on rent-seeking.

Table A12, Columns 2 shows the specification with *Total Value of Contracts Won by Contractor in State* as the dependent variable while Column 3 shows the specification with *Road Quality Rating (Combined).* While neither interaction term is statistically significant at conventional levels, the interaction of *Minister* and *Vote Margin* has a positive sign in both specifications which is consistent with H3 that lower levels of underlying electoral risk dampen the motivations for rent-seeking.

Table A12: The Effect of Alignment and Ministerial Status on Rent-Seeking: Conditional on Underlying Electoral Risk

DV:	(1) Expenditure Unproductive Project	(2) Total Value of Contracts Won by Contractor in State	(3) Road Quality Rating (Combined)
Minister	52.73**	−575.68	−0.09**
	(21.27)	(412.34)	(0.04)
Minister * Vote Margin	−254.45***	397.59	0.17
	(83.84)	(2714.23)	(0.34)
Member of Chief Minister's Party	−31.35	481.82	0.02
	(21.15)	(305.66)	(0.03)
Member of Chief Minister's Party * Vote Margin	10.84	−1014.03	0.10
	(121.09)	(2351.36)	(0.26)
Member of Coalition Partner	−26.13	151.37	0.01
	(18.03)	(419.09)	(0.02)
Electronic Procurement	85.22	1496.01***	0.00
	(59.36)	(295.79)	(.)
Vote Margin	4.05	−543.06	−0.26
	(108.90)	(2448.86)	(0.17)
Vote Share	18.61	468.36	0.08
	(128.28)	(1894.77)	(0.16)
Road Length (Kms)	4.67**	−45.41**	−0.00
	(2.30)	(17.75)	(0.00)
MP in CM's party	−23.60*	−155.98	−0.02
	(13.95)	(209.78)	(0.02)
MP in PM's party	−36.64**	−978.54***	0.00
	(17.22)	(197.26)	(0.03)
Sanctioned Cost	0.24***	6.09***	−0.00
	(0.06)	(0.94)	(0.00)
Illiteracy of Village	−23.03	−242.54	0.01
	(21.80)	(245.28)	(0.05)
SC/ST Proportion	8.58	302.70***	0.01
	(6.85)	(108.20)	(0.02)
Habitation Size	0.60	30.92	0.00
	(1.42)	(30.88)	(0.01)
New Connectivity	12.61	1764.12***	0.03
	(10.85)	(194.88)	(0.04)
Domestic Collaboration	11.52	−366.15**	−0.05
	(23.20)	(146.84)	(0.04)
Years Since Sanctioned	−23.21***	−125.09***	0.01
	(4.68)	(24.47)	(0.01)
Total Expenditure till Present		−1.37	0.00***
		(0.95)	(0.00)
Completed		−269.07	0.06***
		(201.79)	(0.02)
Unit Fixed Effects	Constituency	Constituency	District
State-Electoral Term Fixed Effects	Yes	No	Yes
State Fixed Effects	No	Yes	No
Sanction Year Fixed Effects	Yes	Yes	Yes
Observations	2139	40747	5873

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the individual road project. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

A.15 Investigating the Possibility of a Non-Linear Effect of Electoral Competition on Ministerial Rent-Seeking

This section considers the possibility that electoral competition could have a non-linear effect on electoral rent-seeking. In particular, it is possible that ministers may be most likely to engage in rent-seeking when electoral competition is either very low or very high. Conversely, they may be least likely to engage in rent-seeking when underlying levels of electoral competition are intermediate - not so high as to all but negate the possibility of re-election but not so low so as to make re-election a foregone conclusion.

To investigate this rationale, Table A13 presents results from augmenting the specification presented in Table A12 with *Vote Margin Squared* and its respective interactions with the variables *Minister* and *Member of Ruling Coalition*. If there were a significant non-linear effect of electoral competition on ministerial rent-seeking, we would expect that the interaction of *Vote Margin Squared* with *Minister* should be statistically significant.

Table A13 shows that this interaction term is not statistically significant at conventional levels in Column 1 (the specification analyzing expenditure on unproductive projects). These results suggest that there is no significant non-linear effect of electoral competition on ministers' propensity to engage in this type of rent-seeking.

