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# Preferential Resource Spending under an Employment Guarantee

## The Political Economy of MGNREGS in Andhra Pradesh

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## Abstract

Are ostensibly demand-driven public works programs with high levels of safeguards nonetheless susceptible to political influence? This conjecture is investigated using expenditure data at the local level from India's National Rural Employment Guarantee Scheme. Focusing on one state where accountability and transparency mechanisms have been employed and implementation efforts have been widely applauded, there is no evidence of partisan-influenced spending before the 2009 election however a statistically significant but small in magnitude effect after the 2009 election. Most variation in public works expenditures is explained by the observed needs of potential beneficiaries, as the scheme intended.


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# Preferential Resource Spending under an Employment Guarantee: The Political Economy of MGNREGS in Andhra Pradesh

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While seemingly essential for poverty reduction in many contexts, it is well known that public works spending is often subject to political manipulation (Cadot, Röller, Stephan 2006) whereby public resources are strategically awarded with the intention of garnering or rewarding political support instead of catering to economic needs (Powell 1970; Kurer 1993). Because politically rooted spending may lead to suboptimal social policy and undermine the usefulness of these projects as poverty-reducing or growth-enhancing tools (Kurer 1996), uncovering instances where funds are distributed based on noneconomic reasons and curtailing the extent to which politics can infiltrate project allocation is crucial. This is especially important in light of the many government workfare programs used as short and long term strategies for targeting the poor.

India's Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), employing about 50 million men and women every year (Khera 2011), offers an interesting case for investigating the link between public works spending and politics for two important reasons. First, MGNREGS is derived from the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) which grants citizens the "right to work" on local infrastructure projects at a set minimum wage, making it one of the only programs in the world to nest a government workfare program within a legal entitlement. MGNREGS, therefore, is ostensibly designed to be a self-targeting and demand-driven program, where labor is aggregated and public works are selected at the local level before final approval by higher level government authorities. Second, while the demand-driven nature of the program may suffice to counter the political manipulation of program funds, MGNREGS also put in place a suite of accountability

and transparency mechanisms, including but not limited to publicly available data and social audits. The extent to which these several unique features of MGNREGS have eliminated avenues for using the program for political reward or gain is a conjecture worth exploring.[1]

Given the great heterogeneity in implementation records across states in India (e.g., Dutta et al. 2012, 2014), this paper investigates the correlates of MGNREGS spending at the mandal (subdistrict) level in Andhra Pradesh (AP).[2] AP acts as a useful case because it is one of the few states praised for its implementation quality, allowing us the opportunity to examine whether political manipulation can still exist despite overwhelmingly "good" program performance. Underpinning this implementation in AP, however, is a heavily "top-down" approach despite the "bottom-up" manner originally conceived by MGNREGA. The fact that directives frequently come from higher levels of government raises obvious questions about how MGNREGS can be influenced by political motivations at those levels, undermining the very spirit of an employment guarantee program.

Establishing a relationship between the safeguards or institutions embedded within MGNREGS and the political manipulation of the program would be an incredibly difficult, if not impossible, task. Instead we focus on the extent to which project spending at the mandal level follows patterns of politically influenced nonprogrammatic distribution, as defined by Stokes et al. (2013), beyond the publicly stated target of the

1. We recognize that other programs in India with similar profiles may also be manipulated for political gain, however choose to focus on MGNREGS given the unique features of the program and the context in which we explore this question.
2. While the state-level may seem small, the population of AP during the period under study was nearly 50 million, larger than many countries in other regions of the world, and with high poverty levels. Moreover, it should be noted that the AP that we refer to this in this study is before its bifurcation in mid-2014.

program, human needs (broadly defined), in a state where accountability mechanisms are known to exist and function. The timely occurrence of a national and state-level election in 2009, several years into the implementation of MGNREGS, allows us the opportunity to test for the political distribution of funds on either side of the successful reelection of the United Progressive Alliance (UPA) coalition. We use the mandal level as our unit of analysis, unlike the bulk of the MGNREGS evidence to date, because mandals best match the constituencies that form the state-level assembly, the governing body with ultimate control over MGNREGS spending and priorities (in addition to other reasons, see section III).

Other important political economy research on MGNREGS to date has focused on issues such as rent-seeking behavior (Niehaus and Sukhtankar 2013a) and leakage (Niehaus and Sukhtankar 2013b). There is recent, yet unpublished, literature that links MGNREGS fund allocation to politics. Most similar to our study, Gupta and Mukhopadhyay (2014) find some evidence of an inverted-U shaped relationship between vote shares of the ruling political party in panchayat samiti elections and MGNREGS spending at the subdistrict level in the state of Rajasthan but that the relationship reverses when looking specifically at very close elections. It is important to explore beyond this case study for various reasons, most importantly the colossal dissimilarities in implementation approaches and records between states. In AP, Johnson (2009b) finds no evidence of a relationship between the political affiliation of the most local leaders (gram panchayat and mandal parishad) and MGNREGS outcomes, implying that either MGNREGS is unsusceptible to capture by elected officials or that local leaders have little to no power to manipulate spending levels. Our research fits into and goes beyond this

emerging literature by exploring how election outcomes at higher levels, including for the body with direct control over funding flows, are related to MGNREGS spending outcomes.

Our results offer optimism about the MGNREGS bureaucracy in AP as well as some critiques to guide reforms. We find no evidence of partisan-based spending in the initial years of program implementation although we do uncover a small amount of preference given to mandals that voted for the winning incumbent coalition in the 2009 elections in the following years. Even so, the overwhelming majority of MGNREGS spending to date flowed according to needs-based correlates, as the program intended, so the distortionary effect of politically driven resource allocation is very modest, likely on account of the distinct demand-driven characteristics of the scheme and the local political context at the time. Through our analysis of MGNREGS, we also offer a range of hypotheses for empirically testing these political effects using any public project that straddles a major election and conclude with a discussion of the implications for the literature on the relative merits of central versus local control over program implementation.

## I. CONTEXT

In this section, we provide a summary of MGNREGS implementation and the relevant local political context in AP. For more details on the timing of MGNREGS roll-out and the changing political situation between 2004 and 2012 (see figure 1).

*MGNREGS in AP*

MGNREGS implementation was phased in over three sets of districts categorized based on "backwardness" level. In the first phase the poorest districts gained access to funds in the 2006/07 fiscal year, with each of the remaining two phases joining in succession in the following years.[3] While MGNREGS is a national program implemented by individual states, the states are tasked with implementing it through a "bottom-up" approach to planning and selecting works. Section 16 (3) (4) of MGNREGA stipulates that every gram panchayat, the village level elected body, with participation from constituents, be responsible for aggregating local demand for work, developing a list of projects that would benefit the larger community, and proposing a timeline for completion. The long-run development and annual work plans are submitted to the district level, which aggregates the plans across mandals and then submits to the state-level government for final approval of both the priorities of works and budget (Bhanumurthy et al. 2014).[4] It was envisaged that decentralized responsibility to determine which projects should move forward under MGNREGS would ensure their contextual appropriateness, reflect the local needs and priorities of the people, and facilitate a demand-driven approach.

Popular opinion and empirical studies claim, however, that factors apart from the intended "demand driven" targeting tactics, generally political ones, determine where MGNREGS funds are directed. The Central Employment Guarantee Council (2010) observed that work priorities across India tend to follow orders from state or district

3. In AP, 13 districts were included in phase 1 (2006/07), 6 districts in phase 2 (2007/08), and 3 districts in phase 3 (2008/09). For more details on what is known about the algorithm used to determine the district phase-in and how the intended design may have diverged from actual phase-in, see Zimmermann (2012).
4. The panchayat village is the lowest level of administration in India followed by mandals (a term for subdistricts, or blocks, specific to AP) then districts within each of the 28 states.

headquarters and do not reflect the stated needs and aspirations of the people. In AP specifically, Reddy (2012) observes that implementation has often been flush with directives from the state government on the prioritization of works. Maiorano (2014) further substantiates this claim in the AP, referring to the implementation approach as "supply driven" and "rigid top down" (97). Maiorano finds that hired Field Assistants, not locally elected leaders, implement programs at the village level, undermining the power envisioned of the gram panchayat. The state government of AP, which employs and manages the Field Assistants, can exert direct control of the implementation process through these individuals. Another field report from AP by Chamorro et al. (2010) states that the supply of jobs (and therefore expenditures) seemed more determined by the Field Assistants than by actual demand from laborers. A "top down" approach to program implementation and spending directives may imply the political manipulation of funds by higher-level elected leaders.

At the same time, a growing collection of evidence exists to suggest that AP stands out as a "success story" above other Indian states in implementing MGNREGS. For example, Johnson (2009a) found little evidence that the political affiliation of the local level leader influenced any of the project outcomes in AP. Descriptive evidence from Johnson, Tannirkulam, and Larouche (2009) suggests that MGNREGS in AP has been better targeted to the intended beneficiaries than other government programs operating over the same time frame. Johnson (2009b) found that MGNREGS allowed households in AP to mitigate the negative income effects of weather-related shocks, implying the timely distribution of funds to needy households. As part of their cross-state

analysis, Liu and Barrett (2013) note that AP is one of the eight states categorized as having "good" pro-poor implementation.

*Politics in AP*

Because MGNREGS is implemented by the states and often the program signage and materials feature images of state-level political figures, like the Chief Minister, we expect that voters attribute MGNREGS spending to the political coalition in power within the Legislative Assembly, the state-level governing body.[5] At the time MGNREGA was passed in 2004, the Indian National Congress (INC), the main party within the United Progressive Alliance (UPA) coalition, had just wrested power from the regional party, Telugu Desam, in the AP's Legislative Assembly election. Y. S. Rajashekara Reddy (YSR) took over as Chief Minister with an overt mission to address the agrarian crisis, an issue of contention in the run-up to the election (Srinivasulu 2009). In his years in power, YSR oversaw the implementation of a large number of social welfare measures, the new MGNREGS among them. AP was the inaugural MGNREGS implementation state, further solidifying the scheme as YSR's flagship program. The state-level incumbent coalition in AP is the same incumbent coalition in the National Parliament, meaning it should be very clear to constituents that the UPA is strongly affiliated with MGNREGS program implementation.

The next election, both at the state and national level, was held in April 2009, just at the start of the 2009/10 fiscal year. Ethnographic evidence shows that the assembly

5. To the contrary, data from the Public Evaluation of Entitlement Programmes (PEEP) Survey of 2013 show that nearly three-quarters of surveyed households across ten states, of which Andhra Pradesh was not included, claimed that they did not know which leader was responsible for initiating MGNREGA and an additional 15 percent could not identify the correct leader. We expect AP is a special case given the match between national and state-level governing political parties and the fact that AP was the flagship MGNREGS state.

constituency (AC) elections in 2009 in AP were characterized by candidates from all parties promising the distribution of funds and benefits under a number of social welfare programs (Elliott 2012), although MGNREGS is not among the schemes described. In AP, YSR was reelected with a large margin ostensibly due, among other things, to the successful implementation of various social welfare programs. Reelection in India is rare,[6] so this signaled great satisfaction with YSR's first administration. However, soon after the elections, YSR was killed in a helicopter crash and a struggle for power within the state and party ensued. After deep conflicts with members of the ruling INC party, in 2011 YSR's son, Jaganmohan Reddy, left to form his own party, the YSR Congress. In 2012, the YSR Congress successfully contested by-elections and won 16 of the 19 contested Legislative Assembly seats, with Jaganmohan Reddy himself winning a National Parliament seat and his mother, Y. S. Vijayamma, winning the State Assembly seat vacated previously on account of his father's death.

Another complicating issue in AP is the longstanding fight for state-succession by one of the three cultural regions, Telangana. Throughout his first tenure, YSR was a strong supporter of separation for these 10 districts who claim to lack representation and submit to general neglect of their needs (Ramdas 2013). Upon YSR's death in 2009, uncertainty surrounding the plan to move forward with succession meant the revival of the Telangana movement and violent protests throughout the region. The issue of a separate Telangana state eventually emerged prominent with the national government, which proposed a split of AP in December 2013. The upheaval surrounding YSR's death

6. Indian voters are said to possess an "incumbency aversion" (Linden 2004; Elliott 2011). As evidence, Maiorano (2014) finds that only 25 percent of incumbents throughout India successfully won reelection between 1980 and 2008.

and the reinvigoration of the Telangana movement prompted considerable changes to the contours of the political context in AP after 2009.

## II. Conceptual Framework

Given the accumulated evidence suggesting both good implementation and the heavy-handedness of state-level and state-influenced administrators in AP, there is good reason to expect that both needs-based and politics-based motivations have been instrumental in guiding resource allocation and, ultimately, expenditures under MGNREGS.[7] Strictly, MGNREGS is a "right to work" program, not an antipoverty program, meaning the government does not expressly target funds so much as approve, oversee, and possibly manipulate how they are spent. Self-targeting, however, implies that expenditures should be concentrated in "needier" areas.

In this context, these needs can be viewed as multidimensional so as to meet the immediate necessities of individuals while laying longer term foundations for rural economic growth. Because MGNREGS follows from the newly recognized "right to work" in India, we expect project funds to be spent more in areas with the need to safeguard volatile livelihoods through employment generation and the mitigation of labor market shocks, those more in line with expected demand. However, because groups of

7. We chose to focus our analysis on MGNREGS expenditures instead of allocations for a number of reasons: (i) allocation amounts are simply funds budgeted and may not actually be spent, potentially due to similar political economy reasons, (ii) allocations are formulaic as budgets are made based on the number of job card holders who worked in the MGNREGS in the previous year, (iii) the same state-governing body that makes final decisions about allocations also can directly influence implementation, and therefore expenditures, via the hired and perhaps politically motivated Field Assistants (Maiorano 2014), (iv) field reports show that Field Assistants may have more influence on who works under MGNREGS and when than expressed demand (Chamorro et al. 2010), and (v) expenditure data are theoretically less susceptible to manipulation due to the presence of social audits integrated into the MGNREGS and the fact that the information system is directly linked to actual financial transfers maintained by an external agency (not manual entries by the administration). Actual expenditures are a far more interesting variable to study; however, we use the terms interchangeably throughout.

individuals with different types of livelihoods—for example, cultivators versus agricultural laborers—have explicitly different needs, we expect expenditures to differ where one of these groups dominates the other.[8] Further, because MGNREGS activities are directed around projects, particularly as antidrought measures, where the end result should contribute to increases in agricultural productivity, we also expect that areas with greater need for improving their infrastructure will receive more funds.

Apart from the stated aim of the program, it may be rational for policy makers to use their control over program funds to meet their potentially competing political objectives, introducing a "partisan bias in the allocation of public programs" (9, Stokes et al. 2013). For the purposes of our analysis, we refer to this effect as the nonprogrammatic distribution of funds, following the distinction by Stokes et al. (2013). A program falls into this category when the distribution of benefits does not fully comply with criteria that are publicly available, including (although not necessarily) for partisan reasons. While MGNREGS spending criteria are not formulaic like many other government programs, we would expect that any relationship that emerges between spending levels and politics, after controlling for the factors that should dictate worker demand, is evidence of a deviation from purely demand-driven implementation.

While we presume that this nonprogrammatic, partisan-based distribution of funds may occur throughout implementation, there may be logical reasons that the politics-influenced expenditures may be especially acute at particular times in the election cycle. For example, leading up to a reelection, the incumbent political coalition may use project

8. For example, cultivators depend on agricultural laborers to perform many on-farm functions and may not want a robust MGNREGS program since it may put upward pressure on wages and tighten the labor market on which they depend. On the other hand, agricultural laborers may desire a larger MGNREGS in order to secure employment opportunities, particularly in years with adverse agricultural conditions and reduced demand for hired labor.

funds as a means of encouraging votes.[9] Indeed Maiorano (2014) claims that transforming state welfare schemes into a mechanism for winning reelection was part of the YSR's focus of MGNREGS in AP. The type of effect we are referring to does not necessarily imply direct "vote buying," bribing, or coercive actions taken on the part of politicians. Instead, we focus on a more general form of allocating funds to administrative areas with the intent of garnering political support.[10] After a successful election, politicians may also use their control over funds to reward their faithful constituents. Because the UPA coalition won both state and national-level reelection in 2009, we may expect that they used MGNREGS funds in the years after the election to "compensate" areas where their advantage was higher or to continue encouraging constituencies for the next election in 2014.[11] Because every given point in time sits both in front of a past election and behind a future one, there is no way to disentangle these potential political motivations.

## III. Empirical Methodology and Hypotheses

In this section, we provide details on the model and hypotheses used to understand the nature of MGNREGS fund disbursements for the years surrounding the 2009 election. To estimate the extent to which state-level politics and the targetable needs of the population have influenced MGNREGS spending in the AP, we rely on one main

9. While there are several other means through which the incumbent party could attempt to encourage votes, state-level panel analysis in India by Khemani (2004) suggests that Indian politicians are more likely to target public investment projects and programs that funnel money toward small and marginal farmers by diverting funds from other areas of spending directly before elections. MGNREGS fits this set of characteristics well.
10. This analysis builds on a long history of studies linking project allocation or spending with political objectives leading up to an election (e.g., Wright 1974; Schady 2000; Brusco, Nazareno, Stokes 2004).
11. Like the preelection literature, the study of post-election project allocation and politics has a long history in the political science literature (e.g., Levitt and Synder 1995; Miguel and Zaidi 2003; Finan 2004).

specification but offer a range of alternative identification approaches and robustness checks, mainly relegated to appendices.

