Absence: Electoral Cycles and Teacher Absenteeism in India*

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October 13, 2022

Word Count: 10,282

Public sector worker absence has been commonly cited as a reason for the poor performance of developing country public services. This absenteeism is expensive: a nationally representative sample of villages across India finds that teacher absenteeism costs $1.5 billion a year. Despite high profile academic, policy, and popular attention to the problem, absenteeism continues to be a chronic problem. This paper argues that one explanation for absenteeism is the differential attention politicians pay to public services over the cycle of their tenure. Using the case of teachers in India, teachers and politicians are embedded in a dynamic principal-agent relationship that allows for teacher absenteeism when electoral incentives are not salient and results in increased accountability when they are. I construct a panel of all government schools across India between 2006 and 2018, employ an event study design, and find that teacher absenteeism decreases substantially in the year before an election and is higher in the year after an election. When the number of potential principals increases, absenteeism also increases. Placebo tests on private school absenteeism find smaller and inconsistent effects of election years on absenteeism in the private sector, lending support for a channel of political control of the bureaucracy around elections. Political interference in the bureaucracy has a strong effect on bureaucratic performance, and relationships between public sector workers and the state can ameliorate chronic absenteeism.

INTRODUCTION

Bureaucratic performance has commonly been cited as a reason for the poor performance of public services (Evans, 1995; Tendler, 1997). One measure of bureaucratic under-performance common to low- and middle-income countries is absenteeism and shirking. For basic services like health and education, teachers and health care workers are often absent and, when present, not working (Chaudhury et al., 2006). This absenteeism is expensive. In a nationally representative sample of villages across India, Muralidharan et al. (2017) find that teacher absenteeism costs $1.5 billion a year. But despite continued academic, media,[1] and policy attention (Ministry of Human Resource Development, 2020, 21), absenteeism continues to be a chronic problem for public service provision.

Work across political economy has contrasting predictions on the ability of the state and private actors to reduce absenteeism. On the one hand, bureaucrats and their unions are portrayed as powerful political actors that can turn out (Larreguy, Montiel Olea and Querubin, 2017), swing the vote (Neggers, 2018), easily organize and engage in the electoral and policy process (Anzia, 2013; Moe, 2015), and run their own candidates (Cook, 1996). In contexts of weak state capacity, low levels of accountability, and large informational asymmetries in principal-agent relationships, high levels of absenteeism should not be a mystery. And yet, bureaucrats are subject to frequent sanctions through transfers (Brierley, 2020; Iyer and Mani, 2012; Wade, 1985), and the docking of pay.[2] Absenteeism, as opposed to other measures of public sector worker effort such as long-run quality, is easy to observe (Mani and Mukand, 2007). Given these levers governments and elected politicians have to hold public sector workers accountable, why do politicians not use them more often to hold bureaucrats accountable?

Reconciling these contrasting predictions, this paper argues that bureaucrats' ability to shirk and politicians' ability to reward and sanction have a *temporal* dimension (Carpenter and Krause, 2015). I explore the effects of *electoral cycles* on absenteeism (Nordhaus, 1975): Politicians leverage their powers to sanction bureaucrats when political incentives are salient and bureaucrats leverage their very real powers to shirk when political incentives are less salient. Politicians pay differential attention to bureaucrats over the course of their tenure and are more likely to hold bureaucrats accountable around the electoral period when they are more likely to be scrutinized and rewarded for better performance as elections focus political attention. In exchange, politicians provide bureaucrats with significant leeway outside of elections. With myopic voters and a fragmented party system, this creates an absence cycle around elections.

I test this argument using the case of teachers in India. I construct a geocoded school-level panel of all government schools in India from 2006 to 2018 matched to electoral data over the same period. Leveraging the staggered timing of elections between and within states to identify the effects of the election cycle on teacher attendance, I employ an event-study design of election timing on absenteeism and find that teachers are less likely to be absent in the year immediately preceding an election. Specifically, I find that in the year before an election, within school absenteeism declines by 2.3 percentage points.

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[1] Anand, Geeta. February 19, 2016. "Fighting Truancy Among India's Teachers, With a Pistol and a Stick". *The New York Times*.

[2] Staff Reporter, November 3, 2021. "Uttar Pradesh government issues final warning to school teachers." *The Times of India*.

The effect is large and consistent across several specifications, including modeling the full electoral cycle and using the time to election (Appendix A1). I do not find similar electoral cycles in private schools, providing further support for the effects of electoral cycles on variation in accountability in the public sector and the lack of sanctions politicians have over the private sector.

Exploring the mechanisms of electoral cycles, I find that the greater number of political parties, measured by the number of effective parties in an election, reduces the effects of elections on accountability. While teachers are relatively stable over time within a constituency and have unions to aggregate their interests up to politicians and parties, the question of whom will hold them accountable in the future is complicated by India's competitive electoral environment. As the number of plausible election winners increases, the effect of elections on absenteeism decreases. This suggests that where parties are more institutionalized, bureaucrats and politicians can better negotiate relationships of accountability. The key theoretical insight of this paper is that the costs and benefits of holding front-line functionaries accountable are dynamic over time. It is sometimes more, sometimes less, costly for politicians, as principals, to hold front-line functionaries, as agents, accountable, and this variation in cost explains the variation in absenteeism.

I do not find support for four other common mechanisms for public sector quality that are otherwise inconsistent with dynamic relationships and varying costs and benefits to accountability. There is no evidence that greater electoral competition, political alignment between local politicians and the party in power reduce absenteeism, or higher levels of mid-level bureaucrat or parental effort also do not vary across the electoral cycle, evidence consistent with the channel running through politicians. The null results on these four channels suggest that the channel is through the ability of teachers and politicians to enter a credible relationship over time, rather than electoral competition, the strength of the party in power, or channels through other parts of the bureaucracy or bottom-up pressures from parents.

As the school census panel is self-reported, there could be concerns that teachers are simply "cooking the books" and reporting lower levels of absenteeism near elections to appease politicians, policy-makers, and parents when there has not been any underlying change in their behavior. To address these concerns, I re-run a similar analysis on an independently collected school survey and find similar evidence of an electoral cycle in absenteeism (Appendix A2). Finally, I calculate the cost of absenteeism, and the benefits of reduced absenteeism, for students and the public purse. Test scores improve in election years in government schools, but remain stable across the electoral cycle in private schools. The fiscal recovery from reduced absenteeism is also large. I calculate that electoral pressures reduce the share of wages lost to absenteeism by approximately 30 percent (Appendix A3).

This paper makes at least three significant contributions. First, the paper moves beyond explanations rooted in *static* principal-agent relationships to explain variations in bureaucratic performance through what Carpenter and Krause (2015) have called "transactional authority." The study of bureaucratic performance in political science has traditionally been motivated by the idea that bureaucrats are embedded in principal-agent relationships (Dixit, 2002; Gailmard and Patty, 2012; Wilson, 1991), with asymmetrical information and moral hazards constraints to better performance. Better information, in the form of clearer lines of accountability (Dasgupta and Kapur, 2020; Gulzar and Pasquale, 2017), better channels of communication (Bhavnani and Lee, 2019; Jiang, 2018), or providing information (Björkman and

Svensson, 2009; Pradhan et al., 2014), results in better bureaucratic performance and reduced shirking. Targeting adverse selection as the second constraint in the principal-agent relationship has also been found to impact bureaucratic performance through meritocratic hiring (Oliveros and Schuster, 2018). Reducing the political influence that bureaucrats have is also frequently presented as a solution (Larreguy, Montiel Olea and Querubin, 2017; Moe, 2005). For policy, these papers suggest that stronger political control of bureaucrats will lead to better bureaucratic performance.

In contrast to that literature, this paper presents theory and evidence showing that the inability of politicians to monitor bureaucrats is not necessarily the binding constraint to better bureaucratic performance. I show that teachers and politicians exercise their respective powers with constraints – politicians regularly face voters, and teachers face sanctions that occur in different periods with different effects on job performance. In "transactional authority," these relationships are dynamic *over time* and are constantly negotiated and contested by a changing set of actors (Carpenter and Krause, 2015). While public sector workers can be responsive to one-shot intervention efforts, they are also embedded in relationships that are repeated over time. Policy-makers looking to address chronic absenteeism must take these longer relationships into account, and both the power to sanction that politicians hold and the political advantages public sector workers hold to influence political outcomes (Krause, 1999). Given the close tie between a politician's power to sanction and electoral incentives, one potential reform to address chronic absenteeism would be to weaken this chain of accountability and strengthen chains of accountability that are divorced from electoral incentives, such as those between teachers and mid-level bureaucrats. Indeed, these are already being considered for mid-level bureaucrats,[3] and could be extended to apply to front-line functionaries, too.

Through this, the paper joins a growing literature that studies the control agents, in this case teachers, have on principals, in this case politicians. Bureaucrats are not only embedded in principal-agent relationships, but can also elect their principals (Moe, 2015), campaign for their preferred candidates (Larreguy, Montiel Olea and Querubin, 2017), mobilize voters (Anzia, 2013), and can regularly be sanctioned by politicians through transfers (Brierley, 2020). Bureaucratic performance is as much influenced by the control agents have on principals as the inverse relationship, and greater political control might perversely worsen bureaucratic performance by increasing the reaction of agents. The principal-agent relationship is continuously contested and re-negotiated over time, complicating the one-sided nature of sanctioning traditionally conceived in principal-agent relationships (Carpenter and Krause, 2015). While these insights are more commonplace in the United States (Krause, 1999), this paper shows how they might operate outside of the United States (Hou et al., 2011).