Column 2 of Table A13 - which analyzes the total value of contracts won by the contractor hired for the road project - shows that the coefficient on the interaction of *Vote Margin Squared* with *Minister* is negative and statistically significant at the 90% level. Meanwhile,

the coefficient on the interaction of *Vote Margin* with *Minister* is positive and statistically significant at the 90% level. Additional calculation shows that the effect of ministerial status on the value of contracts won by by the hired contractor is negative and statistically significant at the 95% level when vote margins are at their 25^{th} percentile value in the sample, but that the effect becomes less negative when vote margins are at their median in the sample and even less negative when vote margins are at their 75^{th} percentile value in the sample.These results are consistent with H3 as they suggest that ministers' propensity to engage in rent-seeking is the greatest when underlying levels of electoral risk are highest (i.e. previous vote margins are low).[66]

Column 3 of Table A13 - which analyzes road quality - shows that the coefficient on the interaction of *Vote Margin Squared* with *Minister* is positive and statistically significant. These results suggest that the effect of ministerial status on road quality becomes more negative as vote margins increase from low levels to intermediate levels, but that it becomes less negative and then turns positive as vote margins increase from intermediate levels to high levels.[67] These results suggest that ministerial rent-seeking - as measured by quality underprovision - is least prevalent when previous levels of electoral competition are low (i.e. vote margins are large).

Thus, although the results across different measures of rent-seeking indicate somewhat dif-

[66]The inflection point (i.e. when the negative effect starts to increase in magnitude) occurs when vote margins are higher than their 90^{th} percentile in the sample, but the magnitude of the effect of ministerial status when vote margins are at their 99^{th} percentile in the sample remains less than its effect when vote margins are at their 25^{th} percentile in the sample.

[67]Note, however, the inflection point at which the effect of ministerial status begins to have a positive effect on road quality occurs at a vote margin share of 0.36 which is higher than the 98^{th} percentile of the distribution of vote margins in the sample. In turn, this suggests that this result is not relevant for most of the constituencies in the sample.

ferent results with regard to how levels of underlying risk modify the effect of ministerial status on rent-seeking, none of the results support the idea that rent-seeking is higher when previous levels of electoral competition are low. One possible reason is that a lower level of prior electoral competition in a constituency is the result of an equilibrium where parties cater to their core supporters with the provision of public goods and get rewarded at the polls for doing so.

A.16 Expenditures on 'Productive' Road Projects

Table A14 seeks to examine the affect of ministerial status and ruling party alignment on expenditures on road projects completed within two years. The unit of analysis is the individual road project and constituency fixed effects are included in each of the specifications. Table A14, Column 1 analyzes the effect of ministerial status and alignment on total expenditures incurred on the project to date. The results show that there is no significant effect of membership in the chief minister's party or of ministerial status on expenditures on productive projects. Column 2 analyzes the effect of ministerial status and alignment on expenditure premiums - that is, expenditure in excess of the sanctioned cost of the project - for productive projects. These expenditure premiums typically require special administrative approval from higher-level agencies.[68] Here, we observe that alignment with the chief minister's party has a positive and significant effect. Meanwhile, the coefficient on *Minister* is positive but insignificant indicating that ministers and state ruling party members do not

[68]Interview with PMGSY Official, Uttar Pradesh, December 2015. See Section A.6 for further information on how the dependent variable used in this analysis is coded.

Table A13: The Effect of Alignment and Ministerial Status on Rent-Seeking: Non-Linear Effect of Electoral Risk?