*Politics-Based Distribution*

To test whether the political leaning of an area influenced MGNREGS spending in AP, we estimate total MGNREGS spending per capita in mandal *i* in district *d* during fiscal year *t* using the following regression model:

$$(1) \quad MGNREGS_{idt} = \alpha_0 + \alpha_1 advantage_{id} + \alpha_2 advantage_{id}^2 + \alpha_3 \boldsymbol{needs}_{id} + \alpha_4 \boldsymbol{needs}_{idt} + \alpha_5 \boldsymbol{z}_{idt} + \mu_d + \tau_t + \varepsilon_{idt}$$

where $advantage$ captures the voting behavior of constituents in the most recent AC election (as defined below); $needs$ represents a vector of the observable "needs" of the mandal, both baseline (time-constant) ($needs_{id}$) and year-specific ($needs_{idt}$); $z$ is a vector including other mandal-level controls, notably variables that characterize election particulars described later; $\mu$ represents district-level fixed effects which incorporate the phase during which the jurisdiction joined the MGNREGS; $\tau$ captures fiscal year fixed effects; and $\varepsilon$ is a mean zero random error term. The fiscal years included in our analysis are the three years leading up to the 2009 election (2006/07, 2007/08, 2008/09) and the three fiscal years following the election (2010/11, 2011/12, 2012/13).[12] The model is estimated with data from all six years, then separately for the two time periods of interest

12. As the 2009 election occurred at the very beginning of the 2009/10 fiscal year, is uncertain how MGNREGS spending in that year would have been affected by the election, especially since most of the allocation decisions should have been made before the start of the fiscal year. Furthermore, 2009/10 was a drought year and was characteristic of widespread political upheaval following the death of YSR and the resurgence of the Telangana movement. For all of these reasons, we exclude the 2009/10 MGNREGS spending from our analysis.

(pre- and post-2009 election) using data described in the next section and summarized in appendix S1.[13]

Because Indian elections are governed by a multiparty system and the candidate with the highest percentage of votes wins, we define the $advantage$ term as:

$$advantage_{UPA} = \frac{votes_{UPA} - votes_{other}}{votes_{total}}$$

ranging from −1 to 1, where $votes_{UPA}$ is the total number of votes garnered by the UPA coalition in the matched AC, $votes_{other}$ is the total number of votes received by the non-UPA party with the most number of votes,[14] and $votes_{total}$ is the total number of votes cast in the constituency.[15] We define the $advantage$ term with respect to the UPA coalition because MGNREGS is a UPA flagship program, and we expect that constituents will credit spending under this program to the political coalition that brought it about. We use a list of those parties that provided both "weak" and "strong" support to the UPA coalition before the elections when specifying this variable.[16] Instead of only including a linear $advantage$ term in our model, a square term is added to allow for potential nonlinearities, including an inverted-U pattern, as found by Gupta and Mukhopadhyay (2014).

We utilize the AC level election results—as opposed to local level election or parliamentary constituency election results—for a number of reasons: (i) the state, led by

13. Given the district-wise phase-in of MGNREGS, phase one mandals will have three observations over this time period whereas phase two mandals will have two and phase three only one. In order to ensure that our results are not influenced by this relative weighting, we also provide results by year.
14. Where UPA lost, the total votes from the winning party are used. Where UPA won, the total votes from the second place party are used.
15. Our definition of "advantage" differs from the often-cited definition provided by Gelman and King (1990). Our variable is also called "margins" in some work, including Asher and Novosad (2013).
16. In the 2004 election, the UPA coalition includes 11 parties in AP: INC, MUL, RPI(A), LJNSP, RJD, RPI, TRS, CPI, CPM, AIMIM, PRBP. In the 2009 election, the coalition includes 6 parties in AP: INC, AIMIM, BSP, RJD, JD(S), SP. Independent candidates are considered non-UPA supporters throughout.

the Members of the Legislative Assembly (MLAs), has ultimate implementation and funding authority over MGNREGS, (ii) MLAs, elected via the assembly constituency elections, in AP influence MGNREGS implementation via pressure on and oversight of Field Assistants hired by the Mandal Parishad Development Officer (MPDO), and (iii) the importance of the Field Officer role in AP means that locally elected officials play a much more marginal role than envisioned in the design of the program and perhaps in other states (Maiorano 2014).

Moreover, the mandal was chosen as our unit of analysis for three main reasons: (i) most studies about the many facets of MGNREGS to date only disaggregate to the district level which may obscure potentially important variation at the subdistrict level, especially since MGNREGS is locally implemented, (ii) this variation is not only interesting and important but also nearly essential econometrically when confining our analysis to one state, and (iii) the elections most relevant to the case of AP MGNREGS implementation are the AC elections, constituency boundaries for which best match the mandal administrative boundaries. Since the administration of MGNREGS considers the mandal in its operation and because all data apart from election outcomes are observed at the mandal level, we keep the mandal (not the AC) as our unit of analysis.

We test the hypothesis that state-level administrators strategically spent MGNREGS funds based on their $advantage$ in the previous election, which serves as a measure of known political climate in the mandal, via the following joint null and alternative hypotheses:

$$H_0(1): \alpha_1 = \alpha_2 = 0;\ H_A(1): \alpha_1\ or\ \alpha_2 \neq 0$$

using the coefficient estimates from equation (1). If these null hypotheses are rejected, then past electoral advantage is associated with spending patterns. Because it may be the

case that mandals with high levels of $advantage$ differ in unobserved ways from mandals with lower levels of $advantage$, and perhaps in a way that is correlated with $MGNREGS$ spending, we use various identification strategies as robustness checks (instrumental variables and first difference) in addition to a large number of other variable definition specification checks (see appendix S2).

*Needs-Based Distribution*

While the government is not tasked with spending based on specified criteria, we refer to and test for the presence of what we generically refer to as "needs-based targeting" using a series of variables that describe the state of the population of the mandal before MGNREGS began, all included in the vector $needs$. Because the needs of individuals and their communities may change, we use exogenous baseline characteristics from before the start of implementation for all static needs variables so as to overcome this potential issue.

We arrive at a list of variables that together encapsulate the "needs" of a mandal through several means. First, we refer partially to the task force report written by the Government of India Planning Commission (2006), which describes how districts are identified and targeted for wage employment schemes, allowing us to create variables that mimic, to a large extent, or act as proxies for this list, doing so at the mandal-level instead.[17] Second, because we are interested in studying which groups have their needs considered when dispersing MGNREGS funds, especially cultivators versus (typically worse off) agricultural laborers, we include a number of variables that seek to describe

17. This report describes the following criteria as essential for selection of a district as needy: incidence of poverty, unemployment rate, agricultural wage rate, per hectare agricultural productivity, productivity per agricultural worker, SC/ST population, drought-proneness and desert-proneness, and rural connectivity.

the distribution of land and workers within the mandal. The variables we include describe population characteristics, the type and distribution of land within, and the infrastructure status of the mandal. We, therefore, find evidence of needs-based targeting if we can reject the null hypotheses:

$$H_O(2): \alpha_3 = 0;\ H_A(2): \alpha_3 \neq 0$$

using coefficient estimates from equation (1).

Further, we wish to understand to what extent MGNREGS accommodates the time-varying needs of the mandal, serving as a safety net against shocks, not just as a pro-poor transfer. AP is an agriculturally important and drought-vulnerable state; therefore, variation in rainfall levels over time is expressly important to households deriving some part of their income from agricultural cultivation or labor. In periods when rainfall is particularly bad, MGNREGS spending may increase to account for the resulting surplus of underemployed agricultural laborers if the needs of agricultural labors are truly considered.[18] Similar to Paxson (1992) and Dasgupta (2013), we create a rainfall shock variable for each of the two important seasons, *kharif* and *rabi*, that describes how many standard deviations from long-term average the current season rainfall level is. We conclude that MGNREGS accommodates the time-varying needs of the mandal if we can reject the null hypotheses:

$$H_O(3): \alpha_4 = 0;\ H_A(3): \alpha_4 \neq 0$$

also using coefficient estimates from equation (1).

18. In India, there is also a process by which mandals are declared "drought stricken" and receive government funds, including more MGNREGS funds, to help with the short term crisis conditions. In AP, over 800 mandals were declared in drought in 2005, over 200 in 2006, nearly 1,000 in 2009, over 900 in 2011, and over 200 in 2012 fiscal years. However, because a government body, the Ministry of Rural Development, is in charge of these declarations and because the criterion for declaration are somewhat loosely defined, we expect politics may be a contributing factor in the decision and therefore do not consider this declaration in our analysis.

## IV. DATA

The data used in this analysis come from a range of publically available sources. Because the written names of mandals and districts are often the unique observation in the underlying data sets, we successfully merged all data manually for 1,061 mandals from 22 districts in AP, about 96 percent of the 1,109 rural mandals found in these 22 districts in the Indian Population Census of 2001.[19] Definitions, data sources, and summary statistics for all of the variables used in our analysis can be found in table S1.1 in appendix S1.

One major feature of MGNREGS is the pursuit of transparency. To that end, an incredible amount of administrative information about projects and workers is available online.[20] Website management is handled by the state, with data input directly from the mandal administration and linked to electronic financial transactions data from the relevant institutions. While one may question the quality of government-reported project data, a major study on public works projects around the world praises the information technology system implemented by AP in particular (Subbarao et al. 2013), providing strong evidence that we need not be terribly skeptical of the data quality.[21] We downloaded reports from the website, which include the total amount spent per fiscal

19. There are 23 districts in AP; however, Hyderabad, the capital of the state, is excluded because it is an entirely urban district and therefore should not benefit from MGNREGS.
20. On 11 September 2013, we downloaded mandal level spending data by fiscal year from the MGNREGS website for AP (http://MGNREGA.ap.gov.in) from the "report" section (reports/reports general/R1.6).
21. The administrative data in AP are verified routinely through independent social audits in the gram panchayats across the state (see http://www.socialaudit.ap.gov.in). Verification exercises were also conducted by the authors in select villages in 2014 which suggest that the administrative data are reliable. Household interviews on wages earned and work done by job card holders match entries in post-office or bank books wherever these were available. Likewise individual recall data on the type of work done and number of days are also consistent with administrative data, as are the list of assets created since inception. Details on this exercise available upon request.

year (April–March) at the mandal level, our dependent variable, as well as other variables used as robustness checks. We standardize these values using the rural population size.

Most time-invariant, needs-based variables come from the Indian Population Census from 2001, Indian Agricultural Census from 2005/06, and Indian Village Amenities Census from 2001, all of which were collected before the start of MGNREGS and act as a suitable baseline. Because MGNREGS is a program focused on rural employment, we limit our variables to population and land values that are observed only in rural areas, where possible. The time-varying, needs-based variables, all functions of observed rainfall levels across the two important rainfall seasons, *kharif* and *rabi*, are derived from geospatial data sets linked to mandal-level boundaries. In addition to these contemporaneous variables, we also include a measure of average and the standard deviation of yearly rainfall levels over a recent 12-year timeframe as controls for the agricultural potential of the area.

All elections outcome data were aggregated from various documents made available by the Election Commission of India, which includes a number of votes by the candidate and party for both the 2004 and 2009 elections. An AC can have several mandals in each, and therefore, we assign the results of the AC election to each component mandal.[22] The UPA advantage variables are created from these data. See figure S1.1 in appendix S1 for more details on the distribution of the advantage term across all mandals for both elections. While the advantage variable is our main covariate of interest, we include a number of control variables that seek to capture the idiosyncrasies of the AC elections. Because the AC boundaries and mandal boundaries

22. There were 281 ACs in the 2004 election and 291 in the 2009 election, so the average AC contained 3–4 mandals.

are not always identical, we control for those cases where a mandal is split between two ACs (less than 1 percent of mandals in 2004 and 7 percent in 2009). Moreover, because we are interested in mandal-level MGNREGS expenditures, we collapse election results to the mandal level by taking a population-weighted average across the two ACs. To complicate matters, some AC boundaries were redrawn in 2008, between the 2004 and 2009 elections.[23] We, therefore, control for those cases where mandals contain a new or abolished AC in the regressions involving changes in UPA advantage over time (27 percent of mandals). Another feature is the presence of "reserved" elections where positions are set aside for scheduled castes and tribes (SC/STs), for which we also control. Finally, because voter turnout may be an indicator of voter awareness in India (Mookherjee 2012), we also include this value as a control.

## V. Estimation Results and Discussion

In the following sections, we test our hypotheses related to the determinants of MGNREGS spending in the pre-2009 and post-2009 project implementation years. In so doing, we offer a number of potential reasons for our findings to further contextualize our results.

### *Politics-Influenced Distribution*

First we explore to what extent the UPA funneled MGNREGS funds to areas where it had a greater advantage in the previous election using data from all of the fiscal years under study, as displayed in the first column of table 1. This specification yields a positive and statistically significant coefficient estimate on the linear $advantage$ term,

23. Gerrymandering is not a concern in AP.

but not on the quadratic term. This implies that there is no inverted U-shape or tapering of funds allocated to areas at the highest end of the advantage distribution (unlike Gupta and Mukhopadhyay 2014). As such, we reject (at the 1 percent level) the null hypotheses $H_O(1)$ that the $advantage$ of the UPA coalition in the previous election is not related to MGNREGS expenditure in the subsequent implementation years; indeed, the allocation of funds by AC members appears partisan.

More illuminating is running the same analysis split by pre- and post-2009 election years. The second column of table 1 displays the results specifically for the first three years of the program, those leading up to the 2009 election. Due to the phase-in of the program, we ensure that only those mandals eligible for MGNREGS funds in a particular year are included in the relevant fiscal year cross section.[24] Because mandals in phase 3 only started to receive MGNREGS funds directly before the 2009 election, our discussion related to pre-2009 election spending is most relevant to phase 1 and 2 mandals.

The individually and jointly statistically insignificant linear and quadratic $advantage$ terms mean that we fail to reject the null hypothesis $H_O(1)$ that politics played no part in MGNREGS fund allocation before the 2009 election. There exists no direct relationship between spending and past voting patterns, implying that UPA did not manipulate the new program by directing program resources with the express purpose of winning reelection in the pre-2009 fiscal years or rewarding their supporters in the 2004 election. These results hold under a number of robustness checks, including four IV

24. It should be noted, however, that we do observe several "out of phase" mandals receiving MGNREGS funds a year before they should. This includes 6 phase 2 mandals in 2006/07 and 68 phase 3 mandals in 2007/08. While there could be political economy reasons for early phase-in, this paper does not concern itself with that dimension.

specifications, and alternative variable specifications (see results in appendix S2). Additionally, because we might expect that the fiscal year directly before the 2009 election (2008/09) may have been characterized by more partisan-based spending than the earlier fiscal years, we estimate equation (1) on separate cross sections by fiscal year (table S1.3 in appendix S1) but still find no year when we could reject the null hypothesis of partisan distribution.

The apparent lack of overtly politically motivated funding in the pre-2009 years suggests that state-level administrators allowed the demand-driven nature of the program and accountability mechanisms to drive proper implementation. Instead, the ruling UPA coalition may have used the well-targeted nature of the program funds—directing them to areas with most need—as a means of drumming up support instead of simply funneling money based on how individuals voted in the 2004 election. Our extensive field research suggests that examples of both a lack of political interference and a good bureaucracy were successful in targeting the program in line with beneficiary needs during this time period. These strategies suggest that politicians perceived constituents as "retrospective voters," those influenced more by their experience with policy tools and are likely to vote for incumbents when policy outcomes have been favorable to them. If this was the approach, then it succeeded; YSR and his UPA coalition amassed great popularity and won reelection in 2009.[25]

The third column of table 1 shows the results for the three fiscal years following the 2009 election, after the UPA coalition won a decisive victory in AP and during which

25. We explore how voters in the AC elections responded to MGNREGS expenditures in the years leading up to the election in appendix S3, finding a positive and statistically significant relationship between the total amount of MGNREGS spending in a mandal before the 2009 election and the UPA advantage level in the 2009 election. See appendix S3 for more details.

all areas were entitled to benefits under the program. In this case, we reject (at the 1 percent level) the null hypothesis $H_0(1)$ that the $advantage$ of the UPA coalition in the 2009 election is not related to MGNREGS expenditure in the years after the election, revealing the partisan nature of spending in the post-2009 years. Again, these results hold across a number of robustness checks, including a first difference model, as well as several sample selection and variable definition changes (see appendix S2). This null hypothesis is also rejected for each year when estimating separately by fiscal year (table S1.4 in appendix S1). We conduct F-tests on the relative magnitude of these effects across years. When including all mandals and also when dropping mandals with a by-election in a given fiscal year,[26] we find that the 2010/11 and 2011/12 $advantage$ terms are not statistically distinguishable but that 2011/12 is significantly larger than 2012/13. It is not surprising that 2011/12 may matter most since, with the formation of the YSR Congress that split from the main UPA coalition, it was likely the most important year politically. These events changed the contours of political alignments, and it is conceivable that it prompted parties to garner voter support in various ways, including through MGNREGS.[27]

Evidence of partisan spending in the post-2009 election years represents a departure from the pre-2009 era. We offer two possible explanations for this shift. First, it may have taken a few years for state-level politicians to figure out how to use MGNREGS funds for political gain. Second, it may reflect the changing political climate in AP immediately after the 2009 election. Recall that YSR, the figurehead of

26. By-elections occur when an elected member dies, resigns, or is disqualified. There were 11 ACs with a by-election in 2010/11, 2 in 2011/12, and 16 in 2012/13.
27. The postelection results are also in line with estimates of a model that investigates how political turnover between UPA and non-UPA parties across the elections influenced MGNREGS spending. For more details, see appendix S4.