Second, this paper theorizes on the front-line functionaries of the bureaucracy who "interact with citizens directly and have discretion over significant aspects of citizens' lives" (Lipsky, 2010, 4). They are unique to other types of bureaucrats as they are geographically dispersed, well organized politically, and regularly interface with citizens. Because of this, they can not only influence political control through upwards pressure on politicians but also influence political control through their influence on voters. The paper joins literature that recognizes that these types of bureaucrats should occupy a unique place in

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[3] *T.S.R Subramanian vs. Union of India*, Supreme Court of India, Writ Petition (Civil) No. 82, October 31, 2013.

service provision and democratic accountability as they structure citizen evaluations of the state because of these features (Bertelli et al., 2020; Mangla, 2015; Martin and Raffler, 2020).

Finally, I also use rich administrative data to answer an important question in political science. While the use of administrative data is increasingly common in political science (Lindgren, Oskarsson and Dawes, 2016; Gulzar and Pasquale, 2017), I do not take the quality of this data at face value and verify it against independently collected sources (Herrera and Kapur, 2007). Administrative data suffers from the additional concern that bureaucrats have an incentive to misreport in ways that make their performance look better (Martínez, 2022), on top of all the data quality concerns of other sources of data. Verified against other sources of data, however, administrative data provides great potential for students of political science as it allows us to answer big questions at scale, especially as the data gathering capacity of states improves (Jerven, 2013; Jensenius and Verniers, 2017).

In the next section, I outline the ways that teachers, politicians, and other civil society actors are embedded in *dynamic* and *negotiated* relationships of accountability over time. I outline the constraints all sets of actors face, and explain why front-line functionaries should occupy a distinct place in our theorizing in political science.

ELECTORAL CYCLES IN TEACHER ABSENTEEISM

High levels of public sector worker absenteeism present a paradox to students of the political economy of service provision. Service provider attendance exhibits many features of a "visible" public good: absenteeism is easily observed and fixes are also observed in the short-run (Mani and Mukand, 2007). A service recipient only has to turn up at a school or health clinic to notice that the teacher or doctor is not present to understand the problem. Unlike other forms of service quality such as test scores or good health, improvements in absenteeism are also observable in the short run. Politicians also hold several levers to hold wayward front-line functionaries accountable, including rewarding and punishing performance through transfers (Béteille, 2015; Brierley, 2020), and directly observing service provider effort by visiting schools and health clinics.[4] So why does absenteeism continue to be a chronic problem of service delivery in low and middle-income countries?

I argue that variation in absenteeism can be partially explained by a dynamic relationship that is constantly negotiated across the tenure of elected politicians. Given myopic voters, spending political capital to reduce absenteeism today does not always lead to direct material or political rewards tomorrow, so politicians will ignore absenteeism as a problem until they are forced to do so. Teachers are geographically dispersed and can influence voters through direct and repeated interactions. It is the very fact that attendance is a visible public good – easy to observe, quick to fix – that makes it ripe for being part of a dynamic relationship of accountability. Solutions do not require costly investments in the machinery of governance, as a phone call (Callen et al., 2017), the threat of a transfer (Béteille, 2015; Brierley, 2020), or a visit from a superior will inform the front-line functionary they are being monitored (Chaudhury

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[4]Interview with M. Somi Reddy, District Education Officer, Ranga Reddy District, Andhra Pradesh, September 2013. Anand, Geeta. February 19, 2016. "Fighting Truancy Among India's Teachers, With a Pistol and a Stick". *The New York Times*.

et al., 2006) and likely explains some of the success of simple randomized interventions that have reduced absenteeism.

Teachers and other front-line functionaries face three pressures to perform: bottom-up from service recipients, top-down from mid-level bureaucrats, and top-down from politicians. Service recipients can put pressure on front-line functionaries through increased monitoring (Raffler, Posner and Parkerson, 2018), better information (Andersen and Hvidman, 2021; Björkman and Svensson, 2009), and voicing disaffection to bureaucrats or politicians (Hirschman, 1970). Mid-level bureaucrats monitor bureaucrats as part of their day-to-day functions, with responsibilities for performance and quality (Mangla, 2015). The first two channels do not exhibit inter-temporal tradeoffs in their return on effort – the costs and benefits of a bureaucrat or citizen group attempting to hold front-line functionaries to account are constant over time. The lack of bottom-up pressure from service recipients and top-down pressure from mid-level bureaucrats likely goes a long way in explaining the low baseline levels of front-line functionary performance and high levels of absenteeism.

The return to politician effort, however, is not constant over time. Given flat wage hierarchies and strong tenure protections, politicians have three channels through which to sanction and reward teachers: transfers (Béteille, 2015; Brierley, 2020), job regularization,[5] and withholding pay.[6] Politicians can transfer teachers to better and worse schools within their state and can leverage this power to reward and sanction them strategically (Fagernäs and Pelkonen, 2020). Front-line functionaries that respond favorably are rewarded with transfers to better postings. Politicians can also withhold pay for small transgressions that are otherwise often ignored.

The third channel – top-down pressure from politicians – has received increased attention from political scientists in recent years (Callen et al., 2017; Dasgupta and Kapur, 2020; Gulzar and Pasquale, 2017; Raffler, Posner and Parkerson, 2018). Much of this work has sought to explain the pressures *mid-level* bureaucrats face from politicians. Front-line functionaries are distinct from mid-level bureaucrats, however, as they are far greater in number, geographically dispersed, and are often better organized through staff associations or politically engaged unions (Kingdon and Muzammil, 2009; Vaishnav and Khosla, 2016). While they can be transferred, transfers mostly occur *within* districts, and their tenure extends over many electoral cycles.[7] As they are organized in unions and other interest groups, they also do not rely on any one individual, unlike India's unstable party system, or ephemeral bureaucrat staff association. Therefore, this relationship is stable as one of the parties, the front-line functionaries, are relatively constant over time.

At the same time, front-line functionaries have weaker job protections in that their placements are not governed by as strict rules over postings as mid-level bureaucrats. The strongest tool that politicians have to reward and sanction teachers is their power over transfers. Front-line functionaries have a relatively flat hierarchy, with little wage and role differentiation between an entry-level position and

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[5]Staff Reporter, October 8, 2022. "Punjab issues notification for regularising services of 8,736 contract teachers." *The Indian Express*.

[6]Staff Reporter, November 3, 2021. "Uttar Pradesh government issues final warning to school teachers." *The Times of India*.

[7]See Mizala and Schneider (2014) for another example of politicians and teachers engaging in relationships that extend over multiple electoral cycles with the same group of teachers.

retirement (Evans, Yuan and Filmer, 2020), so the biggest influence on their working conditions and rewards is where they are posted. Even though most teachers are only ever posted and transferred within one district, districts in India are large spatially and demographically, so a posting within a district could be in a large urban center or a rural area with little connectivity. The conditions in schools can also vary substantially, with some schools connected digitally, and others lacking much basic equipment such as textbooks and blackboards. Transfers from one school to another are approved by District Education Officers (DEOs), who often work in the largest city in the district, although accounts of teachers using politicians and brokers connected to politicians to attempt to subvert this process are common (Béteille, 2015). Evidence suggests that there exist cycles in the use of transfers, with transfers increasing after elections (Fagernäs and Pelkonen, 2020).

The threats are not one-sided, however. Like many other countries, teachers in India are well organized in teachers' unions, many with ties to political parties (Kingdon and Muzammil, 2009). Teachers can also run for office and are not required to give up their teaching post while in office. While union power varies from state to state (Béteille, Kingdon and Muzammil, 2017), teacher unions are more formalized than other higher-level bureaucrats who are primarily organized in mutual interest organizations with more limited political functions (Vaishnav and Khosla, 2016). Teachers are also geographically distributed across the country. With the expansion of education in India in the mid-90s and early 2000s, there is now a primary school within one kilometer of every village in India meaning that there is at least one primary school teacher posted to work within close proximity to most citizens in the country (Government of India, 2009). As is common elsewhere, schools often double as polling booths during elections and teachers often work as booth monitors at election time (Neggers, 2018; Larreguy, Montiel Olea and Querubin, 2017). Teachers put these organizational and geographic advantages to use, often campaigning for their preferred candidates and lobbying to have candidates take favorable positions for teachers (Kingdon and Muzammil, 2009). As a result, they pose a credible threat to politicians directly by campaigning themselves, and indirectly by campaigning for others. As a result, the costs and benefits of attempting to hold teachers to account vary over time. To negotiate these dynamic and two-sided threats, politicians expend effort on monitoring front-line functionaries when they are likely to be rewarded for this effort and do not waste political capital on monitoring when they are not likely to be rewarded,[8] allowing front-line functionaries to shirk work in these periods.