DV:	(1) Expenditure Unproductive Project	(2) Total Value of Contracts Won by Contractor in State	(3) Road Quality Rating (Combined)
Minister	53.88*	−1134.62**	−0.05
	(27.81)	(496.00)	(0.04)
Minister * Vote Margin	−287.06	10192.97*	−0.61
	(388.85)	(5440.98)	(0.52)
Minister * Vote Margin Squared	77.79	−24400.05*	2.10**
	(876.20)	(12643.90)	(0.95)
Member of Chief Minister's Party	−6.10	397.16	−0.01
	(26.17)	(375.29)	(0.04)
Member of Chief Minister's Party * Vote Margin	−525.08	1298.87	0.64
	(347.85)	(5088.34)	(0.53)
Chief Minister's Party * Vote Margin Squared	1518.34**	−8238.79	−1.61
	(746.01)	(13320.42)	(1.35)
Vote Margin Squared	−927.74*	12145.32	−0.95
	(504.66)	(9023.80)	(0.69)
Member of Coalition Partner	−30.52*	104.13	0.01
	(18.36)	(413.63)	(0.02)
Vote Margin	352.23	−4540.90	−0.04
	(231.26)	(3775.84)	(0.30)
Road Length (Kms)	11.80***	−45.60**	−0.01*
	(1.65)	(17.75)	(0.00)
MP in CM's party	−25.55*	−142.50	−0.02
	(15.16)	(209.01)	(0.02)
MP in PM's party	−28.77*	−969.67***	0.01
	(16.44)	(197.50)	(0.03)
Illiteracy of Village	−18.47	−235.85	0.01
	(22.41)	(245.53)	(0.05)
SC/ST Proportion	9.44	301.73***	0.01
	(8.65)	(108.29)	(0.02)
Habitation Size	0.54	30.80	0.00
	(1.72)	(30.86)	(0.01)
New Connectivity	9.51	1767.46***	0.05
	(15.79)	(194.94)	(0.04)
Domestic Collaboration	21.38	−366.66**	−0.05
	(26.26)	(146.18)	(0.04)
Years Since Sanctioned	−21.81***	−125.90***	0.01
	(4.73)	(24.47)	(0.01)
Electronic Procurement		1497.79***	0.00
		(295.35)	(.)
Vote Share		565.40	0.11
		(1895.98)	(0.15)
Total Expenditure till Present		−1.34	0.00***
		(0.95)	(0.00)
Sanctioned Cost		6.07***	−0.00
		(0.94)	(0.00)
Completed		−276.21	0.06***
		(202.48)	(0.02)
Unit Fixed Effects	Constituency	Constituency	District
State-Electoral Term Fixed Effects	Yes	No	Yes
State Fixed Effects	No	Yes	No
Sanction Year Fixed Effects	Yes	Yes	Yes
Observations	2147	40747	5873

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the individual road project. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

differ much on average in their ability to gain access to expenditure premiums for productive projects.

A.17 Road Provision Inefficiencies in the Constituencies of Opposition Legislators

Recall that although the results in Table A9 and in Table 2 show that rent-seeking is more likely in ministers' constituencies than in the constituencies of ordinary legislators aligned with the ruling coalition, they fail to show any significant difference in the prevalence of rent-seeking in minister's constituencies relative to the constituencies of legislators who are members of opposition parties. Thus, inefficiencies appear to be just as prevalent in opposition-held constituencies as in minister's constituencies. Moreover, the results in Columns 2 and 3 in Table 2 indicates a higher level of rent-seeking in opposition legislators' constituencies relative to the constituencies of ordinary legislators aligned with the chief minister's party with both the 'quality underprovision' and 'expenditure on unproductive projects' measures of rent-seeking.[69]

Thus, a key question is whether road projects in the constituencies of opposition legislators appear to be inefficient in spite of, or because of, the influence of the relevant ministers. Table A15 probes this question by focusing on expenditures on unproductive road projects in a sample that exclude ministers' constituencies. The variable *Opposition Party Constituency*

[69]We can see this looking at the coefficient on *Member of Chief Minister's Party* in each column. Since each column includes a dummy variable for *Minister*, *Member of Chief Minister's Party* and *Member of Coalition Partner* the reference category for each of these variables is membership in an opposition party.

Table A14: The Effect of Alignment on Expenditures on Road Projects Completed within Two Years

	(1) Total Expenditure till Present	(2) Expenditure Premium
Member of Chief Minister's Party	0.86	0.49***
	(0.60)	(0.19)
Minister	−0.63	0.13
	(0.83)	(0.24)
Member of Coalition Partner	−1.55	0.39*
	(3.76)	(0.21)
Electronic Procurement	19.67***	0.25
	(3.70)	(0.75)
Vote Margin	5.11	1.07
	(5.17)	(1.22)
Vote Share	−13.54**	−4.78***
	(6.57)	(1.84)
Road Length (Kms)	1.83***	0.22***
	(0.29)	(0.07)
MP in CM's party	−0.46	−0.35
	(0.72)	(0.21)
MP in PM's party	0.29	−0.40
	(0.90)	(0.30)
Sanctioned Cost	0.75***	−0.01***
	(0.02)	(0.00)
Illiteracy of Village	2.94*	0.43
	(1.73)	(0.66)
SC/ST Proportion	−0.20	−0.08
	(0.84)	(0.26)
Habitation Size	−0.14	0.03
	(0.17)	(0.05)
New Connectivity	1.23	0.60
	(0.91)	(0.46)
Domestic Collaboration	−0.57	−0.27
	(1.00)	(0.35)
Years Since Sanctioned	−0.16	0.14
	(0.48)	(0.22)
Constituency Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes
Sanction Year Fixed Effects	Yes	Yes
Observations	8496	8496