MGNREGS in AP, was killed soon after his reelection and that a struggle for power ensued in the following years. Politically influenced expenditures during this time may reflect that this disorder prompted politicians to use MGNREGS funds to secure their places in the AP political hierarchy moving forward, based on how their constituents voted in the most recent election. While our analysis is unable to uncover which mechanism is more likely, it does point to the important distinction between the pre- and post-2009 years.

Across all post-2009 years, we estimate an average partial effect of $advantage$ at 0.36 (significant at the 1 percent level), meaning a 1 percentage point increase in the $advantage$ of the UPA coalition in the 2009 election is correlated with about a 4 rupee per capita increase in annual MGNREGS expenditures in the years after the election. Given we observe an average MGNREGS allocation per capita of about 540 rupees in any given fiscal year (table S1.1 in appendix S1), this means that a 1 percentage point increase in UPA $advantage$ is correlated with a less than 1 percent increase in the total MGNREGS funds allocated to a given mandal in the post-election years, a magnitude that is only sizable when considering relatively high levels of UPA $advantage$ or mandals where per capita expenditure levels are much larger than average. While hypotheses-testing provides solid evidence for the existence of partisan-based spending, the magnitude and economic significance of these effects appear very small on average.

*Needs-Based Distribution*

In this section, we investigate the hypothesis that MGNREGS funds were allocated based on various needs of the mandal. With respect to the baseline (time-

invariant) labor-related needs described in $H_0(2)$, we find that mandals with a higher percentage of illiterate individuals received more funds across all panel model specifications but that areas with more SC/ST households received more funds only in the post-2009 years. Because we expect that lower caste and illiterate individuals are likely to require assistance through government programs like MGNREGS on account of their relative poverty and employment levels, these findings suggest that MGNREGS expenditures were targeted to the poorest and neediest areas both before and (even more so) after the 2009 election, after which time all districts had phased into the program. The fact that the SC/ST term becomes significant only in the post-2009 years may be an indication of increasing program awareness over time among this marginalized subpopulation and/or the later inclusion of sanctioned projects on private SC/ST lands.

The coefficient estimates on the percentage of primary agricultural laborers and cultivators, on the other hand, show a changing story before and after the elections. Across most specifications, we find that mandals with a higher percentage of agricultural laborers receive more funds in the preelection period but a lower amount of funds in the post-election period, with the opposite relationship observed for primary cultivators. Because the drought in 2009 and the after-effects were more severe than anything experienced in the pre-2009 years, these results may reflect that even primary cultivators required MGNREGS as a coping mechanism. Still, the fact that we observe an unexpected relationship with respect to casual agricultural laborers, another portion of the population requiring additional income in poor agricultural years, suggests that some of the well-targeted nature of MGNREGS eroded after the election and/or workers became discouraged over time due to rationing and delays in wage payments.

The coefficients on the static variables related to land or acting as proxies for the agricultural potential of the area suggest that these characteristics were also strong considerations when distributing MGNREGS funds to mandals. Mandals with a higher percentage of unirrigated land received more funds, which is not surprising given that land improvement and irrigation projects supposedly accounted for over 75 percent of total MGNREGS projects in AP (Deininger and Liu 2013). This implies that the funds were targeted to areas that stood to gain from the type of infrastructure projects facilitated by MGNREGS. Moreover, areas with more farms that fall into small or marginal size categories and areas with more inequality in land-holding size receive less MGNREGS spending. Higher inequality in land ownership is indicative of fragmented rural communities where rich landowners have power over the landless. Our findings suggest that major landowners were able to lobby to keep MGNREGS less relevant in their communities.[28]

Our final set of static covariates describe other measures of infrastructure that likely function as proxies for a range of additional needs-based variables. We find that areas with more agricultural credit opportunities (a proxy for the robustness of agricultural institutions) and mandals containing more villages with medical facilities and paved approach roads (general infrastructure variables) receive less funds per capita. On the other hand, mandals with more remote villages receive more funding per capita. The direction and significance of these covariates are nearly identical in the years both before

28. It is important to note that political party allegiances in AP are not split between the landed and the landless (also important for the interpretation of our results on agricultural laborers versus cultivators). Both rival political coalitions in AP have "vote banks" among powerful landed communities (Reddys and Kammas), before MGNREGS (Suri 2002; Srinivasulu 2004) and during the 2009 election time (Suri, Rao, Reddy 2009).

and after the 2009 election, suggesting spending has been well matched to areas with more infrastructure needs across time.

We also investigate our hypothesis related to the flexibility of MGNREGS to accommodate time-varying needs, $H_O(3)$, namely changing labor market dynamics between agricultural seasons and years, embodied in the rainfall shock in the current *kharif* and *rabi* seasons. In the pre-2009 election years, we observe that areas with less than average rainfall in both seasons were more likely to receive more funds, and for the *kharif* season, we also find a positive and significant relationship where the magnitude of those negative shocks was highest.

In the post-2009 years, the relationships are not as well behaved. We observe that areas with more substantial below average *kharif* rainfall shocks receive more funds than those areas with less significant negative rainfall shocks. In the *rabi* season, areas with higher negative rainfall shock receive less funds. The post-2009 period, however, should function as a period where the rainfall needs were considered even more since "drought-affected mandals" were supposed to receive more money starting in 2011 via an increase in the number of days individuals were eligible for work (100 to 150) when rainfall levels were far below average. Using our exogenous rainfall shock variables, we find that mandals with higher rainfall shock in the *kharif* season may have benefited from this policy change but that negative *rabi* season anomalies were not correlated with more MGNREGS spending in the post-election years. This is particularly unfortunate since the areas with higher percentages of agricultural laborers received fewer funds, meaning those households who rely more on casual agricultural labor opportunities may have had more difficulty earning income in the *rabi* seasons of these post-2009 years.

*Summary of MGNREGS Spending Results*

As a final exercise, we seek to understand which groups of variables (as categorized in table S1.1 in appendix S1) were most strongly correlated with the distribution of program funds. To do this, we calculate Shapley values using the regression estimates from equation (1), which decompose the explained variance (measured by R2) into contributions over particular groups of regressors (Huettner and Sunder 2012). In other words, we calculate the mean marginal contribution of each group of variables to the overall model R2. These estimates for all years, pre-2009, and post-2009 model specifications are presented in table 2.

Across all included fiscal years (column 1), we find that the voting variables that allow us to measure nonprogrammatic distribution can explain only about 1 percent of the variation in MGNREGS spending levels. By contrast, the four categories of variables that together encapsulate the needs of the mandal explain more than 43 percent of the variation. In the post-election period (column 3), where our results suggest that partisan politics had a stronger relationship with MGNREGS spending than in the pre-election years, we still find that the needs of the mandal far dominate the variation explained by the election variables. Indeed, even as the importance of the $advantage$ variables climbs to only 2.5 percent, the needs variables become even better predictors when all mandals are eligible for MGNREGS, explaining more than 63 percent of the variation in expenditure patterns. This decomposition exercise also uncovers the fact that the statically observed needs-based variables are jointly better predictors of MGNREGS funding levels than the time-varying rainfall variables, suggesting that expenditures have not responded very flexibly to changing labor market dynamics over time, although they do flow to poorer areas more generally.

Our results do not offer guidance on why the nonprogrammatic distribution of funds appears more likely—although insubstantial—in the postelection years. Nonetheless, the fact that politics does not appear to have a major influence on spending levels suggests that the self-targeting, transparency, and accountability mechanisms integrated into the MGNREGA—including widespread information disclosure and social audits—reduce the potential for larger-scale political capture to take hold in AP. While we cannot establish any direct causal relationship between these safeguards and our results, we offer our findings as evidence, particularly alongside more local-level findings in AP by Johnson (2009b), that MGNREGS is less manipulable than public discourse suggests. The fact that preferential spending does not seem to have been a major contributor to MGNREGS spending is likely due to the fact that a transparent top down approach that functions through a strong bureaucracy offers few opportunities for local political operatives to capture rents. This offers an important lesson for program administrators everywhere.

## VI. Conclusions

India's innovative and massive Mahatma Gandhi National Rural Employment Guarantee Scheme was designed as a demand-driven program rooted in the constitutional "right to work" and incorporates a number of accountability and transparency mechanisms aimed at limiting the extent to which politics can influence program spending and implementation. The degree to which these intentions have come to bear is a question worth exploring, both for improving MGNREGS and for designing other major government-funded programs around the world. With great heterogeneity within India, we focus further on the experience in Andhra Pradesh, one state where

implementation is heralded as a “success story” and where the political climate mimics the national level. By testing hypotheses related to covariates that broadly describe the “needs” of the mandal alongside voting trends at the assembly constituency level in both 2004 and 2009, we provide the first quantitative study to our knowledge that explores if partisanship among the UPA coalition at the state-level, where MGNREGS funding is approved and priorities are set, influenced mandal-level MGNREGS expenditures between 2006/07 and 2012/13.

We do not find evidence that the political leaning of a mandal before the 2009 election influenced MGNREGS expenditure levels, but do find consistent evidence (although with an effect small in magnitude) that the distribution of funds after the election was partially politically motivated, either to reward their loyal constituencies for their successful 2009 election or to encourage further support in the 2014 election. We offer two possible reasons for the late emergence of partisan effects: (i) a slow learning process among state-level politicians on how to allocate funds with political objectives in mind, and/or (ii) the political struggle that occurred in AP following the sudden death of the reelected chief minister from the UPA coalition. The political stakes were especially high in the post-2009 election years, suggesting that even programs with considerable safeguards do become more susceptible to political influence where there is more to gain. Alongside these findings, we also observe that expenditures were well aligned with the needs of the mandal, especially characteristics of the population, land, and infrastructure but also the changing labor market dynamics across years and agricultural seasons. Even in the post-2009 election period where past voting outcomes is a major correlate, we still find that the needs of the mandals explain far more of the variation in MGNREGS

expenditures than the political variables. Moreover, we find evidence that aggregate MGNREGS spending in the pre-2009 election years is positively related to a shift in voting patterns toward the UPA coalition in 2009 (see appendix S3), implying that voters "rewarded" the governing coalition for implementing a well-targeted program in the initial years, evidence that overt partisanship in implementation was unnecessary to secure their win.

This paper contributes to the political economy literature by exploring the relationship between election outcomes and spending on large-scale government-sponsored programs. We also offer a set of testable hypotheses for investigating the incidence of partisan-based nonprogrammatic distribution, as defined by Stokes et al. (2013). Moreover, our findings shed light on the ongoing debate about the most appropriate level for managing public programs—central versus local—especially given concerns about political capture (e.g., Bardhan 2002; Bardhan and Mookherjee 2005). Our results suggest that even a heavy-handed central governing apparatus, not envisaged under MGNREGS but evolved as such in AP, can deliver benefits well aligned with constituent needs. While we cannot test whether the "top down" approach is optimal, our results do indicate that centralized spending can be done benevolently. The state-level AP government took the power originally granted to local-level institutions because they perceived these bodies to lack the capacity necessary to implement a program as complex as MGNREGS (Maiorano 2014). But even this "top-down" strategy may only work when state-level authorities have sufficient experience themselves and are able to ensure that accountability mechanisms are not forsaken, implying that complementary investments in state-level capacity may be critical in some instances.

AP makes an important case study because it took a “bottom up” program design and built a “top down” implementation architecture above it. If we cannot find evidence of deep manipulation within this arrangement, then this suggests that a purely decentralized and local implementation approach is not the only way to achieve proper targeting and service delivery to marginalized citizens in other contexts. This evidence offers the possibility of meaningful devolution of program implementation attached to a bureaucratic structure that ensures local political actors do not hold a program hostage. While a useful testing ground for our hypotheses, the AP experience is in no way exceptional; it should be replicable not only within other MGNREGS environments but also across other contexts and programs that want to achieve the dual goals of local ownership and efficient implementation. Further study of the determinants of MGNREGS spending, particularly from states where implementation is less well regarded, could shed light on which elements of program design limit politically motivated spending in order to craft a program that contributes to poverty reduction and economic growth.

## APPENDICES

*APPENDIX S1.* Additional tables and figures

*APPENDIX S2.* Robustness checks

*APPENDIX S3.* Voter response in 2009 to MGNREGS expenditures

*APPENDIX S4.* MGNREGS spending in response to political turnover

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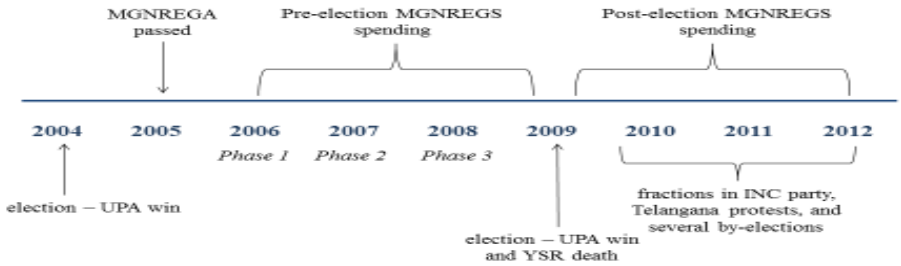
FIGURE 1. Timeline of MGNREGS Project Implementation and Political Situation in AP




*Notes:* Refer to section I for more details.

TABLE 1. Regression Results for MGNREGS Expenditure Models, Preferred Specification

| | (1) | (2) | (3) |
|---|---|---|---|
| | All years | Pre-2009 | Post-2009 |
| | (except 2009) | | |
| UPA advantage in previous election | 0.243*** | -0.0144 | 0.357*** |
| | (0.0528) | (0.0437) | (0.103) |
| UPA advantage in previous election, squared | 0.202 | -0.0297 | 0.269 |
| | (0.186) | (0.146) | (0.413) |
| SC/ST percent (%) | 0.00273** | 0.000661 | 0.00406*** |
| | (0.00107) | (0.000838) | (0.00149) |
| Illiterate (%) | 0.00727*** | 0.00456*** | 0.00883*** |
| | (0.00125) | (0.00108) | (0.00173) |
| Agricultural laborers (%) | 0.00277* | 0.00325** | 0.000875 |
| | (0.00160) | (0.00136) | (0.00215) |
| Cultivators (%) | 0.00672*** | 0.00222 | 0.0102*** |
| | (0.00217) | (0.00163) | (0.00305) |
| Unirrigated land (%) | 0.000983*** | 0.000746*** | 0.00105** |
| | (0.000311) | (0.000247) | (0.000448) |
| Landholdings that are small/marginal (%) | -0.00427*** | -0.00331*** | -0.00504*** |
| | (0.000989) | (0.000821) | (0.00136) |
| Land gini coefficient | -0.703*** | -0.532*** | -0.903*** |
| | (0.198) | (0.163) | (0.281) |
| Long run average yearly rainfall (mm/hr) | 2.214** | 1.209 | 2.640* |
| | (1.056) | (0.807) | (1.480) |
| Long run st. dev. yearly rainfall (mm/hr) | 5.078** | 3.450** | 6.245** |
| | (2.055) | (1.591) | (2.923) |
| Number of ag credit societies (in 1000s) | -0.00937*** | -0.00619*** | -0.0122*** |
| | (0.00211) | (0.00142) | (0.00285) |
| % of villages with medical facilities | -0.162*** | -0.177*** | -0.166** |
| | (0.0567) | (0.0497) | (0.0780) |

| | | | |
|---|---|---|---|
| % of villages with paved road | -0.0727* | -0.0589* | -0.0870 |
| | (0.0426) | (0.0341) | (0.0603) |
| Distance to nearest town from village | 0.00219*** | 0.00103*** | 0.00293*** |
| | (0.000379) | (0.000299) | (0.000562) |
| Kharif season rain < average (1=yes) | 0.0105 | 0.0331*** | -0.0309 |
| | (0.0111) | (0.0122) | (0.0208) |
| Kharif < average * rain shock (abs. value) | 0.0613*** | 0.0315*** | 0.0988*** |
| | (0.0107) | (0.0106) | (0.0156) |
| Rabi season rain < average (1=yes) | 0.00582 | 0.0222* | 0.00189 |
| | (0.0122) | (0.0124) | (0.0214) |
| Rabi < average * rain shock (abs.value) | -0.172*** | -0.0279 | -0.232*** |
| | (0.0171) | (0.0184) | (0.0250) |
| Voter turnout in previous election (%) | -0.00482*** | -0.00191 | -0.00299 |
| | (0.00143) | (0.00122) | (0.00222) |
| SC/ST reserved previous election (1=yes) | 0.00171 | 0.0187 | 0.00646 |
| | (0.0160) | (0.0150) | (0.0239) |
| Split between ACs in previous election (1=yes) | -0.0676** | -0.0919** | -0.0520 |
| | (0.0310) | (0.0386) | (0.0324) |
| Constant | 0.253 | 0.327* | 0.712** |
| | (0.220) | (0.176) | (0.333) |
| Year dummy variables | Y | Y | Y |
| District dummy variables | Y | Y | Y |
| Observations | 5,753 | 2,570 | 3,183 |
| R-squared | 0.508 | 0.495 | 0.509 |
| Joint sig. of UPA advantage vars (p-value) | 0.000 | 0.934 | 0.002 |

*Source:* Authors' analysis based on data from various data sets (see section IV).