Observable Implications

This argument leads to a number of observable implications. First, we should expect absenteeism to be lower immediately before an election, and higher in the immediate post-election period. The greatest returns to politicians come from showing their power over front-line functionaries to voters in the immediate pre-election period. Given myopic voters, the closer to elections they observe politician effort,

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[8]For one example, an interview respondent in Medak District in November 2013 gave examples of how in the run-up to the 2014 legislative assembly election, the local Member of the Legislative Assembly (MLA) had begun to visit their village more frequently to monitor the functioning of public services, including teacher attendance. Interview with school parent conducted by the author in Medak District, Andhra Pradesh, November 2013.

the more likely they are to reward politicians for this effort. Therefore, we should see a decrease in absenteeism before elections.

Second, the dynamic relationship turns on the ability of newly elected politicians to reward teachers, or teachers negotiating reduced monitoring, when the political benefits of monitoring are low far from elections. Politicians must have control over the ability to reward and sanction, namely through transfers to better or worse postings. There is strong evidence of these rewards in the post-election period – Fagernäs and Pelkonen (2020) find that teacher transfers are higher immediately following elections, suggesting that politicians reward and sanction teachers for their performance after elections. A corollary of this is that absenteeism should be higher immediately after elections as there are low benefits to monitoring for politicians.

In independent audits, Chaudhury et al. (2006) found that private school teachers are also likely to be absent, although the levels of absenteeism are much lower than in government schools in the same village. With that, although absenteeism is also likely to be high in private schools, private school teachers are not subject to the same costs from absenteeism as teachers in government schools. Teachers in private schools are managed at the school level and not by elected politicians, and cannot be transferred by politicians. As a result, politicians should have far less control over teacher absenteeism in the private sector as teacher management in private schools does not come under the government. Similar levels of absence in the private sector would suggest that either politicians can control teachers in the private sector, too, or raise concerns over the quality of the data. These concerns should be partially alleviated by looking at absenteeism in the private sector. The threat of sanctions is credible in the public sector and politicians can and do use their power of transfers to sanction teachers. In the private sector, however, politicians cannot transfer teachers, and the management and sanctioning of teachers rests with individual schools. As politicians only control teacher hiring and transfers in the public sector this leads to our third observable implication: we should expect different outcomes in the government and private sector, with an absenteeism cycle among government school teachers, but not among private school teachers.

Given that this is a relationship between front-line functionaries and politicians, the relationship requires clear expectations of the stability of the two parties over time. Uncertainty from either side over the presence of the other party in the relationship over time reduces the stability of the relationship and increases the probability a party will shirk. Given the strong tenure protections of teachers in India, their stability in the relationship is virtually guaranteed. On the other side, however, politicians face uncertainty in their continued tenure. If there are more parties with a credible chance of winning an election, relationships become harder to maintain. There are more actors with who to negotiate, and each actor is less credible over time as there is decreased certainty over whether they will be in power in the next period. As a result, the fourth observable implication is that with a greater number of *credible* political parties competing in a constituency, the probability of a relationship being maintained decreases and absenteeism should be higher around elections.

Alternative Explanations

There are four potential alternative explanations to explain levels of teacher absenteeism that do not assume a dynamic relationship between teachers and politicians: electoral competition, political align- ment, greater bureaucratic effort, and greater parental and societal monitoring. The first explanation, electoral competition, builds upon a retrospective voting model and argues that constituencies that ex- perience greater levels of electoral competition should see greater decreases in absenteeism. If elections focus attention, elections in which politicians fear losing their jobs should focus attention even more. Although it is hard to know ex-ante what the margin of victory will be, it is not unreasonable that a politician might expect an election to be more or less competitive and adjust behavior accordingly. If a dynamic relationship is driving the results, however, the competitiveness of the election should not matter. Electoral competition does not change the costs and benefits of monitoring *over time*. It is not whether a politician is facing pressure from constituents that matters as much as the ability of a politician to credibly maintain a relationship with teachers over time. A competitive election could consist of two parties, meaning that teachers only have two parties to potentially negotiate principal-agent relation- ships and are guaranteed that one of them will be in power in the subsequent period. Negotiating with two parties is not prohibitively difficult and should not necessarily lead to a decrease in the probability of strong relationships of accountability. If the channel of reduced absenteeism is working through a dy- namic temporal relationship rather than greater electoral competition, we should not see any effect on absenteeism in more competitive districts.

The second alternative explanation, partisan alignment between the politicians at the constituency level and the party in power at the state level, has been shown to influence public service outcomes in other scenarios (Asher and Novosad, 2017; Fiva et al., 2021; Garay and Simison, 2022), and could do so in education where education is a concurrent subject and the Director of Education at the state level reports to the Chief Minister in the state.[9] If a local elected politician is aligned with the party in power, they have institutional and personal relationships with executives and ministries that can exert control over state and local-level bureaucrats, including education officers and teachers. Parties in general have an incentive to leverage this control around elections to win elections through better service provision. If a politician is a member of the ruling coalition, teachers could understand their job security to be, in part, a function of their responsiveness to members of the ruling coalition, especially after elections when teachers and bureaucrats are likely to be transferred (Fagernäs and Pelkonen, 2020; Iyer and Mani, 2012). If political alignment were to explain variation in absenteeism, we would see constituencies aligned with the party in power see lower levels of absenteeism.

Finally, I have argued that the relationship of accountability operates through *politicians* rather than mid-level bureaucrats or parents. While politicians can lean on mid-level bureaucrats to put pressure on bureaucrats, much of the increase in pressure should come from politicians themselves. Mid-level

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[9]The Indian constitution stipulates that legislative powers are either Union, State, or concurrent subjects, where the service is the legislative responsibility of the Central Government, state-level governments, or jointly between the Union Government and state governments, respectively. Education is a concurrent subject and the management of education per- sonnel is the responsibility of states.

bureaucrats[10] and voters (Snavely and Desai, 2001),[11] suggested that politician effort on these fronts was often more visible around elections. Both of these groups are not subject to one part of the varying costs and benefits of the relationship the way politicians and teachers are. Mid-level bureaucrats are not subject to electoral pressures and therefore are not rewarded or punished for improved effort and performance around elections – at least not directly. Parents cannot directly threaten teachers with transfers, so do not have a credible threat of punishment in any period. Therefore, an observable implication is that we should *not* observe an increase in top-down monitoring from mid-level bureaucrats or bottom-up monitoring from service recipients leading to a decrease in absenteeism. In the next section, I outline the context and data I use to test the dynamic relationship between politicians and teachers, the four observable implications and four alternative explanations.

DATA & METHODS

This paper draws on two primary sources of data to create a school-level panel across India from 2006 to 2018 for the primary analysis. I combine data from the District Information System for Education (DISE) School Report Cards with assembly constituency election data.

District Information System for Education School Report Cards

The primary data source used in this paper is the DISE School Report Cards. The data consists of self-reported data on school-level infrastructure, enrollment, educational outcomes, resources, and labor for every year from 2006 to 2018.[12] School headmasters are responsible for reporting the data to the National University of Education Planning and Administration (NUEPA) in September of the beginning of the academic year for the previous academic year.[13] All registered schools are mandated to report this data, meaning that all government schools in the country, as well as private schools that meet government standards for registration are included in the data. NUEPA and DISE send the data reporting sheet to unrecognized schools they are aware of, so the data represents an undercount of unrecognized schools as the Government does not have a complete record of schools that have not registered with them. There are approximately 1.3 million government schools, 12 million government school-year observations, and 570,000 private schools and 2.7 million private-school year observations in the data (Panel A of Table 1).

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[10]Interview with M. Somi Reddy, District Education Officer, Ranga Reddy District, Andhra Pradesh, September 2013.

[11]Field observations, Ranga Reddy District, Andhra Pradesh, October 2013.

[12]I refer to years here as the second year in the school year. For example, the 2005-2006 academic year is referred to as 2006. This is to correspond with the electoral year each academic year would correspond to.

[13]NUEPA is a federal public university tasked with training education administrators and researchers as well as collecting nationally representative data on education at the primary and secondary level. Headmasters are responsible for filling out forms, which are then checked by cluster and district education officials. District officials compile the DISE data for all schools in a given district and send it to the state office. Each state then collects the information and sends it NUEPA located in Delhi. There is a five percent back check to verify information (Kaushal, 2010).