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the individual road project. Only road projects completed in two years are included in the sample Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

is a dummy variable that equals 1 if the incumbent legislator is a member of a party that is not the chief minister's party or one of the other parties belonging to the governing coalition. Table A15, Column (1) shows that this variable is positive and significant indicating that expenditures on unproductive road projects are significantly higher in constituencies with a representative from an opposition party. Table A15, Column (2) seeks to explore if this greater unproductive expenditure is in any way driven by ministerial influence. In particular, if rent-seeking in opposition constituencies is a result of ministerial influence, we should see more evidence of rent-seeking in those opposition constituencies that share an administrative district with a minister responsible for rural road works. Indeed, the results in Table A15, Column (2) show that the interaction term between an indicator for belonging to the opposition party and an indicator for sharing an administrative district of a minister responsible for rural road works is positive and significant. Thus, interestingly, the results show that *inefficiency in road projects in the constituencies of opposition party legislators is largely driven by the influence of key ministers.*

These results, in turn, could mean that government elites are able to use their bureaucratic leverage to extract rents from wasteful road projects in the constituencies of opposition legislators when they are located in their own administrative district. Indeed, the notion that government elites seek to control the bureaucracy in opposition-held constituencies is consistent with the findings of Iyer & Mani (2012) who show that chief ministers are more likely to effect the transfer of bureaucrats in districts that are *not* controlled by legislators from their own party than in districts that are controlled by their party legislators. Thus, government elites may have an incentive to use their bureaucratic leverage to prevent road

completion in opposition-held constituencies and then to extract rents from these projects. This interpretation is also consistent with the results of the RDD design presented in the main text which shows evidence of bureaucratic manipulation in opposition constituencies with close races to reduce the prevalence of completed roads in those constituencies.

A.18 Robustness of Main Results to Dropping Roads that Benefit Multiple Habitations

A possible concern with the assignment procedure used in this research is that road projects that benefit multiple habitations that could possibly straddle more than one constituency are assigned to only one constituency. Table A16 shows that the results in Table 2 are robust to dropping road projects that benefit more than one habitation. These additional results show that the main results are not an artifact of the assignment procedure.

Table A15: Analysis of Expenditures on Unproductive Road Projects: Opposition Party Legislators

Dependent Variable: Expenditure - Unproductive Project	(1)	(2)
Opposition Party Constituency	28.49*	18.66
	(15.27)	(13.90)
Opposition Party Constituency * Admin. District of Road Minister		135.73***
		(36.97)
Administrative District of Roadworks Minister		−118.72***
		(34.88)
Electronic Procurement	58.25	58.80
	(67.67)	(67.06)
Vote Margin	0.54	−34.02
	(96.55)	(77.05)
Vote Share	−9.69	23.50
	(145.83)	(115.39)
Road Length (Kms)	6.08**	6.54**
	(2.99)	(3.00)
MP in CM's party	−26.04	−29.38
	(20.79)	(19.41)
MP in PM's party	−47.65**	−37.11*
	(19.49)	(18.89)
Sanctioned Cost	0.22***	0.21***
	(0.08)	(0.07)
Illiteracy of Village	−23.82	−22.86
	(22.56)	(22.59)
SC/ST Proportion	12.75*	11.80*
	(7.03)	(7.04)
Habitation Size	0.90	0.89
	(1.55)	(1.55)
New Connectivity	7.36	8.60
	(11.49)	(11.72)
Domestic Collaboration	10.33	10.84
	(31.50)	(31.22)
Years Since Sanctioned	−28.91***	−28.06***
	(5.12)	(5.02)
Constituency Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes
Sanction Year Fixed Effects	Yes	Yes
Observations	1890	1890

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the individual road project. Constituencies in which the representative is a minister are excluded from Column (3). Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.