*Notes:* *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per equation 1. Pre-2009 years include 2006/07, 2007/08, and 2008/09. Post-2009 years include 2010/11, 2011/12, 2012/12. Standard errors, shown in parentheses, are clustered at the mandal level (i=1,061). Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. Results split by fiscal year can be found in appendix S1. A large number of robustness checks

on these results can be found in appendix S2.

TABLE 2. Decomposition of R-squared for MGNREGS Fund Expenditure Models

| | (1) | (2) | (3) |
|---|---|---|---|
| | All years | Pre-2009 | Post-2009 |
| Non-programmatic distribution | 1.0 | 0.1 | 2.5 |
| Needs-based: labor-related | 13.6 | 9.7 | 22.9 |
| Needs-based: land-related | 13.2 | 12.8 | 16.7 |
| Needs-based: infrastructure-related | 13.8 | 11.8 | 20.2 |
| Needs-based: rainfall-variability | 2.7 | 2.8 | 3.9 |
| Election controls | 2.2 | 2.3 | 3.1 |
| District and year dummies | 53.5 | 60.5 | 30.7 |
| R-squared | 0.5076 | 0.4948 | 0.5077 |
| Observations | 5,753 | 2,570 | 3,183 |

*Source:* Authors' analysis based on data from various data sets (see section IV).

*Notes:* Notes: The included numbers represent Shapley values, or the percentage of the R2 that can be explained by a particular group of regressors. We calculate these values using the "rego" user-written command in Stata. See table S1.1 in appendix S1 for which variables are included in each of the six categories. The relevant matched regression results for these estimates are the specifications displayed in the matched columns of table 1 (equation 1 estimated with OLS).

# SUPPLEMENTAL APPENDICES

## APPENDIX S1: ADDITIONAL TABLES AND FIGURES

Table S1.1: Definitions, data sources, mean, and standard deviations of variables used in analysis

| Variable name | Variable description | Data source | Phase 1 (n=639) | Phase 2 (n=297) | Phase 3 (n=125) | All mandals (n=1,061) |
|---|---|---|---|---|---|---|
| **Dependent variables** | | | | | | |
| MGNREGS | Total spent (in 1000 Rs) by MGNREGS (total tech and admin) at the mandal level per capita in each fiscal year (2006/07 – 2012/13) | MGNREGS AP website and Indian Population Census 2001 | 0.59 (0.44) | 0.48 (0.45) | 0.35 (0.41) | 0.54 (0.45) |
| MGNREGS change | Difference between aggregate MGNREGS spending (total tech and admin) at the mandal level per capita between 2010/11-2012/13 and 2006/07-2008/09 | MGNREGS AP website and Indian Population Census 2001 | 1.1 (1.0) | 1.2 (1.1) | 1.2 (1.2) | 1.2 (1.1) |
| **Non-programmatic distribution** | | | | | | |
| UPA advantage in 2004 | Percent of votes between UPA and winner or second place party if UPA lost or won election (2004), respectively (range -1 to 1) $advantage_{UPA} = \frac{votes_{UPA} - votes_{other}}{votes_{total}}$ | Election Commission of India | 0.07 (0.18) | 0.08 (0.12) | 0.02 (0.13) | 0.07 (0.16) |
| UPA advantage in 2009 | Percent of votes between UPA and winner or second place party if UPA lost or won election (2009), *see above for definitions* | Election Commission of India | -0.01 (0.12) | 0.02 (0.08) | -0.01 (0.06) | -0.002 (0.11) |
| UPA advantage change | Difference between UPA advantage in 2009 and 2004 | Election Commission of India | -0.08 (0.22) | -0.06 (0.14) | -0.06 (0.15) | -0.06 (0.19) |
| UPA support category | Binary variable for mandal elected UPA in both 2004 and 2009 (winwin) | Election Commission of India | 0.37 (0.48) | 0.51 (0.50) | 0.38 (0.49) | 0.41 (0.49) |
| | Binary variable for mandal elected UPA in 2009 but not 2004 (losewin) | Election Commission of India | 0.13 (0.34) | 0.12 (0.33) | 0.10 (0.30) | 0.13 (0.33) |
| | Binary variable for mandal elected UPA in 2004 but not 2009 (winlose) | Election Commission of India | 0.39 (0.49) | 0.32 (0.47) | 0.42 (0.50) | 0.38 (0.49) |
| | Binary variable for mandal did not elect UPA in either 2004 or 2009 (loselose) | Election Commission of India | 0.10 (0.30) | 0.04 (0.20) | 0.10 (0.30) | 0.08 (0.28) |
| **Needs of mandal: labor-related** | | | | | | |
| SC/ST caste (%) | Percent of people in mandal from either SC or ST castes | Indian Population Census 2001 | 28.5 (13.1) | 26.2 (12.1) | 24.8 (17.4) | 27.4 (13.4) |
| Illiterate (%) | Percent of people in mandal classified as illiterate | Indian Population Census 2001 | 56.4 (8.0) | 51.2 (8.7) | 45.5 (10.4) | 53.7 (9.3) |
| Agricultural laborers (%) | Percent of people in mandal classified as mainly agricultural laborers | Indian Population Census 2001 | 15.1 (5.0) | 20.0 (6.2) | 20.4 (7.0) | 17.1 (6.2) |
| Cultivators (%) | Percent of people in mandal classified as mainly cultivators | Indian Population Census 2001 | 16.0 (5.4) | 11.0 (5.0) | 9.5 (6.8) | 13.8 (6.1) |
| **Needs of mandal: land-related** | | | | | | |
| Unirrigated land (%) | Percent of gross cropped area not under irrigation in mandal | Indian Agricultural Census 2005/06 | 57.3 (30.7) | 52.9 (31.3) | 35.5 (31.8) | 53.5 (31.7) |
| Landholdings that are small/marginal (%) | Percent of total operational landholdings in mandal that are ≤2 hectares | Indian Agricultural Census 2005/06 | 49.7 (13.4) | 54.8 (16.4) | 62.1 (13.7) | 52.6 (13.7) |
| Land gini coefficient | Computed gini coefficient of land holding size classes using categorical variables at mandal level | Indian Agricultural Census 2005/06 | 0.48 (0.05) | 0.47 (0.04) | 0.48 (0.04) | 0.48 (0.05) |
| Long run average yearly rainfall rate (mm/hr) | Average estimated annual precipitation rate (mm/hr) in the mandal, 2000-2012 | NASA | 0.11 (0.02) | 0.11 (0.02) | 0.13 (0.01) | 0.11 (0.02) |
| Long run standard deviation of yearly rainfall rate (mm/hr) | Average estimated annual precipitation rate (mm/hr) in the mandal, 2000-2012 | NASA | 0.03 (0.01) | 0.03 (0.01) | 0.04 (0.01) | 0.03 (0.01) |

| Variable name | Variable description | Data source | Phase 1 (n=639) | Phase 2 (n=297) | Phase 3 (n=125) | All mandals (n=1,061) |
|---|---|---|---|---|---|---|
| **Needs of mandal: infrastructure-related** | | | | | | |
| Number of ag credit societies (in 1000s) | Total number of agricultural credit societies across all villages in mandal | India Village Amenity Survey 2001 | 4.5 (4.3) | 6.5 (4.7) | 9.0 (8.5) | 5.6 (5.3) |
| Villages with medical facilities (%) | Population-weighted percent of villages in mandal with medical facilities | India Village Amenity Survey 2001 | 0.82 (0.17) | 0.83 (0.17) | 0.84 (0.15) | 0.83 (0.17) |
| Villages with paved road (%) | Population-weighted percent of villages in mandal with a paved access road | India Village Amenity Survey 2001 | 0.84 (0.21) | 0.93 (0.14) | 0.90 (0.17) | 0.87 (0.19) |
| Distance to nearest town from village | Population weighted average distance from villages to nearest town across all villages in mandal | India Village Amenity Survey 2001 | 34.8 (21.6) | 29.4 (19.9) | 32.5 (27.7) | 33.0 (22.1) |
| **Needs of mandal: rainfall-variability** | | | | | | |
| Kharif season rain less than average | Binary variable for rainfall in current kharif season was less than average across 2001-2012 (June – Oct) | NASA | 0.46 (0.50) | 0.49 (0.50) | 0.36 (0.48) | 0.46 (0.50) |
| Kharif season rainfall shock | Absolute value of rainfall shock in current kharif season, constructed using estimated precipitation rate (mm/hr) in the mandal (June-Oct) $\lvert rain\ shock_t \rvert = \frac{\lvert rainfall_t - rainfall_{mean} \rvert}{rainfall_{sd}}$ | NASA | 0.65 (0.73) | 1.1 (1.0) | 1.0 (0.71) | 0.82 (0.85) |
| Rabi season rain less than average | Binary variable for rainfall in current rabi season was less than average across 2001-2012 (Nov – Feb) | NASA | 0.50 (0.50) | 0.39 (0.49) | 0.34 (0.47) | 0.45 (0.50) |
| Rabi season rainfall shock | Absolute value of rainfall shock in current rabi season, constructed using estimated precipitation rate (mm/hr) in the mandal (Nov- Feb), *see kharif for definition* | NASA | 0.78 (0.72) | 0.62 (0.54) | 0.74 (0.51) | 0.73 (0.66) |
| **Election controls** | | | | | | |
| Voter turnout in 2004 election (%) | Percent of eligible voters that voted in 2004 AC election | Election Commission of India | 72.5 (6.0) | 74.1 (5.6) | 77.2 (5.1) | 73.5 (6.0) |
| Voter turnout in 2009 election (%) | Percent of eligible voters that voted in 2009 AC election | Election Commission of India | 75.6 (6.0) | 76.7 (5.0) | 82.5 (6.4) | 76.7 (6.2) |
| SC/ST reserved election in 2004 (1=yes) | 2004 AC election was reserved for SC or ST castes | Election Commission of India | 0.24 (0.43) | 0.19 (0.39) | 0.28 (0.45) | 0.23 (0.42) |
| SC/ST reserved election in 2009 (1=yes) | 2009 AC election was reserved for SC or ST castes | Election Commission of India | 0.32 (0.47) | 0.23 (0.42) | 0.31 (0.47) | 0.30 (0.46) |
| Mandal split between two ACs in 2004 | Binary variable for whether or not mandal is split between two AC districts in 2004 | Election Commission of India | <0.01 (0.07) | 0 (0) | 0.02 (0.07) | <0.01 (0.07) |
| Mandal split between two ACs in 2009 | Binary variable for whether or not mandal is split between two AC districts in 2009 | Election Commission of India | 0.05 (0.23) | 0.09 (0.29) | 0.09 (0.28) | 0.07 (0.25) |
| New or abolished AC | AC was new or abolished in 2008 redistricting | Election Commission of India | 0.26 (0.44) | 0.28 (0.45) | 0.29 (0.45) | 0.27 (0.44) |
| **Instrumental variables for pre-2009 models** | | | | | | |
| Full fiscal year rainfall shock in 2003 | Actual rainfall shock during 2003 fiscal year, constructed using estimated precipitation rate (mm/hr) in the mandal, *see above for definition* | NASA | -0.33 (0.58) | -0.61 (0.56) | -0.18 (0.29) | -0.39 (0.56) |
| Rabi season rainfall shock in 2003 | Actual rainfall shock during 2003 rabi season, constructed using estimated precipitation rate (mm/hr) in the mandal, *see above for definition* | NASA | 0.05 (0.74) | -0.35 (0.40) | 0.21 (0.42) | -0.04 (0.66) |
| UPA advantage in 1999 | Percent of votes between hypothetical UPA and winner or second place party if UPA lost or won election (1999), constructed using UPA coalition parties in 2004 election, *see above for definitions* | Election Commission of India | -3.2 (14.3) | -8.2 (13.2) | -7.9 (9.5) | -5.2 (13.7) |

Note: Standard deviations in parentheses. See Section IV of main text for more details.

Table S1.2: Total MGNREGS spending figures from various sources (in 1000s Rs.)

| Fiscal year | National funds available[1] | Andhra Pradesh funds available[1] | Total Andhra Pradesh funds observed spent across mandals used in this analysis[2] |
|---|---|---|---|
| 2006/07 | 120,735,556 | 11,422,439 | 5,766,143 |
| 2007/08 | 193,395,355 | 22,932,082 | 19,871,900 |
| 2008/09 | 373,970,615 | 37,066,960 | 16,754,406 |
| 2009/10 | 495,791,950 | 53,835,480 | 23,377,902 |
| 2010/11 | 541,721,425 | 91,070,968 | 34,674,508 |
| 2011/12 | 488,324,949 | 57,815,077 | 29,227,950 |
| 2012/13 | 424,642,606 | 45,578,855 | 37,524,884 |

Source: [1]National figure from here: http://MGNREGA.nic.in/NetMGNREGA/WriteReaddata/Circulars/Briefing_booklet13.pdf. 2011 and 2012 statistics were provisional at time of report. [2]Total across mandals used in this analysis, as aggregated from MGNREGS website: http://MGNREGA.ap.gov.in. For more details, see footnote 20 in main text.

Table S1.3: Regression results by year for MGNREGS fund expenditure model, pre-2009

| | (1)<br>2006/07 | (2)<br>2007/08 | (3)<br>2008/09 |
|---|---|---|---|
| UPA advantage in 2004 election | 0.0155 | -0.0807 | -0.00921 |
| | (0.0319) | (0.0633) | (0.0489) |
| UPA advantage in 2004 election squared | -0.180* | 0.0893 | -0.0952 |
| | (0.107) | (0.234) | (0.180) |
| SC/ST caste (%) | 0.000817 | 0.00139 | -9.66e-05 |
| | (0.000537) | (0.00103) | (0.000758) |
| Illiterate (%) | 0.00194* | 0.00541*** | 0.00458*** |
| | (0.000990) | (0.00164) | (0.00126) |
| Agricultural laborers (%) | 0.000604 | 0.00522*** | 0.00276** |
| | (0.00102) | (0.00184) | (0.00139) |
| Cultivators (%) | 0.00218** | 0.00218 | 0.00237 |
| | (0.00109) | (0.00219) | (0.00167) |
| Unirrigated land (%) | 0.000197 | 0.000808** | 0.000982*** |
| | (0.000214) | (0.000398) | (0.000305) |
| Landholdings that are small/marginal (%) | -0.00220*** | -0.00459*** | -0.00247*** |
| | (0.000536) | (0.00109) | (0.000837) |
| Land gini coefficient | -0.435*** | -0.712*** | -0.413** |
| | (0.123) | (0.243) | (0.188) |
| Long run average yearly rainfall rate (mm/hr) | -0.665 | 1.742 | 0.896 |
| | (0.602) | (1.195) | (0.943) |
| Long run st. dev. yearly rainfall (mm/hr) | 3.215** | 6.499** | 1.129 |
| | (1.634) | (2.742) | (2.100) |
| Number of ag credit societies (in 1000s) | -0.00284*** | -0.00954*** | -0.00572*** |
| | (0.00105) | (0.00214) | (0.00142) |
| % of villages with medical facilities | -0.0988*** | -0.204*** | -0.208*** |
| | (0.0304) | (0.0587) | (0.0452) |
| % of villages with paved road | -0.0107 | -0.0723 | -0.0680* |
| | (0.0210) | (0.0465) | (0.0367) |
| Distance to nearest town from village | 0.000744*** | 0.00139*** | 0.00105*** |
| | (0.000229) | (0.000465) | (0.000351) |
| Kharif season rain less than average (1=yes) | 0.0303 | -0.135*** | 0.0349* |
| | (0.0203) | (0.0438) | (0.0189) |
| Kharif less than average * rain shock (abs value) | -0.0146 | 0.823** | -0.00288 |
| | (0.0157) | (0.330) | (0.0275) |
| Rabi season rain less than average (1=yes) | 0.00364 | -0.0120 | 0.0560** |
| | (0.0149) | (0.0636) | (0.0265) |
| Rabi less than average * rain shock (abs value) | 0.0229 | 0.189 | 0.0543 |
| | (0.0253) | (0.226) | (0.0481) |
| Voter turnout in 2004 election (%) | -0.000609 | -0.000994 | -0.00197 |
| | (0.000929) | (0.00185) | (0.00142) |
| SC/ST reserved 2004 election (1=yes) | -0.00549 | 0.0376* | 0.00768 |
| | (0.0109) | (0.0219) | (0.0171) |
| Split between ACs in 2004 election (1=yes) | -0.101 | -0.0891 | -0.0555 |
| | (0.0629) | (0.147) | (0.0931) |
| Constant | 0.438*** | 0.240 | 0.370 |
| | (0.152) | (0.292) | (0.225) |
| District dummy variables | Y | Y | Y |
| Observations | 617 | 914 | 1,039 |
| R-squared | 0.471 | 0.506 | 0.480 |
| F-test of difference in advantage term across fiscal years (p-values) | | | |
| Relative to 2006/07 | N/A | 0.083 | 0.603 |
| Relative to 2007/08 | 0.083 | N/A | 0.122 |
| Relative to 2008/09 | 0.603 | 0.122 | N/A |