Table 1: Summary Statistics

Panel A: DISE School Level Summary Statistics

	Government Schools			Private Schools			Difference	All Schools		
	Mean	SD	N	Mean	SD	N		Mean	SD	N
Absent (%)	0.14	0.35	11,888,443	0.03	0.16	2,672,423	-0.115***	0.12	0.32	15,378,545
Rural (%)	0.93	0.26	12,016,513	0.63	0.48	2,692,784	-0.298***	0.86	0.35	15,531,546
Number of Teachers	4.52	4.30	11,646,051	8.56	7.36	2,579,633	4.04***	5.49	5.61	15,032,804

Panel B: IHDS School Level Summary Statistics

	Government Schools			Private Schools			Difference	All Schools		
	Mean	SD	N	Mean	SD	N		Mean	SD	N
Number of Students	176.00	175.02	2,122	235.95	205.78	1,904	60***	204.35	192.51	4,026
Number of Teachers	5.34	3.85	2,125	8.54	5.43	1,905	3.2***	6.85	4.93	4,030

Panel C: IHDS Teacher Level Summary Statistics

	Government Schools			Private Schools			Difference	All Schools		
	Mean	SD	N	Mean	SD	N		Mean	SD	N
Absent from school (%)	0.16	0.37	15,070	0.12	0.33	16,755	-0.04	0.14	0.35	31,825
Absent on official duty (%)	0.03	0.17	15,070	0.02	0.12	16,755	-0.016	0.02	0.15	31,825
Male (%)	0.36	0.48	15,101	0.36	0.48	16,820	-0.003	0.36	0.48	31,921
Age	40.59	9.61	15,021	33.07	9.87	16,629	-7.523	36.64	10.45	31,650
Hindu (%)	0.85	0.36	15,095	0.83	0.38	16,748	-0.024	0.84	0.37	31,843
Muslim (%)	0.08	0.27	15,095	0.07	0.26	16,748	-0.006	0.07	0.26	31,843
Other Religion (%)	0.07	0.26	15,095	0.10	0.30	16,748	0.031***	0.09	0.28	31,843
Upper Caste (%)	0.35	0.48	14,905	0.44	0.50	16,415	0.083***	0.40	0.49	31,320
OBC (%)	0.40	0.49	14,905	0.41	0.49	16,415	0.011*	0.40	0.49	31,320
SC/ST (%)	0.24	0.43	14,905	0.14	0.35	16,415	-0.093	0.19	0.39	31,320
Other Caste (%)	0.01	0.11	14,905	0.01	0.10	16,415	-0.001	0.01	0.10	31,320
Distance from school (km)	5.60	9.56	15,003	3.02	5.71	16,544	-2.574	4.25	7.89	31,547

Panel D: IHDS Student Level Summary Statistics

|	Government Schools			Private Schools			Difference	All Schools		
	Mean	SD	N	Mean	SD	N		Mean	SD	N
Reading	0.58	0.35	6,882	0.73	0.31	4,716	0.155***	0.64	0.34	11,759
Math	0.45	0.31	6,854	0.60	0.31	4,696	0.153***	0.51	0.32	11,708
Writing	0.51	0.40	6,830	0.67	0.36	4,654	0.16***	0.57	0.39	11,640
Overall Score	0.51	0.30	6,812	0.67	0.27	4,636	0.156***	0.57	0.30	11,602
Local Teacher	0.41	0.49	6,652	0.56	0.50	4,562	0.148***	0.47	0.50	11,258
Male	0.48	0.50	6,989	0.58	0.49	4,771	0.098***	0.52	0.50	11,926
Age	9.53	1.13	6,989	9.51	1.13	4,771	-0.023	9.65	2.47	11,926
Grade	3.64	1.56	6,989	3.30	1.65	4,771	-0.344	3.50	1.61	11,926

Notes: For all panels, Columns 1-3 present summary statistics for government schools, Columns 4-6 present summary statistics for private schools, Column 7 presents a t-test of differences between government and private schools, and Columns 8-10 present summary statistics for all schools together. For column 7, * p < 0.1, ** p < 0.05, *** p < 0.01. Panel A presents summary statistics for the school-level panel of District Information Systems for Education data from 2006-2014, Panel B presents summary statistics from the 2011-2012 wave of the Indian Human Development Survey (IHDS) school survey at the school level, Panel C presents summary statistics for the IHDS data at the teacher level, and Panel D presents summary statistics for the IHDS data at the student level.

Electoral Data

I then match the DISE data with electoral data at the assembly constituency level from 2001 to 2021.[14] Assembly constituencies are India's state-level legislative assemblies and are equivalent to state houses in the United States and other two-tiered federal systems. Each assembly constituency elects one Member of the Legislative Assembly (MLA) in a first-past-the-post single-member district. The Chief Minister of the state is typically selected from the winning party or coalition and is often the leader of the winning party. The management of education personnel is a state responsibility, making assembly constituencies the appropriate level of analysis.

Education administration is managed at the district level within India, the third rung of India's administrative organization. Within a state, District Education Officers (DEOs) are responsible for the recruitment, hiring, and management of teachers. DEOs are appointed by the State Chief Minister and serve at the district level. Several assembly constituencies are nested within each district, so one DEO reports to several MLAs within their district (a map for one district, Tonk, is presented in Figure 1). School accountability lies with the DEO who is responsible for ensuring that teachers show up for work among other responsibilities including the hiring and firing of teachers, the delivery of school resources, and implementation of educational projects within their district.

Figure 1: Nesting of Assembly Constituencies Within Education Districts: Tonk District, Rajasthan
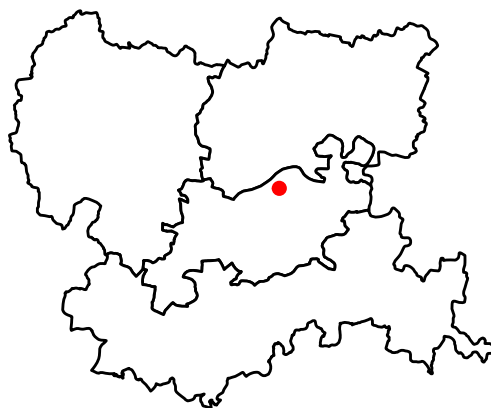
Notes: This figure presents how assembly constituencies are nested within education districts. The figure plots Tonk district in the Eastern part of the state of Rajasthan. The black lines within the district represent the four assembly constituencies within Tonk: Deoli-Uniara, Malpura, Niwai, and Tonk, with the district capital of Tonk highlighted in red. The District Education Officer (DEO) is based in Tonk.

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[14]Data was downloaded from the Trivedi Centre for Political Data at Ashoka University and more details of the data collection process can be found in Jensenius (2016) and Jensenius and Verniers (2017).

Matching schools involves a four-step process.[15] First, I match the school report cards data to the precise locations of schools.[16] Using these locations, I placed schools in Assembly Constituencies using Assembly Constituency shapefiles. For schools that did not have georeferenced coordinates available, the first 9 digits of the school identification number provided by DISE identifies the village in which the school was located. For these schools, I matched their village to other schools within the same village that have georeferenced coordinates available.[17] Next, for schools that did not have georeferenced coordinates and were not co-located in a village with a school that did, I use a crosswalk from Adukia, Asher and Novosad (2019) that matches DISE village codes to Census of India village codes. Using precise village locations from the Census of India, I then matched these schools to Assembly Constituencies. Finally, for any remaining schools, I used the postal pincode of the school provided in the DISE data by querying the postal pincode in google maps, and placed the school in the center of that postal pincode. I was able to match 85.5 % of schools in the DISE data, with further details provided in Table A5.

I also use the Indian Human Development Survey (IHDS) data used to estimate the academic benefits of reduced absenteeism and independently verify absenteeism in Appendix A2, there is no geographic location information for schools below the district level, so I am unable to match schools to their exact assembly constituency. Instead, I match the election date by only matching schools if all the assembly constituencies within a district held an election in the same year. Assembly constituencies are nested within districts and there are between four and ten assembly constituencies in each district, so one DEO will respond to various MLAs (see Figure 1).

Empirical Set-Up

I use an event study model to understand timing over the electoral cycle, with the staggered state-level elections across India as the events. Specifically, I estimate the following equation using school-level yearly panel data:

$$Y_{it} = \sum_{j \neq 0} \alpha_j \cdot \mathbb{1}\{j = t - e_c\} + \beta_1 y_{i,t-1} + Z_{i,t} + \gamma_i + \zeta_t + \epsilon_{it} \tag{1}$$

where i represents schools, t represents the calendar year, and Y is either an indicator for any absence in the school year, or the number of missed teacher days (in log terms) in a given school year. $\alpha_j \cdot \mathbb{1}\{j = t - e_c\}$ is an indicator variable that equals one when school i is j years away from the state election e_i in year t. $\alpha_j \cdot \mathbb{1}\{j = t - e_c\}$ ranges over the electoral cycle from two years or more years to an election ($j = -2$) to 2 or more years after an election ($j = 2$).[18] For example, if a school is in a constituency that held an assembly election in 2010, e_c = 2010. In the year 2011 (t = 2011), the dummy on 1 year after an

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[15]I provide a more detailed description of this process in Appendix A4.

[16]Precise locations of schools can be found at https://schoolgis.nic.in/.

[17]Villages are nested within assembly constituencies, so a village level match guarantees an assembly constituency-level match.

[18]Few constituencies in the data had an electoral cycle longer than five years in the data, so most dummies for 2 or more years before/after an election precisely indicate 2 years.

election is 2011 - 2010 will equal 1, and all other distance to election dummies will equal 0. The election year (j = 0) serves as the reference category.

The model also includes school and year fixed effects, $\gamma_i + \zeta_t$. These fixed effects control for unobserved national-level trends, as well as any unobserved school-specific characteristics. Finally, I include a lag of the dependent variable, $y_{i,t-1}$ to explicitly model the temporal dependence of the data as absenteeism in one year is likely influenced by earlier absenteeism. I am also concerned about the presence of serial correlation in the data, so including a lag makes sense from a modeling perspective. I run the analyses on two sets of outcomes: whether there is any absence in a school in a year, and the total number of absences in a school. We can think of these two sets of results as the extensive and intensive margins respectively.