Table A16: The Effect of a Alignment and Ministerial Status on Rent-Seeking: Analysis of Individual Road Projects (Dropping Roads Benefiting Multiple Habitations)

	(1) Total Value of Contracts Won by Contractor in State	(2) Road Quality	(3) Expenditure Unproductive Project	(4) Expenditure Unproductive Project	(5) Expenditure Unproductive Project
Minister	−574.51**	−0.07**	26.40		
	(270.32)	(0.03)	(18.22)		
Minister (CM's Party)				56.44**	
				(25.41)	
Member of Chief Minister's Party	380.55	0.03	−41.17**	−44.22**	−12.80
	(235.83)	(0.02)	(18.08)	(18.77)	(17.04)
Member of CM's Party * Adm. Dist. of Roads Minister (CM's Party)					−78.26**
					(37.76)
Administrative District of Road Works Minister (CM's Party)					−62.15***
					(11.55)
Minister (Coalition Partner)				39.12	
				(25.06)	
Cabinet Minister				−42.05*	
				(23.28)	
Member of Coalition Partner	283.92	0.02	−51.44***	−49.84**	−50.21**
	(497.60)	(0.03)	(18.74)	(19.28)	(25.31)
Electronic Procurement	2157.95***				
	(365.50)				
Vote Margin	−2783.55	−0.30	−22.55	−46.49	−19.85
	(1722.12)	(0.19)	(94.91)	(95.89)	(79.38)
Vote Share	1527.95	0.14	−2.26	18.85	52.53
	(1975.71)	(0.21)	(121.62)	(120.25)	(100.05)
Road Length (Kms)	−22.66	−0.00	1.74	1.47	2.66
	(15.55)	(0.00)	(2.43)	(2.42)	(4.50)
MP in CM's party	25.38	0.00	−13.40	−10.05	−37.13*
	(239.82)	(0.03)	(16.18)	(17.83)	(19.45)
MP in PM's party	−978.02***	−0.03	−32.45	−32.67*	−26.27
	(221.89)	(0.04)	(20.75)	(19.59)	(21.25)
Total Expenditure till Present	−2.15*	0.00**			
	(1.30)	(0.00)			
Sanctioned Cost	7.05***	−0.00	0.31***	0.31***	0.31***
	(1.07)	(0.00)	(0.07)	(0.07)	(0.08)
Illiteracy of Village	−478.50*	0.09	−31.58	−30.54	−28.18
	(289.98)	(0.07)	(21.63)	(21.16)	(23.63)
Habitation Size	17.58	0.01	0.40	0.48	0.71
	(34.61)	(0.01)	(1.48)	(1.50)	(1.61)
SC/ST Proportion	426.31***	0.04	14.17	14.63	20.17*
	(128.63)	(0.03)	(10.35)	(10.25)	(10.56)
New Connectivity	2103.85***	0.05	3.16	4.51	3.84
	(238.65)	(0.05)	(12.05)	(12.12)	(12.84)
Domestic Collaboration	−289.96*	−0.08	24.07	24.86	23.94
	(154.64)	(0.05)	(22.78)	(22.80)	(28.12)
Years Since Sanctioned	−122.29***	0.01	−20.03***	−20.09***	−25.17***
	(25.15)	(0.01)	(4.64)	(4.58)	(5.00)
Unit Fixed Effects	Constituency	District	Constituency	Constituency	Constituency
State Fixed Effects	Yes	No	No	No	No
State-Electoral Term Fixed Effects	No	Yes	Yes	Yes	Yes
Sanction Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	30696	3797	1559	1559	1357

Significance levels : ∗: 10% ∗∗: 5% ∗ ∗ ∗: 1%. The unit of analysis is the individual road project. Column (2) includes all road projects in the sample for which a quality rating either by a state monitor or a national monitor is available. Columns (3), (4) and (5) include only road projects that were sanctioned at least five years prior to data collection and that remained incomplete at the time of data collection. Column (5) excludes road projects in ministers' constituencies. Heteroskedastic-consistent standard errors clustered by state constituency are shown in parentheses.