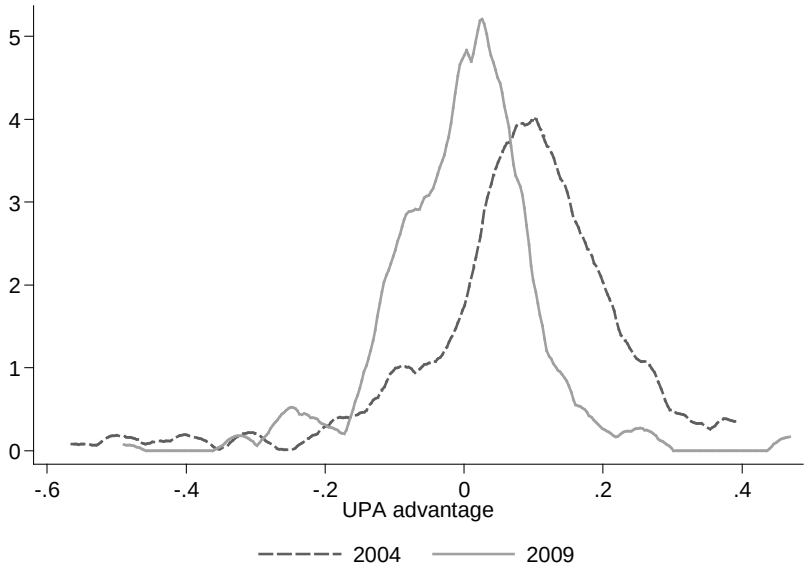
Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation 1. Standard errors are found in parentheses. Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. An F-test for the significance of the difference in the advantage term across fiscal years shows that only the 2006/07 and 2007/08 results are significantly different from each other, and only at the 10 percent level.

Table S1.4: Regression results by year for MGNREGS fund expenditure model, post-2009

| | (1)<br>2010/11 | (2)<br>2011/12 | (3)<br>2012/13 |
|---|---|---|---|
| UPA advantage in 2009 election | 0.292** | 0.478*** | 0.243** |
| | (0.133) | (0.113) | (0.108) |
| UPA advantage in 2009 election squared | 0.517 | -0.117 | 0.407 |
| | (0.495) | (0.423) | (0.409) |
| SC/ST caste (%) | 0.00283* | 0.00490*** | 0.00473*** |
| | (0.00144) | (0.00124) | (0.00120) |
| Illiterate (%) | 0.0121*** | 0.00854*** | 0.00704*** |
| | (0.00238) | (0.00206) | (0.00196) |
| Agricultural laborers (%) | 0.00427 | -0.00119 | 0.000689 |
| | (0.00266) | (0.00231) | (0.00222) |
| Cultivators (%) | 0.00706** | 0.0101*** | 0.0134*** |
| | (0.00314) | (0.00271) | (0.00260) |
| Unirrigated land (%) | 0.00180*** | 0.000642 | 0.00104** |
| | (0.000581) | (0.000502) | (0.000478) |
| Landholdings that are small/marginal (%) | -0.00228 | -0.00652*** | -0.00558*** |
| | (0.00158) | (0.00137) | (0.00131) |
| Land gini coefficient | -0.858** | -0.986*** | -0.849*** |
| | (0.353) | (0.304) | (0.296) |
| Long run average yearly rainfall (mm/hr) | 2.676 | 4.591*** | 1.004 |
| | (1.688) | (1.603) | (1.421) |
| Long run st. dev. yearly rainfall (mm/hr) | 4.128 | 9.134*** | 5.954* |
| | (3.947) | (3.463) | (3.287) |
| Number of ag credit societies (in 1000s) | -0.0148*** | -0.00995*** | -0.0109*** |
| | (0.00269) | (0.00232) | (0.00223) |
| % of villages with medical facilities | -0.292*** | -0.0965 | -0.117* |
| | (0.0855) | (0.0736) | (0.0703) |
| % of villages with paved road | -0.140** | -0.0462 | -0.0510 |
| | (0.0688) | (0.0590) | (0.0570) |
| Distance to nearest town from village | 0.00514*** | 0.00222*** | 0.00139** |
| | (0.000668) | (0.000576) | (0.000550) |
| Kharif season rain less than average (1=yes) | -0.169 | 0.113 | -0.0324 |
| | (0.124) | (0.0749) | (0.0324) |
| Kharif less than average * rain shock (abs value) | -0.794* | 0.0595 | 0.0712 |
| | (0.448) | (0.0391) | (0.0459) |
| Rabi season rain less than average (1=yes) | 0.0565 | -0.0140 | 0.0235 |
| | (0.157) | (0.0630) | (0.0379) |
| Rabi less than average * rain shock (abs value) | -1.647 | -0.177** | 0.212** |
| | (1.702) | (0.0730) | (0.0990) |
| Voter turnout in 2009 election (%) | -0.00259 | -0.00635*** | -0.000243 |
| | (0.00269) | (0.00232) | (0.00224) |
| SC/ST reserved 2009 election (1=yes) | -0.0291 | 0.0217 | 0.0417 |
| | (0.0311) | (0.0270) | (0.0258) |
| Split between ACs in 2009 election (1=yes) | -0.0484 | -0.0512 | -0.0531 |
| | (0.0482) | (0.0415) | (0.0398) |
| Constant | 0.535 | 0.840** | 1.396*** |
| | (0.438) | (0.417) | (0.385) |
| District dummy variables | Y | Y | Y |
| Observations | 1,061 | 1,061 | 1,061 |
| R-squared | 0.517 | 0.520 | 0.615 |
| F-test of difference in advantage term across fiscal years (p-values) | | | |
| Relative to 2010/11 | N/A | 0.219 | 0.723 |
| Relative to 2011/12 | 0.219 | N/A | 0.002 |
| Relative to 2012/13 | 0.723 | 0.002 | N/A |

Notes: Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation 1. Standard errors are found in parentheses. An F-test for the significance of the difference in the advantage term across fiscal years shows that only the 2011/12 and 2012/13 results are significantly different from each other (where the magnitude is clearly largest in 2011/12). The same test was run when dropping mandals with a by-election in a given year, producing nearly identical results (not shown).

Figure S1.1: Kernel density of UPA advantage variable by election year




Note: Definition of UPA advantage can be found in Section III of the main text.

## APPENDIX S2: ROBUSTNESS CHECKS

*S2.1 Description*

Because it may be the case that mandals with high levels of $advantage$ differ in unobserved ways from mandals with lower levels of $advantage$, and perhaps in a way that is correlated with $MGNREGS$, we offer additional identification strategies that deal with potential endogeneity issues as robustness checks to support our results presented in Table 1 of the main text.

In the pre-2009 election years, we use a series of instrumental variables (IVs). The first is a rainfall shock variable for the total year and the main *rabi* season in the fiscal year preceding the 2004 election.[1] Voters in India routinely "punish" incumbent politicians for poor rainfall events beyond their control (Cole *et al.* 2013). This was especially true in the 2004 election when farmers, reliant on good and consistent rainfall for their income, voted against the incumbent party (Telugu Desam) and for the UPA, punishing the incumbent for a horrible cropping season in 2004 (Rao and Suri 2006; *The Hindu* 2004). While conceptually well-correlated with the $advantage$ of the UPA in 2004, fulfilling the relevance criteria, there is also no reason to believe that, after controlling for long-term and current rainfall, rainfall events of 2003 would affect MGNREGS implementation three or more years later apart from through their influence on election outcomes of 2004, satisfying the exclusion restriction. We also include an IV specification where the rainfall shock variables are interacted with the three main regions in AP (Telangana, Rayalaseem, Coastal) in the event that rainfall shocks are spatially correlated or more important to income levels in some areas than others (Sarsons 2015).

Following analysis on the Peruvian Social Fund by Schady (2000), we also include the lagged $advantage$ from the previous elections in 1999 as an IV for the pre-2009 election years.

[1] Several other important long-term and contemporaneous rainfall and irrigation variables are already included in the model. These rainfall shock IVs are specific to the year preceding the 2004 election.

Past election results are expected to be relatively good predictors of current election outcomes (relevance), even with "incumbency aversion" (see footnote 6 in main text), but should not influence MGNREGS implementation and expenditures several years later apart from through the 2004 election outcomes (exclusion). Moreover, the UPA coalition was not formed until 2004, so we use the 2004 UPA coalition parties to create a hypothetical UPA $advantage$ for 1999, another argument for instrument exogeneity. All of the usual IV diagnostic tests are performed.[2]

In the post-2009 election years, the IVs described above are unfortunately not relevant and using similar but updated instruments applicable to the 2009 elections is not a convincing strategy since MGNREGS was already in progress and lagged rainfall and elections variables are likely correlated with post-2009 expenditures. Instead, we rely on a first difference approach:

(S2.1) $$\Delta MGNREGS_{id} = \gamma_0 + \gamma_1 \Delta advantage_{id} + \gamma_2 \boldsymbol{needs}_{id} + \gamma_3 \boldsymbol{z}_{id} + \rho_p + \varepsilon_{id}$$

where all subscripts are as they were described in the main text, with the addition of MGNREGS phase $p$, $\Delta advantage$ is the difference in UPA $advantage$ between 2009 and 2004 elections, and $\Delta MGNREGS$ is the difference in total $MGNREGS$ spending between aggregate 2010/11-2012/13 and aggregate 2006/07-2008/09. This first difference method allows us to eliminate any mandal-level fixed effects, lessening concerns about endogeneity.[3] We also include phase dummies, $\rho_p$, since the phase in which a mandal was placed will directly influence total

[2] Because both $advantage$ and $advantage^2$ may be endogeneous, we also create a squared term in our IV regressions by predicting the endogenous variable in our first stage regression, then use the square of the predicted term as an IV following suggestions in Wooldridge (2010) in order to avoid a forbidden regression.

[3] We also explored if regression discontinuity design methods (RDD) (with potential discontinuity at $advantage = 0$) would a feasible strategy to cleanly identify the effect of electing a UPA coalition member in 2009 on MGNREGS spending in the post-2009 years. A similar strategy is employed by Asher and Novosad (2013) who also use Indian election data but for the purpose of isolating the effect on local economic growth outcomes. While regression discontinuity design is an attractive method where a discontinuity occurs at a discrete point, a key assumption in identification under this strategy is that a discontinuity occurs at a known threshold (Lee and Lemieux 2010). Using both local linear (non-parametric) regression under a range of bandwidths and global polynomial (parametric) regression approaches, we find no evidence of discontinuity at $advantage = 0$ (see Figures S2.1 and S2.2 and therefore cannot rely on regression discontinuity in these data.

expenditures in the pre-2009 election period and, therefore, the change in spending between the two time periods. With this specification, we can test nearly identical hypotheses as those denoted in $H_O(1)$ of the main text:

$$H_O(S2.1): \gamma_1 = 0; H_A(A2.1): \gamma_1 > 0$$

In addition to these estimation strategies, we also employ as robustness checks a number of alternate specifications of the dependent and main independent variables, clustering strategies for the standard errors, and included samples, all of which is described in the results sub-section below.

*S2.2 Results*

In the pre-2009 election years, the lack of political favoritism in MGNREGS spending remains when controlling for potential endogeneity using four alternate IV specifications (Table S2.2). The fact that our results do not change when including instruments that hold up under a number of diagnostic test (including but not limited to relevance tests, see Table S2.1) lends credence to the claim that the endogeneity of the $advantage$ term does not influence our OLS results in the pre-2009 era.

In the post-2009 years, we move to a first difference approach described in equation (S2.1) to test $H_O(S2.1)$. As shown in Table S2.3, we find that a change in UPA $advantage$ between the 2004 and 2009 elections is also positively and significantly related to a change in aggregate MGNREGS spending before and after the election. Even more convincing is the fact that the average partial effects of the $\Delta advantage$ terms (0.40 and 0.42) are remarkably similar to the average partial effect of the $advantage$ term estimated in panel for the post-2009 years (0.36). Because differencing eliminates mandal-level fixed effects, we find the resemblance of these terms to lend further credibility to our post-2009 partisan expenditure claims. Given

concerns that it is the redistricted mandals that may be driving the results in the first difference estimates, we add an interaction term for those mandals in a new or abolished AC. Indeed, the relationship is only positive and significant for those mandals that kept the same AC affiliation, with no relationship for those that were affected by redistricting, adding further validity to our findings.

Not only do both the pre- and post-2009 results hold up to various estimation robustness tests, but also to a number of other specifications and sample variations. First we estimate all models with added mandal level population weights given mandals can vary in size and, therefore, potential political importance (Table S2.4). Then, we estimate with clustered standard errors at the AC level instead of mandal level (Table S2.5) in case this is a more relevant area over which to cluster. In neither case to we observe a change in the direction or significance of our main politics-based results.

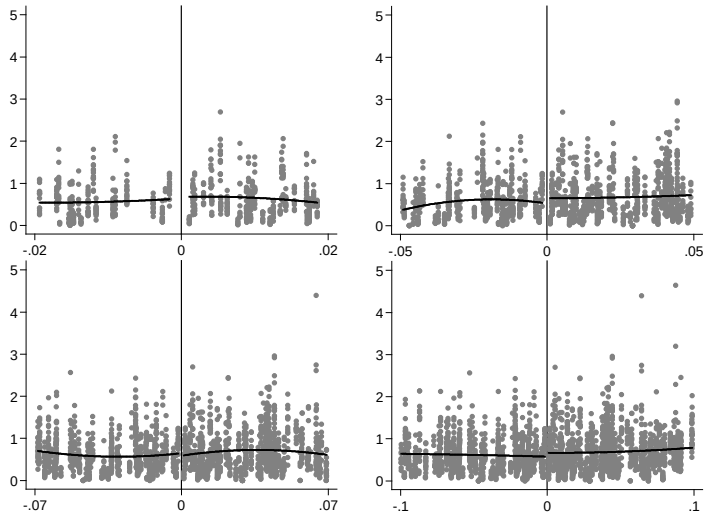
Moreover, to be sure our results still hold when focusing only on the main INC party within the full UPA coalition, we use an $advantage$ term specific to INC and uncover the same relationships before and after the election, including incredible similarity in the magnitude of the marginal effect in the post-2009 years (Table S2.6). Then, because of concerns that the politics surrounding the Telangana succession may be driving some of our results, we drop the Telangana districts (Table S2.6).[4] For the pre-2009 years, we do find that the coefficient estimate on the squared $advantage$ term is negative and statistically significant, but that the estimated average partial effect of the $advantage$ term is neither positive nor significant. In the post-2009 years, both $advantage$ terms are significant, although the inflection point is at an $advantage$ level of 0.31, above which there are only 7 non-Telangana mandals. Lastly, we may be

[4] There are 10 Telangana districts, but 1 is Hyderabad. All 9 of the districts with rural mandals fall in phase 1. The non-Telangana district sample includes 630 mandals.

concerned that mandals with a by-election in the post-2009 years influence our results. We drop all mandals with a by-election in a given fiscal year (Table S2.5) and still find a positive and strongly significant linear relationship.