The identification of the effect of each distance to election year dummy ($\alpha_j \cdot \mathbb{1}\{j = t - e_c\}$ relies on the staggered and repeated timing of state elections across the states in my sample. Elections at the state level are held approximately every five years, and the effect of elections on schools is identified by comparing the same school in election and non-election years across multiple election cycles, controlling for time-invariant school characteristics with γ_i and time-variant conditions with ζ_t. This leverages within-school variation, assuming that controlling for time and school invariant trends, the effect of each year is identified as the only difference between different values of j.

RESULTS

I provide summary statistics for the two sources of data in this paper, a school-level panel from the District Information System for Education (DISE) from 2006-2018 and the 2011-2012 round of the Indian Human Development Survey (IHDS) in Table 1.

Although I use fewer variables from the DISE data (Panel A in Table 1), there are significant differences across all variables between private and public schools. First, private schools are larger, with 4 more teachers in each school in the DISE data and 60 more students and 3 more teachers in each school in the IHDS data (Panel B in Table 1). Teachers in private schools are 12 percentage points less likely to be absent, private schools are more likely to be located in cities, and private schools are also likely to be larger. The size of government and private schools between the IHDS and DISE datasets are remarkably similar, suggesting that IHDS does not sample from a particular type of school when looking at private or government schools. Most schools in the sample are also rural and government schools, consistent with the distribution of schools in India. There are few teacher-level differences between government and private schools other than that private school teachers are likely to be of higher caste status than their government school counterparts, with private school teachers more likely to be upper caste and not Hindu or Muslim, suggesting schools that both cater to economic elites and religious minorities (Panel C in Table 1).

At the student level, test scores are universally higher for private schools, likely a reflection of selection into private education (Panel De in Table 1). Students in private schools are ten percent more likely to be boys, and they are also more likely to have a teacher drawn from the local community, suggesting

a different composition of teachers and students. The nature of testing did not select for older students, however, with most of the students taking tests about ten years old and in the third grade.

Next, I turn to the specification and results from Equation 1. Panel A in Figure 2 reports whether there is any reported absenteeism in a school over the entire five-year electoral cycle, and Panel B reports the log number of average absences per teacher over the five-year electoral cycle. The results in Figure 2 make the nature of the electoral cycle clear. Taking Panel A, absenteeism decreases by 2.3 percentage points the year before an election and increases by 1.8 percentage points the year immediately after an election from the election year mean of 15 percent. The point estimate on one year before the election is significant, confirming that teachers are less likely to be absent in the year before elections. While the first-year post-election point estimate is not different from the election year mean, it is different from the point estimate for the year before the election, suggesting higher levels of absenteeism the year after the election relative to the year before the election. The results are substantively identical for the logged average number of absences per teacher presented in Panel B of Figure 2. In short, teacher absenteeism is significantly lower immediately before elections, and higher immediately after elections providing empirical support to one observable implication of a dynamic relationship with varying benefits and costs to sanctions – teachers are more likely to show up for work before elections when electoral incentives for politicians are salient, and less likely to show-up after elections when electoral incentives are weak.

Teacher absenteeism is robust to different specifications and lower in government schools in the year before an election years across all specifications presented in Appendix A1. I now turn to teacher absenteeism in the private sector. If these results are indicative of relationships between politicians and public sector teachers, we should not see similar results for private schools as politicians do not exert the same level of control on private schools as they do government schools. Otherwise, if results are similar, this would be suggestive of other effects specific to election years I am unable to pick up with this data.

Absence in the Private Sector

I repeat the analysis in Equation 1 for the subset of private schools in the data and present results in Figure 3. While the point estimate on absenteeism is lower in election years similar to Figure 2, there are two important differences. First, there is no significant difference in absenteeism in any year of the electoral cycle and no pattern of absenteeism over the election cycle. Second, absenteeism is significantly lower in private schools than in private schools in all specifications, with an election year mean of 0.047 percent.

The results from Figure 3 suggest that there is no absenteeism election cycle in private schools as there is in government schools. Expanding the specifications to include and exclude school and year fixed effects in Table A8 shows that these specifications are not sensitive to modeling choices. This provides further support for a dynamic relationship and the third observable implication that we should not see an absenteeism cycle in private schools. The lack of an electoral cycle in absenteeism in private schools provides support for a channel that runs from politicians to *government* schools and that politicians cannot credibly pressure teachers in private schools to show up for work around elections in the way they

Figure 2: Any Absence in a School Year over the Electoral Cycle in Government Schools
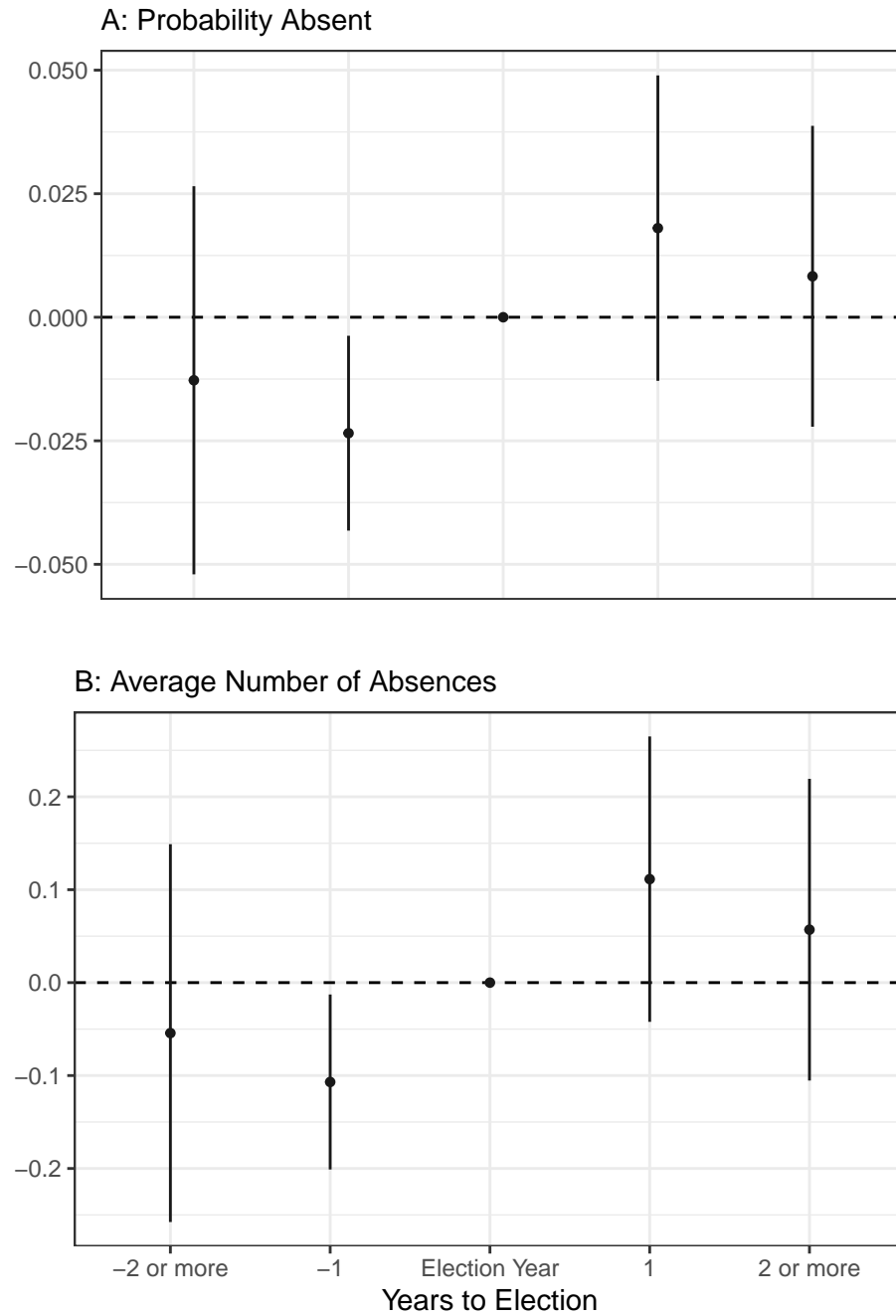
A: Probability Absent

B: Average Number of Absences

Notes: In Panel A, the dependent variable is a dummy variable that takes the value of one if a school reports any teacher absenteeism in that year. In Panel B, the dependent variable is the log number of absences. The regression includes controls for the number of teachers in a school, a dummy for whether the school is in a rural area, a lagged dependent variable, and year and school fixed effects. The line represents 95% confidence intervals with standard errors clustered at the constituency-year level. There are 10,898,187 school-year observations and 1,223,086 total schools in Panel A, and 10,898,187 school-year observations and 1,223,086 total schools in Panel B. The election year mean is 0.15 for Panel A and 0.03 in Panel B. Panel A corresponds to Column 4 in Table A6 and Panel B corresponds to Column 4 in Table A7.

Figure 3: Any Absence in a School Year over the Electoral Cycle in Private Schools
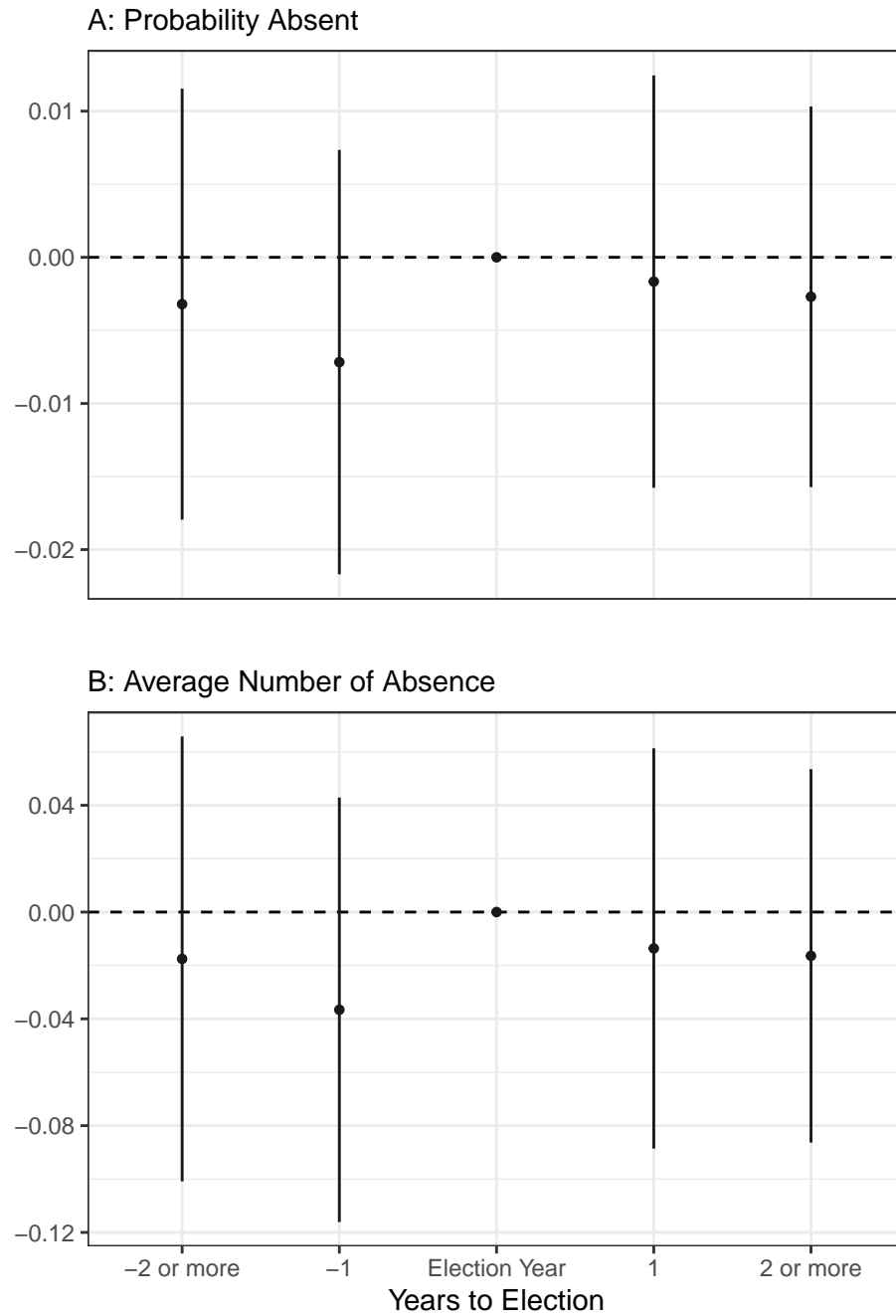
A: Probability Absent

B: Average Number of Absence

Notes: In Panel A, the dependent variable is a dummy variable that takes the value of one if a school reports any teacher absenteeism in that year. In Panel B, the dependent variable is the log number The regression includes controls for the number of teachers in a school, a dummy for whether the school is in a rural area, a lagged dependent variable, and year and school fixed effects. The line represents 95% confidence intervals with standard errors clustered at the constituency-year level. There are 3,027,683 school-year observations and 527,151 in Panel A, and 3,027,683 and 527,151 total schools in Panel B. The election year mean is 0.047 in Panel A and 0.009 in Panel B. Panel A corresponds to Column 4 in Table A8 and Panel B corresponds to Column 4 in Table A9.

can for government school teachers. This is most likely because they cannot credibly sanction teachers in private schools through transfers.

Uncertainty in the Relationship

So far, I have shown there are strong electoral cycles in teacher absenteeism in government schools in India. Absenteeism decreases in the year before an election and is higher in the year after an election. These effects are not found in the private sector, suggesting political control of the public sector bureaucracy. In this section, I test the fourth observable implication that emerges from my argument: That a greater number of political actors in any potential principal-agent relationship complicates the relationship, and see higher absenteeism around elections. With multiple politicians, teachers must negotiate with multiple actors, all but one unlikely to be in power in the post-election period. To measure the *credible* number of politicians teachers could be form a relationship with, I use the effective number of parties (ENOP) interacted with the individual electoral cycle dummies.[19] Formally, I estimate the following equation:

$$Y_{it} = ((\sum_{j \neq 0} \alpha_j \cdot \mathbb{1}\{j = t - e_i\}) \times \text{ENOP}_c) +$$

$$(\sum_{j \neq 0} \alpha_j \cdot \mathbb{1}\{j = t - e_i\}) + \text{ENOP}_c + \beta_1 y_{i,t-1} +$$

$$Z_{i,t} + \gamma_i + \zeta_t + \epsilon_{it}, \quad (2)$$

and is equivalent to the model in Equation 1 with the addition of the effective number of parties at the constituency level interacted with the year dummies, as well as their constitutive terms.

I present results of the effects of a greater number of credible parties on the probability of any absence in a year in Column 1 of Table 2.[20] The absence electoral cycle is still present when including an interaction with the ENOP, lending support to our earlier results. The interaction between the electoral cycle dummies and the electoral characteristics of the constituency is significant for the effective number of parties in a constituency. An additional viable party in the constituency lowers absenteeism in *non-election* years between 0.2 and 0.4 percentage points. There are no effects of additional parties in election years, with the electoral cycle reversed: a greater number of viable parties leads to lower levels of absenteeism in non-election years.

These results suggest that having more viable parties in a constituency reduces absenteeism outside of the immediate electoral period. In election years, the proximity to elections is a stronger driver of reduced absenteeism, irrespective of whether there are more parties or not. A greater number of parties drives reduced absenteeism only when distant from elections.

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[19] ENOP is calculated as an electoral concentration of the parties where $\text{ENOP} = \frac{1}{\sum_{p=1}^{n} v_p^2}$ where v is the vote share of party p overall n parties running in the constituency.

[20] Results on the logged average number of absences are presented in Table A13 and are substantively identical to Table 2.

Table 2: Channels of Reduced Absenteeism

	Absent			Visits	SMC
	(1)	(2)	(3)	(4)	(5)
-2 Years from Election	0.005	−0.027	−0.025	−0.256	−0.026
	(0.025)	(0.024)	(0.029)	(0.341)	(0.102)
-1 Year from Election	−0.023	−0.030**	−0.026***	−0.190	−0.627
	(0.014)	(0.010)	(0.007)	(0.335)	(0.650)
1 Year from Election	0.032	0.015	0.029*	0.130	−0.311
	(0.021)	(0.018)	(0.014)	(0.395)	(0.333)
2 Years from Election	0.021	0.003	0.019	−0.107	−0.702
	(0.020)	(0.016)	(0.024)	(0.395)	(0.453)
Effective Number of Parties	−0.0002				
	(0.002)				
Margin of Victory		−0.0004			
		(0.0003)			
In Governing Coalition			−0.001		
			(0.006)		
-2 Years from Election x ENOP	−0.004***				
	(0.001)				
-1 Year from Election x ENOP	−0.0002				
	(0.001)				
1 Year from Election x ENOP	−0.003*				
	(0.001)				
2 Years from Election x ENOP	−0.003**				
	(0.001)				
-2 Years from Election x Margin		0.001**			
		(0.001)			
-1 Year from Election x Margin		0.001			
		(0.0004)			
1 Year from Election x Margin		0.0003			
		(0.001)			
2 Years from Election x Margin		0.001			
		(0.001)			
-2 Years from Election x Coalition			0.014*		
			(0.007)		
-1 Year from Election x Coalition			0.003		
			(0.006)		
1 Year from Election x Coalition			0.001		
			(0.008)		
2 Years from Election x Coalition			−0.011		
			(0.010)		
Election Year Mean		0.132		7.809	5.613
Number of Schools	1,223,024	1,223,080	1,182,729	1,223,242	1,118,531
Observations	10,897,895	10,896,578	7,614,319	11,009,426	6,720,764

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered at the constituency-year level in parentheses. All columns include controls for the number of teachers in the school, whether the school is in a rural area, a lagged dependent variable, and school and year fixed effects. Column one interacts the year dummies with the margin of victory in the reference year election. Column two interacts the year dummies with the effective number of parties in the reference year election. Column three interacts the year dummies with whether the school is a constituency government by an MLA that is also a member of the ruling coalition at the state level. Column four runs an electoral cycle regression on the number of visits by cluster and resource administrative officials to the school. Column five runs a regression on how many School Management Committee meetings the school held in that year.