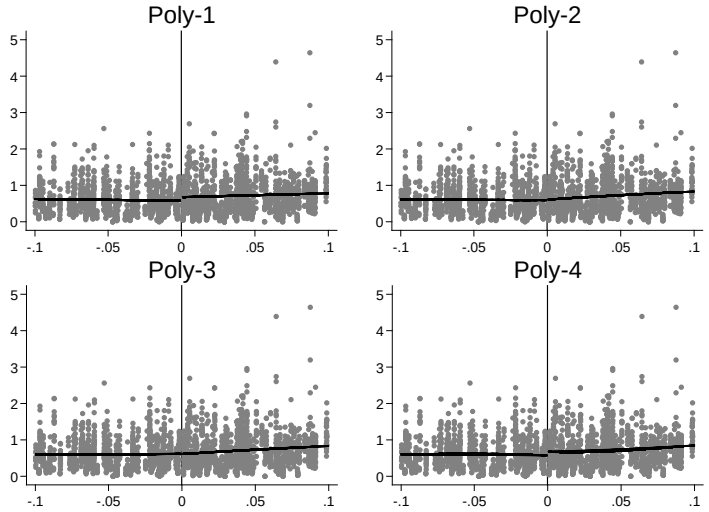
We also redefine our dependent variable as the total amount spent on *wages* (not in aggregate) per capita, the percent of households in a mandal working on MGNREGS in a given fiscal year, and the average number of days of MGREGS work (unconditional), results for which can be found in Table S2.7. Here, another important finding emerges. While our aforementioned estimates are consistent with the total amount spent on wages and the number of days employed on MGNREGS, the positive and significant relationship in the post-2009 period disappears when changing our outcome variable to the percent of households working under MGNREGS in a given year. We interpret this finding as evidence that politicians at the state level have power over budgetary outlays and actual expenditures under MGNREGS, but not in determining which and how many households within a given mandal actually benefit under the program, tasks left to local-level implementers.

Figure S2.1: Diagnostic test for RDD plausibility—local linear approach (non-parametric), post-2009 election




Notes: Instead of choosing an optimal bandwidth following Imbens and Kalyanaraman (2012), we show a range of possibilities, none of which show any discontinuity at UPA advantage=0. In all graphs, the x-axis shows UPA advantage in 2009 while the y-axis shows MGNREGS spending per capita (in 1000 Rs.) in the post-2009 years.

Figure S2.2: Diagnostic test for RDD plausibility—global polynomial approach (parametric), post-2009 election




Notes: The four graphs shown here represent increasing orders of polynomials included in the regression. While the full sample is used in estimation, we restrict the x-axis to a more narrow range in order to look for a discontinuity at advantage=0. In all graphs, the x-axis shows UPA advantage in 2009 while the y-axis shows MGNREGS spending per capita (in 1000 Rs.) in the post-2009 years.

Table S2.1: Relevance tests for IV results, pre-2009 election

| | (1)<br>IV-1 | (2)<br>IV-2 | (3)<br>IV-3 | (4)<br>IV-4 |
|---|---|---|---|---|
| Full year rainfall shock (2003) | -0.0844*** | | -0.0660*** | |
| | (0.0163) | | (0.0161) | |
| Rabi season rainfall shock (2003) | 0.0297*** | | 0.0310*** | |
| | (0.00969) | | (0.00955) | |
| Full year rainfall shock (2003) in Telangana | | | | -0.0635*** |
| | | | | (0.0234) |
| Full year rainfall shock (2003) in Rayalaseem | | | | -0.0981** |
| | | | | (0.0455) |
| Full year rainfall shock (2003) in Coastal AP | | | | -0.0117 |
| | | | | (0.0264) |
| UPA advantage in 1999 AC election | | 0.213*** | 0.198*** | 0.193*** |
| | | (0.0357) | (0.0361) | (0.0356) |
| SC/ST percent (%) | -0.000477 | -5.55e-05 | -0.000393 | -0.000451 |
| | (0.000494) | (0.000475) | (0.000475) | (0.000476) |
| Illiterate (%) | -0.00512*** | -0.00521*** | -0.00495*** | -0.00521*** |
| | (0.00103) | (0.000979) | (0.000973) | (0.000971) |
| Agricultural laborers (%) | -0.000755 | -0.000715 | -0.000782 | -0.000933 |
| | (0.000947) | (0.000915) | (0.000912) | (0.000926) |
| Cultivators (%) | 0.00157 | 0.00129 | 0.00139 | 0.00174 |
| | (0.00108) | (0.00109) | (0.00105) | (0.00108) |
| Unirrigated land (%) | -0.000553** | -0.000589*** | -0.000488** | -0.000471** |
| | (0.000224) | (0.000217) | (0.000217) | (0.000219) |
| Landholdings that are small/marginal (%) | -0.000991 | -0.000686 | -0.000623 | -0.000604 |
| | (0.000619) | (0.000585) | (0.000581) | (0.000583) |
| Land gini coefficient | 0.0432 | 0.0991 | 0.0843 | 0.104 |
| | (0.123) | (0.120) | (0.116) | (0.117) |
| Long run average yearly rainfall (mm/hr) | -0.164 | -0.542 | -0.192 | 0.115 |
| | (0.499) | (0.491) | (0.500) | (0.544) |
| Long run st. dev. yearly rainfall (mm/hr) | -0.854 | 1.155 | 0.250 | 0.776 |
| | (1.309) | (1.319) | (1.335) | (1.327) |
| Number of ag credit societies (in 1000s) | -0.000890 | -0.000722 | -0.000623 | -0.000696 |
| | (0.00112) | (0.00104) | (0.00102) | (0.00100) |
| % of villages with medical facilities | -0.0599* | -0.0651** | -0.0639** | -0.0557* |
| | (0.0325) | (0.0312) | (0.0310) | (0.0310) |
| % of villages with paved road | -0.0253 | -0.00961 | -0.0137 | -0.0148 |
| | (0.0241) | (0.0244) | (0.0237) | (0.0240) |
| Distance to nearest town from village | 0.000294 | 0.000132 | 0.000224 | 0.000155 |
| | (0.000227) | (0.000221) | (0.000222) | (0.000221) |
| Kharif season rain < average (1=yes) | 0.00391 | 0.00555 | 0.00493 | 0.00309 |
| | (0.00705) | (0.00696) | (0.00680) | (0.00679) |
| Kharif < average * rain shock (abs. value) | -0.00465 | -0.00970* | -0.00639 | -0.00487 |
| | (0.00549) | (0.00549) | (0.00539) | (0.00523) |
| Rabi season rain < average (1=yes) | -0.00575 | -0.00415 | -0.00245 | -0.00608 |
| | (0.00644) | (0.00634) | (0.00617) | (0.00627) |
| Rabi < average * rain shock (abs.value) | 0.0147* | 0.00924 | 0.00791 | 0.0158* |
| | (0.00893) | (0.00943) | (0.00870) | (0.00909) |
| Voter turnout in 2004 election (%) | 0.00118 | 0.00138 | 0.00126 | 0.00141 |
| | (0.000991) | (0.000965) | (0.000963) | (0.000982) |
| SC/ST reserved 2004 election (1=yes) | 0.0184** | 0.0255*** | 0.0243*** | 0.0247*** |
| | (0.00886) | (0.00894) | (0.00869) | (0.00886) |
| Split between ACs in 2004 election (1=yes) | 0.160*** | 0.156*** | 0.160*** | 0.156*** |
| | (0.0313) | (0.0293) | (0.0277) | (0.0273) |
| Constant | 0.375** | 0.291** | 0.286** | 0.160 |
| | (0.146) | (0.137) | (0.137) | (0.130) |
| Year dummy variables | Y | Y | Y | Y |
| District dummy variables | Y | Y | Y | Y |
| Observations | 2,570 | 2,570 | 2,570 | 2,570 |
| R-squared | 0.217 | 0.233 | 0.248 | 0.243 |
| Joint significance of IVs (F-value) | 15.55 | 35.64 | 19.70 | 11.42 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Only pre-2009 election years are included in these regressions (2006/07, 2007/08, 2008/09). Standard errors, in parentheses, are clustered at the mandal level (i=1,039). Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. We use the squared predicted values from these regressions as the IV for the squared endogenous term ($advantage^2$) following Wooldridge (2010). Full regression and associated test results can be found in Table S2.2.

Table S2.2: Regression results for MGNREGS expenditure models (IV specifications), pre-2009 election

| | (4)<br>IV-1 | (5)<br>IV-2 | (6)<br>IV-3 | (7)<br>IV-4 |
|---|---|---|---|---|
| UPA advantage in 2004 election | -0.317 | -0.0280 | -0.0911 | -0.0956 |
| | (0.231) | (0.194) | (0.176) | (0.182) |
| UPA advantage in 2004 election, squared | -0.0703 | -0.873 | -0.527 | -0.444 |
| | (0.534) | (0.605) | (0.519) | (0.498) |
| SC/ST percent (%) | 0.000645 | 0.000363 | 0.000485 | 0.000514 |
| | (0.000854) | (0.000860) | (0.000855) | (0.000842) |
| Illiterate (%) | 0.00294* | 0.00475*** | 0.00430*** | 0.00425*** |
| | (0.00169) | (0.00148) | (0.00145) | (0.00140) |
| Agricultural laborers (%) | 0.00308** | 0.00348** | 0.00334** | 0.00332** |
| | (0.00141) | (0.00139) | (0.00138) | (0.00138) |
| Cultivators (%) | 0.00266 | 0.00258 | 0.00253 | 0.00250 |
| | (0.00176) | (0.00170) | (0.00169) | (0.00165) |
| Unirrigated land (%) | 0.000535* | 0.000749*** | 0.000700*** | 0.000696*** |
| | (0.000305) | (0.000274) | (0.000271) | (0.000270) |
| Landholdings that are small/marginal (%) | -0.00364*** | -0.00324*** | -0.00334*** | -0.00336*** |
| | (0.000863) | (0.000844) | (0.000832) | (0.000834) |
| Land gini coefficient | -0.518*** | -0.570*** | -0.551*** | -0.547*** |
| | (0.165) | (0.166) | (0.164) | (0.165) |
| Long run average yearly rainfall (mm/hr) | 0.979 | 0.808 | 0.925 | 0.960 |
| | (0.878) | (0.894) | (0.860) | (0.843) |
| Long run st. dev. yearly rainfall (mm/hr) | 3.469** | 4.139** | 3.853** | 3.785** |
| | (1.657) | (1.676) | (1.624) | (1.672) |
| Number of ag credit societies (in 1000s) | -0.00648*** | -0.00602*** | -0.00616*** | -0.00618*** |
| | (0.00156) | (0.00151) | (0.00149) | (0.00149) |
| % of villages with medical facilities | -0.197*** | -0.184*** | -0.186*** | -0.185*** |
| | (0.0519) | (0.0531) | (0.0512) | (0.0522) |
| % of villages with paved road | -0.0656* | -0.0713* | -0.0676* | -0.0665* |
| | (0.0360) | (0.0366) | (0.0356) | (0.0360) |
| Distance to nearest town from village | 0.00109*** | 0.00103*** | 0.00104*** | 0.00104*** |
| | (0.000314) | (0.000308) | (0.000306) | (0.000306) |
| Kharif season rain < average (1=yes) | 0.0345*** | 0.0310** | 0.0322*** | 0.0324*** |
| | (0.0126) | (0.0124) | (0.0124) | (0.0124) |
| Kharif < average * rain shock (abs. value) | 0.0287*** | 0.0312*** | 0.0307*** | 0.0307*** |
| | (0.0109) | (0.0110) | (0.0109) | (0.0108) |
| Rabi season rain < average (1=yes) | 0.0200 | 0.0205* | 0.0207* | 0.0209* |
| | (0.0125) | (0.0124) | (0.0124) | (0.0124) |
| Rabi < average * rain shock (abs.value) | -0.0235 | -0.0241 | -0.0247 | -0.0250 |
| | (0.0185) | (0.0184) | (0.0182) | (0.0183) |
| Voter turnout in 2004 election (%) | -0.00156 | -0.00252** | -0.00218* | -0.00211* |
| | (0.00126) | (0.00125) | (0.00122) | (0.00121) |
| SC/ST reserved 2004 election (1=yes) | 0.0242 | 0.0136 | 0.0170 | 0.0176 |
| | (0.0155) | (0.0151) | (0.0150) | (0.0151) |
| Split between ACs in 2004 election (1=yes) | -0.0430 | -0.0542 | -0.0589 | -0.0617 |
| | (0.0585) | (0.0558) | (0.0497) | (0.0494) |
| Constant | 0.733*** | 0.804*** | 0.674*** | 0.424* |
| | (0.243) | (0.247) | (0.223) | (0.221) |
| Year dummy variables | Y | Y | Y | Y |
| District dummy variables | Y | Y | Y | Y |
| Observations | 2,570 | 2,570 | 2,570 | 2,570 |
| R-squared | 0.477 | 0.484 | 0.489 | 0.490 |
| Joint sig. of UPA advantage vars (p-value) | 0.386 | 0.339 | 0.531 | 0.595 |
| Under-identification test (F-value, p-value) | 31.224 (0.000) | 25.379 (0.000) | 43.643 (0.000) | 43.332 (0.000) |
| Over-identification test (Hansen J, p-value) | 2.060 (0.151) | - | 2.991 (0.224) | 6.098 (0.107) |

Notes: *** p<0.01, ** p<0.05, * p<0.1. Only pre-2009 election years are included in these regressions (2006/07, 2007/08, 2008/09). Standard errors, in parentheses, are clustered at the mandal level (i=1,039). Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. Included IV specifications include: (1) total fiscal year rainfall shock from 2003 and rabi rainfall shock from 2003; (2) UPA advantage in 1999 AC election; (3) total fiscal year rainfall shock from 2003, rabi rainfall shock from 2003, and UPA advantage in 1999 AC election; (4) total fiscal year rainfall shock from 2003 interacted with three region variables as well as the UPA advantage in the 1999 AC election. All IV specifications also include a squared predicted value from the regression in Table S2.1. See text for more details on how these variables were constructed.

Table S2.3: Regression results for MGNREGS expenditure models (first difference), post-2009 election

| | (1) | (2) | (3) |
|---|---|---|---|
| Change in UPA advantage, 2009-2004 | 0.397** | 0.418** | |
| | (0.168) | (0.168) | |
| Change in UPA advantage, 2009-2004 (no redistrict) | | | 1.095*** |
| | | | (0.373) |
| Change in UPA advantage, 2009-2004 (with redistrict) | | | 0.252 |
| | | | (0.187) |
| SC/ST caste (%) | -0.00377 | -0.00442 | -0.00450 |
| | (0.00261) | (0.00282) | (0.00281) |
| Illiterate (%) | 0.0166*** | 0.0159*** | 0.0160*** |
| | (0.00416) | (0.00421) | (0.00420) |
| Agricultural laborers (%) | -0.0109** | -0.0100* | -0.00984* |
| | (0.00507) | (0.00518) | (0.00517) |
| Cultivators (%) | 0.0341*** | 0.0335*** | 0.0333*** |
| | (0.00646) | (0.00649) | (0.00648) |
| Unirrigated land (%) | 0.00298*** | 0.00294** | 0.00303*** |
| | (0.00113) | (0.00115) | (0.00114) |
| Landholdings that are small/marginal (%) | -0.00700** | -0.00696** | -0.00698** |
| | (0.00301) | (0.00304) | (0.00303) |
| Land gini coefficient | -0.110 | -0.0777 | 0.00667 |
| | (0.682) | (0.684) | (0.684) |
| Long run average yearly rainfall (mm/hr) | 20.86*** | 20.89*** | 20.39*** |
| | (2.126) | (2.157) | (2.167) |
| Long run st. dev. yearly rainfall (mm/hr) | -17.98** | -19.50*** | -18.37*** |
| | (6.984) | (7.035) | (7.046) |
| Number of ag credit societies (in 1000s) | -0.0245*** | -0.0251*** | -0.0253*** |
| | (0.00590) | (0.00593) | (0.00592) |
| % of villages with medical facilities | -0.536*** | -0.540*** | -0.515*** |
| | (0.172) | (0.173) | (0.173) |
| % of villages with paved road | -0.135 | -0.127 | -0.138 |
| | (0.156) | (0.156) | (0.156) |
| Distance to nearest town from village | 0.00552*** | 0.00558*** | 0.00566*** |
| | (0.00136) | (0.00140) | (0.00140) |
| SC/ST reserved 2009 election (1=yes) | | -0.0803 | -0.100 |
| | | (0.0762) | (0.0767) |
| SC/ST reserved 2004 election (1=yes) | | 0.145* | 0.141* |
| | | (0.0767) | (0.0766) |
| New or abolished AC in 2008 (1=yes) | | 0.104 | 0.181** |
| | | (0.0640) | (0.0744) |
| Split between ACs in 2004 election (1=yes) | | -0.314 | -0.315 |
| | | (0.401) | (0.401) |
| Split between ACs in 2009 election (1=yes) | | -0.103 | -0.0962 |
| | | (0.113) | (0.113) |
| Constant | -1.156** | -1.111** | -1.152** |
| | (0.549) | (0.552) | (0.552) |
| Phase dummy variables | Y | Y | Y |
| Observations | 1,039 | 1,039 | 1,039 |
| R-squared | 0.367 | 0.372 | 0.374 |

Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation S2.1 in this Appendix. Standard errors included in parentheses. Only 1,039 of 1,061 mandals are included because there was no UPA coalition candidate in ACs matched to 22 mandals in the pre-2009 election years.