Testing Four Alternative Explanations

Finally, I test a series of alternative explanations that have been suggested are plausible channels through which elections might reduce absenteeism. These include greater electoral competition leading to reduced absenteeism near elections, the alignment between politicians in power in a constituency and the party in power at the state, and that bureaucrats or parents strategically increase their monitoring around elections given a politician's re-election concerns.

I operationalize electoral competitiveness by the margin of victory of the upcoming election, and political alignment by coding whether the MLA in power at the constituency level is aligned with the party in power at the state level. For the first two alternative explanations, I replicate Equation 2, replacing the ENOP with either the margin of victory or whether the MLA is aligned with the party in power at the state.

For the third alternative explanation, I use the number of visits by cluster and block resource coordinators as a dependent variable to see if higher-level bureaucratic effort has increased. Cluster and block resource coordinators report to the DEO and the mid-level bureaucrats between schools and the district level tasked with ensuring administrative and pedagogical compliance. If we were to see a greater number of visits by these two groups, it would suggest the channel operating through DEOs putting greater pressure on their subordinates to then hold teachers to account. In the fourth and final alternative explanation, I test to see whether there are a greater number of School Management Committee (SMC) meetings in schools. SMCs are school level bodies comprised of parents empowered to raise issues and hold local schools accountable in election years.[21] To test these two channels, I replicate Equation 1 using either the number of visits by cluster and block resource coordinators or the number of SMC meetings held in a school in a year as the outcome variable.

I present results on the effects of more competitive elections and political alignment on the probability of any absence in a year in Columns 2 and 3 in Table 2. Like the effects of a greater number of parties, the absence electoral cycle is still present in both specifications, lending further support to the earlier results. In column four in Table 2, I regress the number of visits by cluster and block resource coordinators, and in column five I regress the number of school management committee (SMC) meetings on the electoral cycle. In both specifications, I find no effect of the electoral cycle on these two potential forms of monitoring, suggesting that these forms of monitoring are not driving the reduced absenteeism we see.

Together, I find that absenteeism in government schools significantly decreases in the year before an election and is higher, although not significant in the year after an election (Figure 2). We see no similar cycles in private schools (Figure 3), suggesting that whatever is driving these cycles only operates in the public sector, and I take this as suggestive evidence that there is a relationship between politicians and public sector teachers to reduce absenteeism before elections and reduce sanctioning after elections. I

[21]While earlier work on SMCs suggested they were defunct across many parts of India (Banerjee et al., 2010), state governments have placed increasing importance on their proper functioning in recent years, leading to their greater importance in monitoring in more recent years. See, for example, the Government of Delhi's efforts, Baruah, Sukrita. October 29, 2021. "Across Delhi, govt schools, new programme to help parents be more hands-on with their children." *Indian Express*, New Delhi. and Muralidharan and Singh (2020).

also find that a greater number of politicians, measured through the effective number of parties, leads to greater absenteeism in the year before an election and election years, which I take to be suggestive of more difficulty in maintaining relationships when there are a greater number of actors (Column 1 of Table 2). I then test four alternative explanations that have been suggested as plausible other ways that elections could impact public service quality, including the competitiveness of an election, the political alignment between the politician in power in a constituency and the party in power at the state level, increased bureaucratic effort, and increased parental effort. I find no support for any of these explanations (Columns 2-5 in Table 2). It is important to note that I am unable to directly test whether other societal groups outside of SMCs, namely women's associations (Drèze and Kingdon, 2001; Mangla, 2021), that have been shown to monitor schools increase their monitoring efforts around elections and this is a limit of my administrative data. The measure of SMC monitoring is likely picking up some of the efforts of other societal actors, but absent data on these informal monitoring networks, I cannot test this directly.

THE BENEFITS OF REDUCED ABSENTEEISM

A second-order question is if there are downstream consequences of reduced absenteeism for governance and students or if this is an example of "performative governance" where bureaucrats exert effort to appear to be working, but there are no material changes in outcomes (Ding, 2020). For students, the increased attendance of teachers would suggest greater instructional time and potentially higher levels of learning. For the state, increased attendance would also result in decreased leakage in spending as teachers are paid for the time in the classroom, rather than time absent from work. Here, I test whether increased attendance from teachers results in higher test scores as well as calculate the fiscal recovery from decreased absenteeism in election years.

Effects on Students

The IHDS survey tests a smaller subset of students using basic literacy, numeracy, and reading comprehension tests. I leverage this data to test if test scores exhibit a similar electoral cycle in government and private schools as we do for absenteeism. I run a reduced-form model of the effect of the electoral cycle on test scores. This replicates the analysis for Figures 2 and 3, replacing absenteeism with test scores. I present these results in Figure 4.

A clear pattern emerges with test scores that mirror the pattern we see for teacher absenteeism. For government schools, test scores are significantly lower in the years before and after the election year for all subjects tested. For private schools, test scores do not exhibit a similar pattern. These results suggest that there is a translation from increased teacher attendance in schools and student learning. As government school teachers are subject to pressures from politicians around elections, they are more likely to show up and teach students, who then perform better on independently administered tests.

Figure 4: Test Scores Improve in Election Years for Government School Students Relative to Non-Election Years but Not in Private Schools

A: Test Scores for Students in Government Schools

B: Test Scores for Students in Private Schools
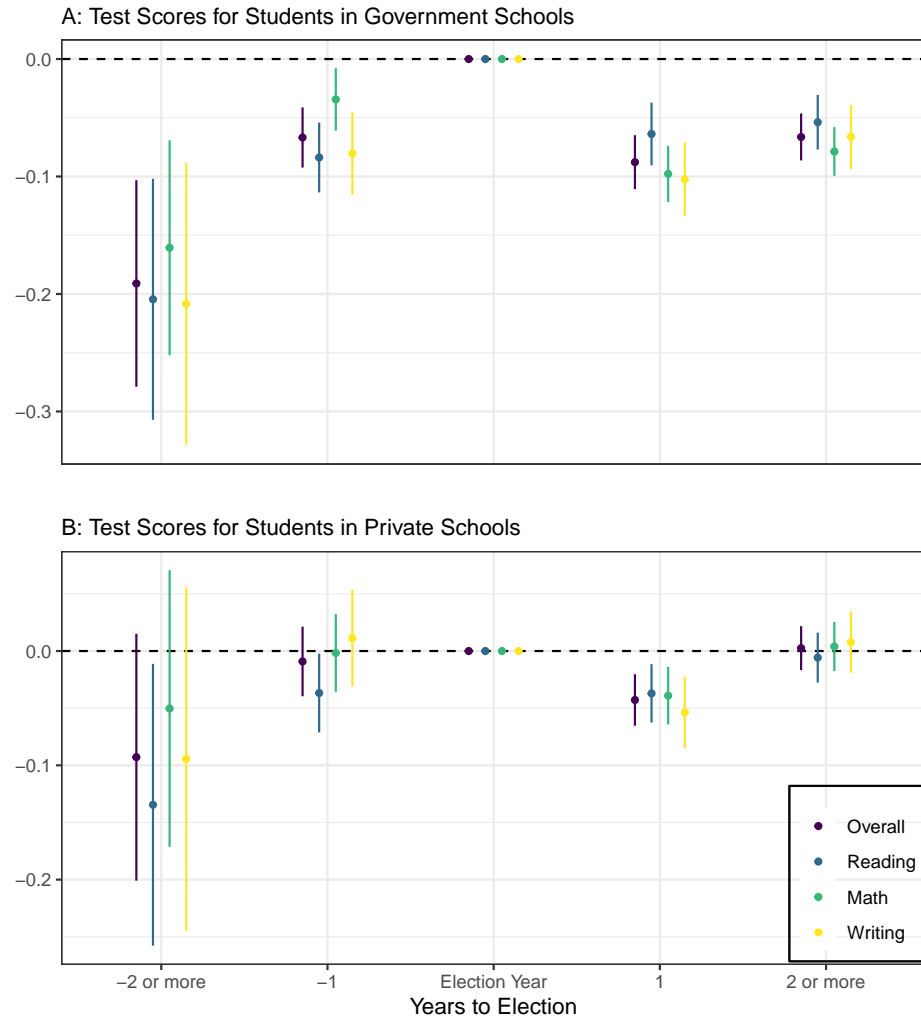
Notes: This figure reports the effects of electoral cycles on test scores using IHDS test data. I run results for test scores overall, and four reading, math, and writing comprehension separately. The overall scores are a sum of the other three scores, while each individual score is rescaled from 0 to 1. For reading, a child is scored as unable to read, able to read letters, words, paragraphs, or an entire story. In math, a child is scored as unable to recognize a number, whether they can recognize a number, whether they can subtract to one-digit numbers, or whether they can divide a two-digit number by a one-digit number. For writing, a child is scored by whether they cannot write, can write a paragraph with two mistakes or fewer, or can write with no mistakes. All models include controls for the child's age, gender, class, and whether their teacher lives in their village. Panel A presents results for test scores for children that attend government schools. Panel B presents results for test scores for children that attend private schools. I present the regression tables for these results in Table A12.