Table S2.4: With mandal-level population weights applied during regression

| | (1)<br>All years (except 2009) | (2)<br>Pre-2009 | (3)<br>Post-2009 |
|---|---|---|---|
| UPA advantage in previous election | 0.227*** | -0.0216 | 0.285*** |
| | (0.0506) | (0.0391) | (0.0926) |
| UPA advantage in previous election, squared | 0.245 | -0.0331 | 0.357 |
| | (0.179) | (0.133) | (0.389) |
| SC/ST percent (%) | 0.00254** | 6.19e-05 | 0.00426*** |
| | (0.000986) | (0.000737) | (0.00138) |
| Illiterate (%) | 0.00632*** | 0.00422*** | 0.00750*** |
| | (0.00111) | (0.000999) | (0.00155) |
| Agricultural laborers (%) | 0.00288** | 0.00346*** | 0.00105 |
| | (0.00135) | (0.00122) | (0.00183) |
| Cultivators (%) | 0.00841*** | 0.00302** | 0.0125*** |
| | (0.00181) | (0.00141) | (0.00258) |
| Unirrigated land (%) | 0.000972*** | 0.000813*** | 0.000988*** |
| | (0.000266) | (0.000218) | (0.000380) |
| Landholdings that are small/marginal (%) | -0.00383*** | -0.00301*** | -0.00456*** |
| | (0.000859) | (0.000740) | (0.00116) |
| Land gini coefficient | -0.613*** | -0.484*** | -0.809*** |
| | (0.183) | (0.151) | (0.259) |
| Long run average yearly rainfall (mm/hr) | 2.110** | 1.221* | 2.313* |
| | (0.943) | (0.726) | (1.315) |
| Long run st. dev. yearly rainfall (mm/hr) | 3.575** | 2.585* | 4.488* |
| | (1.818) | (1.393) | (2.623) |
| Number of ag credit societies (in 1000s) | -0.00724*** | -0.00460*** | -0.00951*** |
| | (0.00175) | (0.00111) | (0.00241) |
| % of villages with medical facilities | -0.178*** | -0.181*** | -0.194*** |
| | (0.0475) | (0.0428) | (0.0662) |
| % of villages with paved road | -0.0491 | -0.0531* | -0.0448 |
| | (0.0375) | (0.0293) | (0.0527) |
| Distance to nearest town from village | 0.00194*** | 0.000819*** | 0.00260*** |
| | (0.000344) | (0.000265) | (0.000516) |
| Kharif season rain < average (1=yes) | 0.0143 | 0.0324*** | -0.0251 |
| | (0.0104) | (0.0110) | (0.0181) |
| Kharif < average * rain shock (abs. value) | 0.0578*** | 0.0309*** | 0.0934*** |
| | (0.00997) | (0.0101) | (0.0142) |
| Rabi season rain < average (1=yes) | 0.000700 | 0.0247** | -0.0123 |
| | (0.0110) | (0.0111) | (0.0181) |
| Rabi < average * rain shock (abs.value) | -0.166*** | -0.0274 | -0.215*** |
| | (0.0156) | (0.0169) | (0.0216) |
| Voter turnout in previous election (%) | -0.00436*** | -0.00149 | -0.00187 |
| | (0.00132) | (0.00105) | (0.00200) |
| SC/ST reserved previous election (1=yes) | -0.00127 | 0.0196 | 0.000327 |
| | (0.0144) | (0.0133) | (0.0209) |
| Split between ACs in previous election (1=yes) | -0.0702*** | -0.0427 | -0.0557** |
| | (0.0269) | (0.0315) | (0.0278) |
| Constant | 0.239 | 0.302* | 0.626** |
| | (0.197) | (0.155) | (0.294) |
| Year dummy variables | Y | Y | Y |
| District dummy variables | Y | Y | Y |
| Observations | 5,753 | 2,570 | 3,183 |
| R-squared | 0.517 | 0.496 | 0.541 |
| Joint sig. of UPA advantage vars (p-value) | 0.000 | 0.829 | 0.008 |

Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation 1 in the main text. Pre-2009 years include 2006/07, 2007/08, and 2008/09. Post-2009 years include 2010/11, 2011/12, 2012/12. Standard errors, shown in parentheses, are clustered at the mandal level (i=1,061). Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. These models are identical to those presented in Table 1 of the main text, but with mandal-level population weights (derived from census data) applied.

Table S2.5: With clustering of standard errors at AC-level and dropped by-elections

| | Clustering at AC-level, dropped split mandals | | Dropped mandals with by-elections in AC |
|---|---|---|---|
| | (1) Pre-2009 | (2) Post-2009 | (3) Post-2009 |
| UPA advantage in previous election | -0.0141 | 0.357** | 0.425*** |
| | (0.0666) | (0.158) | (0.105) |
| UPA advantage in previous election, squared | -0.0269 | 0.189 | 0.427 |
| | (0.228) | (0.700) | (0.445) |
| SC/ST percent (%) | 0.000664 | 0.00382** | 0.00377** |
| | (0.00122) | (0.00174) | (0.00151) |
| Illiterate (%) | 0.00454*** | 0.00865*** | 0.00919*** |
| | (0.00131) | (0.00236) | (0.00175) |
| Agricultural laborers (%) | 0.00321** | 0.00264 | 0.00139 |
| | (0.00158) | (0.00254) | (0.00215) |
| Cultivators (%) | 0.00220 | 0.00939** | 0.00963*** |
| | (0.00193) | (0.00393) | (0.00309) |
| Unirrigated land (%) | 0.000735** | 0.00123** | 0.00109** |
| | (0.000286) | (0.000483) | (0.000447) |
| Landholdings that are small/marginal (%) | -0.00334*** | -0.00533*** | -0.00519*** |
| | (0.00103) | (0.00160) | (0.00138) |
| Land gini coefficient | -0.521*** | -0.999*** | -0.923*** |
| | (0.173) | (0.324) | (0.285) |
| Long run average yearly rainfall (mm/hr) | 1.231 | 3.228* | 3.370** |
| | (1.066) | (1.746) | (1.488) |
| Long run st. dev. yearly rainfall (mm/hr) | 3.430* | 5.665 | 6.332** |
| | (2.024) | (3.674) | (2.936) |
| Number of ag credit societies (in 1000s) | -0.00622*** | -0.0147*** | -0.0124*** |
| | (0.00143) | (0.00360) | (0.00277) |
| % of villages with medical facilities | -0.176*** | -0.175** | -0.162** |
| | (0.0528) | (0.0849) | (0.0791) |
| % of villages with paved road | -0.0590* | -0.0755 | -0.0815 |
| | (0.0309) | (0.0618) | (0.0603) |
| Distance to nearest town from village | 0.00103*** | 0.00297*** | 0.00292*** |
| | (0.000349) | (0.000664) | (0.000568) |
| Kharif season rain < average (1=yes) | 0.0332** | -0.0282 | -0.0207 |
| | (0.0150) | (0.0302) | (0.0214) |
| Kharif < average * rain shock (abs. value) | 0.0316** | 0.0977*** | 0.0899*** |
| | (0.0146) | (0.0213) | (0.0161) |
| Rabi season rain < average (1=yes) | 0.0224 | -0.00258 | 0.0205 |
| | (0.0174) | (0.0286) | (0.0225) |
| Rabi < average * rain shock (abs.value) | -0.0284 | -0.232*** | -0.251*** |
| | (0.0244) | (0.0369) | (0.0265) |
| Voter turnout in previous election (%) | -0.00193 | -0.00388 | -0.00328 |
| | (0.00177) | (0.00324) | (0.00224) |
| SC/ST reserved previous election (1=yes) | 0.0187 | -0.000171 | 0.00668 |
| | (0.0204) | (0.0315) | (0.0238) |
| Split between ACs in previous election (1=yes) | | | -0.0511 |
| | | | (0.0323) |
| Constant | 0.322 | 0.806** | 0.650* |
| | (0.230) | (0.407) | (0.334) |
| Year dummy variables | Y | Y | Y |
| District dummy variables | Y | Y | Y |
| Observations | 2,559 | 2,961 | 3,062 |
| R-squared | 0.494 | 0.503 | 0.515 |
| Joint sig. of UPA advantage vars (p-value) | 0.975 | 0.079 | 0.000 |

Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation 1 in the main text. Pre-2009 years include 2006/07, 2007/08, and 2008/09. Post-2009 years include 2010/11, 2011/12, 2012/12. Standard errors, shown in parentheses, are clustered at the AP level in columns 1 and 2 and at the mandal level in column 3. Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. These models are identical to those presented in Table 1 of the main text, but with slightly different sub-samples and standard error clustering methods.

Table S2.6: Alternate specification and robustness checks

| | Dropped Telangana districts | | With INC advantage instead | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | Pre-2009 | Post-2009 | Pre-2009 | Post-2009 |
| UPA advantage in last election | 0.0493 | 0.699*** | | |
| | (0.0556) | (0.126) | | |
| UPA advantage in last election squared | -0.537** | -1.137*** | | |
| | (0.227) | (0.401) | | |
| INC advantage in last election | | | 0.0195 | 0.357*** |
| | | | (0.0422) | (0.103) |
| INC advantage in last election squared | | | -0.0136 | 0.269 |
| | | | (0.105) | (0.413) |
| SC/ST caste (%) | 0.000962 | 0.00371* | 0.000660 | 0.00406*** |
| | (0.00128) | (0.00218) | (0.000834) | (0.00149) |
| Illiterate (%) | 0.00459*** | 0.00716*** | 0.00458*** | 0.00883*** |
| | (0.00125) | (0.00180) | (0.00107) | (0.00173) |
| Agricultural laborers (%) | 0.00327* | -0.000922 | 0.00324** | 0.000875 |
| | (0.00171) | (0.00243) | (0.00135) | (0.00215) |
| Cultivators (%) | 0.00553** | 0.0158*** | 0.00229 | 0.0102*** |
| | (0.00235) | (0.00369) | (0.00161) | (0.00305) |
| Unirrigated land (%) | 0.000412 | 0.000290 | 0.000771*** | 0.00105** |
| | (0.000355) | (0.000533) | (0.000245) | (0.000448) |
| Landholdings that are small/marginal (%) | -0.00280** | -0.00657*** | -0.00328*** | -0.00504*** |
| | (0.00127) | (0.00192) | (0.000818) | (0.00136) |
| Land gini coefficient | -0.409* | -1.134*** | -0.539*** | -0.903*** |
| | (0.226) | (0.394) | (0.165) | (0.281) |
| Long run average yearly rainfall (mm/hr) | -0.835 | 2.487 | 1.185 | 2.640* |
| | (0.992) | (1.848) | (0.798) | (1.480) |
| Long run st. dev. yearly rainfall (mm/hr) | 7.851*** | 4.073 | 3.479** | 6.245** |
| | (2.414) | (3.727) | (1.589) | (2.923) |
| Number of ag credit societies (in 1000s) | -0.00549*** | -0.0101*** | -0.00613*** | -0.0122*** |
| | (0.00140) | (0.00260) | (0.00140) | (0.00285) |
| % of villages with medical facilities | -0.168** | -0.102 | -0.176*** | -0.166** |
| | (0.0696) | (0.0987) | (0.0496) | (0.0780) |
| % of villages with paved road | -0.0460 | -0.0257 | -0.0577* | -0.0870 |
| | (0.0501) | (0.0768) | (0.0341) | (0.0603) |
| Distance to nearest town from village | 0.00163*** | 0.00336*** | 0.00102*** | 0.00293*** |
| | (0.000391) | (0.000757) | (0.000299) | (0.000562) |
| Kharif season rain less than average (1=yes) | 0.0904*** | 0.0219 | 0.0337*** | -0.0309 |
| | (0.0235) | (0.0240) | (0.0122) | (0.0208) |
| Kharif less than avg. * rain shock (abs value) | -0.0239* | 0.0524*** | 0.0315*** | 0.0988*** |
| | (0.0134) | (0.0170) | (0.0106) | (0.0156) |
| Rabi season rain less than average (1=yes) | -0.00330 | -0.106*** | 0.0227* | 0.00189 |
| | (0.0184) | (0.0334) | (0.0124) | (0.0214) |
| Rabi less than avg. * rain shock (abs value) | 0.122*** | 0.00784 | -0.0272 | -0.232*** |
| | (0.0374) | (0.0540) | (0.0183) | (0.0250) |
| Voter turnout in last election (%) | -0.00563*** | -0.00343 | -0.00204* | -0.00299 |
| | (0.00192) | (0.00252) | (0.00121) | (0.00222) |
| SC/ST reserved last election (1=yes) | -0.0276 | -0.0144 | 0.0199 | 0.00646 |
| | (0.0212) | (0.0284) | (0.0149) | (0.0239) |
| Split between ACs in last election (1=yes) | -0.117* | -0.0806** | -0.0995** | -0.0520 |
| | (0.0633) | (0.0327) | (0.0392) | (0.0324) |
| Constant | 0.376 | 1.300*** | 0.0853 | 1.010*** |
| | (0.245) | (0.424) | (0.195) | (0.381) |
| Year dummy variables | Y | Y | Y | Y |
| District dummy variables | Y | Y | Y | Y |
| Observations | 1,301 | 1,890 | 2,570 | 3,183 |
| R-squared | 0.524 | 0.607 | 0.495 | 0.509 |
| Joint sig. of UPA/INC advantage vars (p-value) | 0.039 | 0.000 | 0.559 | 0.002 |

Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation 1 in the main text. Pre-2009 years include 2006/07, 2007/08, and 2008/09. Post-2009 years include 2010/11, 2011/12, 2012/12. Standard errors, shown in parentheses, are clustered at the mandal level (i=630 in the non-Telangana specifications and i=1,061 in the full sample INC models). Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. These models are identical to those presented in Table 1 of the main text, but with slightly different sub-samples and independent variable definitions.

Table S2.7: Alternate dependent variable and robustness checks

| | Dep var=Total expenditures on wages per capita | | Dep var=Percent of households working on MGNREGA | | Dep var= Average number of days of employment on MGNREGA (unconditional) | |
|---|---|---|---|---|---|---|
| | (1) Pre-2009 | (2) Post-2009 | (3) Pre-2009 | (4) Post-2009 | (5) Pre-2009 | (6) Post-2009 |
| UPA advantage in last election | -0.0116 | 0.250*** | 0.0195 | 0.0641 | -1.668 | 10.51*** |
| | (0.0377) | (0.0828) | (0.0348) | (0.0433) | (1.937) | (3.700) |
| UPA advantage in last election squared | -0.0589 | 0.186 | -0.0276 | -0.235 | -1.593 | -2.949 |
| | (0.121) | (0.333) | (0.121) | (0.160) | (6.204) | (14.87) |
| SC/ST caste (%) | 0.000754 | 0.00410*** | 0.00104 | 0.00126** | 0.0160 | 0.119** |
| | (0.000738) | (0.00128) | (0.000630) | (0.000536) | (0.0348) | (0.0552) |
| Illiterate (%) | 0.00385*** | 0.00790*** | 0.00722*** | 0.00869*** | 0.270*** | 0.543*** |
| | (0.000958) | (0.00147) | (0.000921) | (0.000837) | (0.0514) | (0.0685) |
| Agricultural laborers (%) | 0.00279** | 0.000725 | 0.00328*** | 0.00158* | 0.148** | 0.0375 |
| | (0.00122) | (0.00184) | (0.00103) | (0.000934) | (0.0635) | (0.0813) |
| Cultivators (%) | 0.00238* | 0.00774*** | 0.000965 | 0.00227* | 0.0618 | 0.209* |
| | (0.00142) | (0.00261) | (0.00118) | (0.00119) | (0.0692) | (0.110) |
| Unirrigated land (%) | 0.000595*** | 0.000773** | 7.71e-06 | -0.000275 | 0.0247** | 0.0224 |
| | (0.000219) | (0.000365) | (0.000208) | (0.000200) | (0.0116) | (0.0168) |
| Landholdings that are small/marginal (%) | -0.00306*** | -0.00546*** | -0.00160*** | -0.00214*** | -0.154*** | -0.251*** |
| | (0.000720) | (0.00110) | (0.000592) | (0.000531) | (0.0346) | (0.0480) |
| Land gini coefficient | -0.467*** | -0.919*** | -0.419*** | -0.541*** | -26.40*** | -55.31*** |
| | (0.143) | (0.243) | (0.128) | (0.121) | (7.068) | (10.84) |
| Long run average yearly rainfall (mm/hr) | 1.061 | 2.481** | -0.00851 | -0.492 | 11.29 | 16.53 |
| | (0.700) | (1.250) | (0.641) | (0.596) | (36.66) | (55.07) |
| Long run st. dev. yearly rainfall (mm/hr) | 3.031** | 5.571** | 2.453* | 1.066 | 124.7* | 185.4* |
| | (1.397) | (2.458) | (1.418) | (1.310) | (70.85) | (110.9) |
| Number of ag credit societies (in 1000s) | -0.00493*** | -0.00989*** | -0.00528*** | -0.00590*** | -0.233*** | -0.421*** |
| | (0.00122) | (0.00240) | (0.00107) | (0.00115) | (0.0594) | (0.106) |
| % of villages with medical facilities | -0.152*** | -0.158** | -0.120*** | -0.173*** | -9.098*** | -11.68*** |
| | (0.0436) | (0.0618) | (0.0340) | (0.0302) | (2.081) | (2.761) |
| % of villages with paved road | -0.0360 | -0.0633 | -0.0536** | -0.0189 | -1.478 | -1.644 |
| | (0.0294) | (0.0488) | (0.0268) | (0.0248) | (1.453) | (2.088) |
| Distance to nearest town from village | 0.000856*** | 0.00237*** | 0.00111*** | 0.00134*** | 0.0389*** | 0.108*** |
| | (0.000272) | (0.000497) | (0.000239) | (0.000248) | (0.0144) | (0.0232) |
| Kharif season rain less than average (1=yes) | 0.0311*** | -0.0263 | 0.0290*** | -0.0163** | 1.650*** | -1.462** |
| | (0.0104) | (0.0172) | (0.00896) | (0.00762) | (0.524) | (0.691) |
| Kharif less than avg. * rain shock (abs value) | 0.0333*** | 0.0855*** | 0.0240*** | 0.0209*** | 1.335*** | 3.757*** |
| | (0.00947) | (0.0136) | (0.00755) | (0.00610) | (0.479) | (0.622) |
| Rabi season rain less than average (1=yes) | 0.0272** | -0.0155 | 0.000562 | 0.00563 | 1.687*** | -1.009 |
| | (0.0111) | (0.0177) | (0.00959) | (0.00780) | (0.575) | (0.775) |
| Rabi less than avg. * rain shock (abs value) | -0.0231 | -0.169*** | 0.0338*** | -0.0675*** | -1.257 | -6.764*** |
| | (0.0165) | (0.0197) | (0.0124) | (0.00814) | (0.785) | (0.855) |
| Voter turnout in last election (%) | -0.00235** | -0.00337* | -0.000886 | -0.000377 | -0.105** | -0.145* |
| | (0.00109) | (0.00193) | (0.000960) | (0.00106) | (0.0532) | (0.0864) |
| SC/ST reserved last election (1=yes) | 0.0181 | 0.00890 | 0.0249** | 0.0174 | 1.769** | 2.216** |
| | (0.0134) | (0.0204) | (0.0123) | (0.0108) | (0.726) | (0.960) |
| Split between ACs in last election (1=yes) | -0.0902*** | -0.0385 | -0.0555 | -0.00546 | -4.156** | -0.985 |
| | (0.0346) | (0.0288) | (0.0404) | (0.0153) | (1.709) | (1.199) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Constant | 0.167 | 1.080*** | 0.159 | 0.701*** | 13.53 | 64.71*** |
| | (0.169) | (0.319) | (0.152) | (0.161) | (8.357) | (13.90) |
| Year dummy variables | Y | Y | Y | Y | Y | Y |
| District dummy variables | Y | Y | Y | Y | Y | Y |
| Observations | 2,570 | 3,183 | 2,570 | 3,183 | 2,570 | 3,183 |
| R-squared | 0.469 | 0.549 | 0.522 | 0.632 | 0.490 | 0.565 |
| Joint sig. of UPA advantage vars (p-value) | 0.856 | 0.009 | 0.837 | 0.152 | 0.6738 | 0.0164 |

Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation 1 in the main text. Pre-2009 years include 2006/07, 2007/08, and 2008/09. Post-2009 years include 2010/11, 2011/12, 2012/12. Standard errors, shown in parentheses, are clustered at the mandal level (i=1,061). Only 1,039 of 1,061 mandals are included in the pre-2009 election years because there was no UPA coalition candidate in ACs matched to 22 mandals. These models are identical to those presented in Table 1 of the main text, but with different dependent variable definitions.

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## APPENDIX S3: VOTER RESPONSE IN 2009 TO MGNREGS EXPENDITURES

Because the UPA won re-election in 2009, there is good reason to believe that MGNREGS spending played some role in their victory. While not the central focus of our analysis, considering the relationship in this direction will add support for or against a growing body of literature linking the UPA's performance in the 2009 election with this program in particular (Elliott 2011; Ramani 2009; Zimmermann 2012a). Moreover, if we are able to reject the null hypotheses that the partisan-based distribution of funds was present in the pre-election years, then this test will help us to understand to what extent this strategy "worked" for the UPA coalition. To investigate the link between MGNREGS expenditures and voter response in 2009, we estimate the following model as a cross section:

(S3.1) $$\Delta advantage_{id} = \delta_1 MGNREGSsum_{id} + \delta_2 \boldsymbol{needs}_{id} + \delta_3 \boldsymbol{z}_{id} + \mu_d + \varepsilon_{id}$$

where $\Delta advantage$ is the difference in voting advantage of the UPA coalition between the 2009 and 2004 elections and $MGNREGSsum$ is the total program funds spent in the mandal in and before 2008/09 (for definitions of all other variables and included subscripts, see the main text). We conclude that there is evidence that MGNREGS expenditures are positively correlated with a shift in voters towards the UPA coalition by testing the hypothesis:

$$H_O(S3.1): \delta_1 = 0;\ H_A(A3.1): \delta_1 > 0$$

Because it may be the case that voters view their AC-specific incumbent party as the implementers of MGNREGS and, therefore, reward that party instead of the UPA coalition with their votes in 2009, we also run equation (S3.1) by redefining the $\Delta advantage$ term with respect to the AC-specific incumbent party for comparison. Where $H_O(S3.1)$ holds for the UPA coalition but not for the AC-specific incumbent party, we take this as *ex post* empirical evidence to accompany much qualitative evidence that we correctly define our analysis with respect to the UPA coalition.

While we find little to no evidence of blatant politically-rooted spending in years before the 2009 election (see Table 1 of main text), we remain interested in how constituents responded to MGNREGS spending specific to their mandal in the years leading up to 2009 with their votes in the election. Regression results for equation (S3.1) are found in Table S3.1 below. When specifying $\Delta advantage$ with respect to the UPA coalition in both elections (columns 1 and 2), we find that aggregate MGNREGS spending in the pre-election years is positive and statistically significantly correlated with the movement of voters towards UPA candidates. This allows us to reject the null in $H_O(S3.1)$ that MGNREGS expenditures were uncorrelated with the UPA's 2009 victory. When re-specifying $\Delta advantage$ with respect to the AC-specific incumbent party from the 2004 election (columns 3 and 4), however, we find no significant relationship between aggregate MGNREGS spending in the pre-election years and voter response, meaning that we fail to reject the null in $H_O(S3.1)$ under the AC-specific incumbent specification.

These results have three major implications. First, the fact that UPA candidates were "rewarded" for MGNREGS expenditures but AC-specific incumbent parties were not implies that voters attribute MGNREGS to the UPA coalition even when a different party is in power in their matched AC. This evidence supports the claim that MGNREGS is seen as a UPA "flagship" program and supports our decision to define our analysis with respect to the UPA coalition throughout. Second, the fact that voters credited UPA with MGNREGS funds and voted in favor of the UPA as a result adds to a growing body of literature showing the importance of MGNREGS in the 2009 election results (Elliott 2011; Ramani 2009; Zimmermann 2012a). Third, because we find no evidence of overwhelmingly political spending in the years leading up to the election, voters are not responding to this non-programmatic distribution but instead the fact that the program appears to have been well-targeted to the needs of mandals. Indeed, explicit

vote “encouragement” was unnecessary for the UPA coalition to secure their 2009 victory; catering to the needs of their constituents by allocating scarce resources where they were most essential was a winning strategy for UPA. This sentiment was echoed in a study by Sharma (2009, cited in Chamorro *et al.* 2010) which suggests that AP has implemented MGNREGS well because political will has created a cycle of good performance leading to more political support.

Table S3.1: Regression results for political reward in 2009 election for MGNREGS spending

| | UPA advantage | | Local incumbent advantage | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | All mandals | Phase 1 and 2 | All mandals | Phase 1 and 2 |
| Total MGNREGS spending, 2006/07-2008/09 | 0.0282*** | 0.0196* | 0.00254 | -0.00127 |
| | (0.0105) | (0.0110) | (0.00996) | (0.0105) |
| SC/ST caste (%) | 0.000195 | 0.000418 | -0.000286 | -0.000178 |
| | (0.000573) | (0.000655) | (0.000578) | (0.000657) |
| Illiterate (%) | 0.00301*** | 0.00355*** | -0.00153* | -0.00217** |
| | (0.000939) | (0.00101) | (0.000884) | (0.000963) |
| Agricultural laborers (%) | 0.00227** | 0.00145 | 0.00104 | 0.00151 |
| | (0.00105) | (0.00115) | (0.000980) | (0.00109) |
| Cultivators (%) | -0.00130 | -0.000594 | 0.00182 | 0.00266** |
| | (0.00124) | (0.00135) | (0.00118) | (0.00129) |
| Unirrigated land (%) | 0.000172 | 2.73e-05 | 0.000397* | 0.000306 |
| | (0.000229) | (0.000248) | (0.000214) | (0.000237) |
| Landholdings that are small/marginal (%) | -0.000782 | -0.00161** | 0.000698 | 0.000355 |
| | (0.000626) | (0.000675) | (0.000614) | (0.000677) |
| Land gini coefficient | -0.324** | -0.294* | 0.135 | 0.221 |
| | (0.142) | (0.151) | (0.143) | (0.154) |
| Long run average yearly rainfall (mm/hr) | -0.636 | 0.0739 | 0.821 | 1.052 |
| | (0.669) | (0.724) | (0.631) | (0.688) |
| Long run st. dev. yearly rainfall (mm/hr) | 3.021* | 2.653 | 0.360 | 0.304 |
| | (1.566) | (1.669) | (1.487) | (1.606) |
| Number of ag credit societies (in 1000s) | 0.000774 | 0.000709 | 0.000838 | -7.12e-05 |
| | (0.00108) | (0.00134) | (0.000986) | (0.00125) |
| % of villages with medical facilities | 0.0879** | 0.0693* | -0.0339 | -0.0270 |
| | (0.0341) | (0.0366) | (0.0324) | (0.0353) |
| % of villages with paved road | 0.00933 | -0.00759 | 0.0258 | 0.0162 |
| | (0.0275) | (0.0288) | (0.0264) | (0.0283) |
| Distance to nearest town from village | 0.000226 | -3.87e-05 | 5.81e-05 | 0.000174 |
| | (0.000267) | (0.000289) | (0.000250) | (0.000273) |
| SC/ST reserved election in 2009 (1=yes) | 0.0253* | 0.0280** | 0.0244* | 0.0121 |
| | (0.0134) | (0.0142) | (0.0126) | (0.0136) |
| SC/ST reserved election in 2004 (1=yes) | -0.0223* | -0.0337** | -0.0175 | -0.0111 |
| | (0.0135) | (0.0146) | (0.0130) | (0.0141) |
| New or abolished AC in 2008 (1=yes) | -0.0223* | -0.0284** | -0.0146 | -0.0206* |
| | (0.0117) | (0.0126) | (0.0113) | (0.0124) |
| Mandal split between ACs in 2004 (1=yes) | -0.0612 | -0.128 | -0.0322 | -0.0945 |
| | (0.0697) | (0.0906) | (0.0626) | (0.0830) |
| Mandal split between ACs in 2009 (1=yes) | 0.0388** | 0.0444** | -0.0151 | 0.00232 |
| | (0.0195) | (0.0213) | (0.0187) | (0.0207) |
| Constant | -0.00931 | -0.0358 | -0.265* | -0.287* |
| | (0.148) | (0.158) | (0.144) | (0.155) |
| District dummy variables | Y | Y | Y | Y |
| Number of mandals | 1,039 | 914 | 929 | 815 |
| R-squared | 0.262 | 0.272 | 0.143 | 0.151 |

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors included in parentheses. All reported results are estimated per equation S2.1. Sample for UPA advantage models includes those mandals with a UPA coalition candidate in both 2004 and 2009. Sample for models incumbent advantage includes mandals where we can track the incumbent party between the 2004 and 2009 elections.

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## APPENDIX S4: MGNREGS SPENDING IN RESPONSE TO POLITICAL TURNOVER

In the presence of partisan-influenced expenditure patterns, we might also expect that political turnover has an effect on MGNREGS spending. For instance, those areas that did not vote for UPA in 2004 but did in 2009 were "rewarded" with MGNREGS spending after the 2009 election, implying that the UPA coalition considers changes in voting patterns over time when making decisions about fund allocation and spending. We also expect that those areas that voted for the UPA in 2004 but not in 2009 were "punished" by receiving less funds, all else equal. To test this hypothesis, we specify an additional model where the $advantage$ term is dropped and substituted with four categories— $winwin$ includes those mandals that elected the UPA coalition in both 2004 and 2009; $losewin$ includes mandals where UPA lost in 2004 but won in 2009; $winlose$ includes mandals where UPA won in 2004 but lost in 2009; and $loselose$ includes mandals where UPA lost in both elections:

(S4.1) $$MGNREGS_{idt} = \beta_0 + \beta_1 losewin_{id} + \beta_2 winlose_{id} + \beta_3 loselose_{id} + \beta_4 needs_{id} + \beta_5 needs_{idt} + \beta_6 z_{idt} + \mu_d + \tau_t + \varepsilon_{idt}$$

where $winwin$ is the excluded group. Using these coefficient estimates, we test another set of non-programmatic distribution hypotheses:

$$H_O(S4.1): \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_A(S4.1): \beta_1 > \beta_2,\ \beta_1 > \beta_3,\ \beta_2 < 0,\ \beta_3 < 0$$

We test $H_O(S4.1)$ using the coefficient estimates in Table S4.1. Again, we reject the null hypothesis that mandals were treated the same way when grouping based on their change in voting patterns between 2004 and 2009. Indeed, the results of t-tests suggest that both of the groups that did not vote for UPA in 2009 ($loselose$ and $winlose$) were "punished" with less funds than were spent in mandals that elected a UPA candidate in both elections ($winwin$). We also find that those mandals that consistently did not vote for UPA ($loselose$) received

significantly less funds than the group that switched from non-UPA supporters in 2004 to supporters in 2009 ($losewin$); however, the previously non-UPA mandals that moved towards the UPA in 2009 ($losewin$) were no more or less likely to receive more funds than those mandals that were consistent supporters ($winwin$). These findings provide further evidence that not voting for UPA in 2009 meant significantly less MGNREGS funds would flow to the mandal, although overturning a non-UPA AC representative provided no additional benefit.

Table S4.1: Regression results for political turnover model, post-2009 election

| | |
|---|---|
| UPA 2004=lose and UPA 2009=win | 0.00540 |
| | (0.0340) |
| UPA 2004=win and UPA 2009=lose | -0.0604*** |
| | (0.0223) |
| UPA 2004=lose and UPA 2009=lose | -0.109*** |
| | (0.0318) |
| SC/ST percent (%) | 0.00402*** |
| | (0.00150) |
| Illiterate (%) | 0.00883*** |
| | (0.00174) |
| Agricultural laborers (%) | 0.000921 |
| | (0.00216) |
| Cultivators (%) | 0.0104*** |
| | (0.00298) |
| Unirrigated land (%) | 0.00108** |
| | (0.000450) |
| Landholdings that are small/marginal (%) | -0.00505*** |
| | (0.00136) |
| Land gini coefficient | -0.922*** |
| | (0.277) |
| Long run average yearly rainfall (mm/hr) | 2.713* |
| | (1.489) |
| Long run st. dev. yearly rainfall (mm/hr) | 6.004** |
| | (2.937) |
| Number of ag credit societies (in 1000s) | -0.0121*** |
| | (0.00280) |
| % of villages with medical facilities | -0.166** |
| | (0.0791) |
| % of villages with paved road | -0.0785 |
| | (0.0601) |
| Distance to nearest town from village | 0.00305*** |
| | (0.000567) |
| Kharif season rain < average (1=yes) | -0.0306 |
| | (0.0208) |
| Kharif < average * rain shock (abs. value) | 0.0995*** |
| | (0.0157) |
| Rabi season rain < average (1=yes) | -7.00e-05 |
| | (0.0214) |
| Rabi < average * rain shock (abs.value) | -0.229*** |
| | (0.0248) |
| Voter turnout in 2009 election (%) | -0.00265 |
| | (0.00224) |
| SC/ST reserved 2009 election (1=yes) | -0.00374 |
| | (0.0243) |
| Split between ACs in 2009 election (1=yes) | -0.0536 |
| | (0.0327) |
| Constant | 0.719** |
| | (0.329) |
| Year dummies | Y |
| District dummies | Y |
| Observations | 3,183 |
| R-squared | 0.509 |
| Joint sig. of UPA advantage vars (p-value) | 0.001 |

Notes: *** p<0.01, ** p<0.05, * p<0.1. All reported results are estimated per Equation S3.1 in this Appendix. Post-2009 years include 2010/11, 2011/12, 2012/12. Standard errors, shown in parentheses, are clustered at the mandal level (i=1,061). See text for definitions of variables.