Effects on State Finances

Next, I conduct a back-of-the-envelope calculation of the lower and upper ranges of what the decrease in absenteeism means for the fiscal purse.[22] I take the highest and lowest average monthly teacher salary from two other studies that have calculated teacher wages across India. In Muralidharan et al. (2017), they calculate the average monthly wage of a government school teacher in India to be ₹11,368 (approximately $455 USD), and in Kingdon and Sipahimalani-Rao (2010), they calculate the average monthly wage to be ₹5,418 (approximately $217 USD).[23] The highest point estimate in Figure 2 estimates a decrease in absenteeism of 1.5 days per government school between two years after an election and an election year. Taken together, this results in a fiscal recovery of between approximately $75,703,081 and $36,080,163 USD per year, or 31% of the total budget lost to absenteeism per year. This recovery is comparable to policy interventions that directly attempt to reduce absenteeism (see Duflo, Hanna and Ryan (2012)). The question for policy then becomes how we can extend the increase in attention to education quality from election years to all years.

CONCLUSION

Looking to explain the chronic rates of absenteeism in public services, I have argued that front-line service workers and politicians are in a dynamic relationship with benefits and costs to sanctions that vary over time. When electoral incentives are salient for politicians, they can use the threat of future sanctions to encourage teachers to show up for work. In return, front-line service workers shirk work further away from elections.

Combining school-level data on the universe of government schools in India matched to the timing of state-level elections in India, I have shown that there is a strong and persistent electoral cycle to absenteeism in government schools. While reported rates of absenteeism are lower in this data than independent audits, approximately 14 percent of schools report some absenteeism in any given school year, and an average of 5.34 teaching days are lost to absenteeism yearly in each school. These numbers decline significantly in election years. The probability of any absence and the total number of days lost to absenteeism declines by 2.3 percentage points in a government school in the year before an election. These results are robust to the choice of identification strategy, how I measure absenteeism, and the data source. All specifications show remarkably similar electoral cycles in absenteeism. There is no evidence for a

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[22]I provide full details of these calculations in Appendix A3

[23]Muralidharan et al. (2017) and Kingdon and Sipahimalani-Rao (2010) each calculated average government teacher wages across India in 2010, but the large differences in their estimates likely emerge from their respective sampling and estimation methods. Muralidharan et al. (2017) rely on survey based estimates from a sample of states across India, whereas Kingdon and Sipahimalani-Rao (2010) rely on reported wages from the National Sample Survey (NSS) of India, a nationally representative survey of the country. While the higher estimates in Muralidharan et al. (2017) could be subject to desirability and sample biases, the lower estimates in Kingdon and Sipahimalani-Rao (2010) could be subject to difficulties in correctly identifying full-time government school teachers as opposed to other employees that also work in schools and are paid less than full-time teachers.

similar electoral cycle in absenteeism in private schools, pointing to a relationship between politicians and *public sector* teachers.

Unpacking the results, I find that when the dynamic relationship becomes harder to enforce – when there are more potential political parties to act as principals in the future – absence does not decrease as much. Constituencies with a greater number of parties show lower levels of absenteeism outside of election years, but higher levels of absenteeism approaching elections. In a context where there are porous borders between political parties and the lower levels of the bureaucracy, unclear lines of accountability are detrimental to the functioning of the state. I find no evidence of an election cycle in mid-level bureaucratic effort, parental effort, or that greater political competition or alignment with the party in power at the state level reduces absenteeism. It is neither the risk of losing power nor the ability to sanction through state-level ministries that drives reduced absenteeism. These null results further point to interactions between individual-level political candidates and teachers in their constituency, rather than direct interactions between voters and politicians, or engaging the mid-level bureaucracy.

A scope condition of this argument is that these relationships are only likely with front-line functionaries. The dynamic relationship is contingent on a level of autonomy of the agent that allows them to impose costs on principals. In this case, teachers are autonomous political actors that can openly support or oppose politicians during elections. We are unlikely to see smaller bureaucracies that have often been the object of study in political science like mid-level bureaucrats (Dasgupta and Kapur, 2020; Gulzar and Pasquale, 2017), or civil service officers (Bhavnani and Lee, 2019), in similar relationships as they do not pose a credible *electoral* threat to politicians. While some of these bureaucrats are organized in interest groups,[24] they lack the numbers and geographical spread of front-line functionaries and do not regularly interface with voters. Unlike teachers, their relationship with elected politicians would be episodic and related to specific policy outcomes, not everyday working conditions such as absenteeism.

Teachers and other front-line functionaries, there is a quid-pro-quo relationship that other members of the bureaucracy are unable to engage in. Unlike mid-level bureaucrats, teachers are geographically dispersed (Weber, 1976), influential within their communities, and politically active (Kingdon and Muzammil, 2009). This means they pose a different threat through their political activities that other bureaucrats do not – they can reach a large number of voters. They should hold a distinct place in our theorizing on the politics of the bureaucracy as a result.

More generally, the full range of politics of front-line functionaries remains understudied in political science. Taken together, Indian teachers are likely one of the biggest single sources of employment in India. In contrast to other employment sources, teachers operate in a relatively flat hierarchy, with little wage and role differentiation between a starting position and an end-of-career teacher. Better understanding the broad range of ways that front-line functionaries enter and engage in the political process beyond just an interest group is a ripe area for study in political science.

Policy and scholarly attention is turning to managerial interventions that can address the political

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[24]For example, officers of the Indian Administrative Service have a staff association that can lobby for preferred policies, but they are small in number and do not engage in electoral politics in the same way that teachers unions do (Nair, Remya, Mayank Aggarwal, and Yogendra Kalavalapalli. October 30, 2015. "IAS officers get pay commission jitters." *Mint*. Accessed July 14, 2021).

economy constraints of poor public sector performance in low- and middle-income countries (Bertelli et al., 2020). The findings from this paper have two potential policy implications. First, joining work on the porous borders between politicians and low-level bureaucrats (Mangla, 2015), the findings suggest that reducing the ability of politicians to interfere in the functioning of the low-level bureaucracy can have high returns for service quality. While early developmental state literature focused on the idea of "embedded autonomy" and the ability of high-level bureaucrats to work free of political interference (Evans, 1995), my findings suggest embedded autonomy is equally important at lower levels of bureaucratic organization. A greater number of political actors at the local level attenuates the impact of electoral accountability (Berenschot, 2018). My paper also joins other work in suggesting that an intervention with potentially high returns is investing in the mid-level bureaucracy that sits between the politician and the front-line functionary and is tasked with overseeing front-line functionaries (Dasgupta and Kapur, 2020; Muralidharan et al., 2017). In this paper, it appears as if the pressures of elections lead to greater interest in service provision, the question for policymakers is how to extend the effects we see in election years to non-election years. If the channel is greater attention in election years, as I have argued, then having mid-level bureaucrats monitor teachers in *all* years has the potential for high returns for absenteeism, student learning, and the public purse.

The paper leaves at least two questions unanswered that are ripe for further study. First, what returns do *politicians* receive from better educational quality? Or, in other words, do voters reward politicians for an easily monitored aspect of service provision? The answer from other contexts suggests that the returns are high (Larreguy, Montiel Olea and Querubin, 2017), but the findings could stand to be unpacked further. Second, what returns do *teachers* receive from working together with politicians? Transfers are the rewards teachers receive for good performance. Does this extend to rewarding teachers for delivering votes? Again, evidence from a similar context suggests that teachers are rewarded around elections (Fagernäs and Pelkonen, 2020), but more work could be done to unpack these mechanisms. More generally, political science has often approached the politics of teachers as an organized interest group (Anzia, 2013; Moe and Wiborg, 2016; Murillo and Ronconi, 2004). While teachers' unions are certainly powerful, the mundane day-to-day work of teachers also makes them valuable for politicians on two levels. In the short run, they have intimate relationships with many voters and can encourage them to turn up to vote or even vote for certain candidates. In the long run, they socialize students in the predominant state-building narratives, and for politicians with long time horizons, provide a valuable way to influence the political socialization of entire cohorts of future voters. Researchers should take these smaller and more quotidian roles seriously in the same way we take the day-to-day work of brokers seriously.

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A1 ROBUSTNESS TO DIFFERENT MEASURES OF ELECTION TIMING

A potential concern with my results is that the results might be sensitive to the specification of the functional form of election timing. In this appendix, I re-estimate the results from Figures 2 to A1 using the number of years to the election instead of individual electoral cycle dummies.

A1.1 Using A Continuous Measure of Distance to Elections

I run a regression using the number of years to the next election. The formal equation takes the form:

$$Y_{i,t} = \beta_1 \text{Years to Next Election}_{i,t} + \beta_2 y_{i,t-1} + Z_{i,t} + \gamma_i + \zeta_t + \mu_{i,t,d}, \tag{A1}$$

where Years to Next Election$_{i,t}$ is a continuous variable that indicates the number of years school i is to the next legislative election, and the rest of the equation is as in Equations 1.

I present results for government schools in Table A1 and for private schools in Table A2. The results using a continuous measure of years to election are largely the same as other specifications, but it is important to note that the results for private schools are significant in all specifications that include lagged dependent variables (columns 1-4 and 6-9). The point estimates are between one-third and one-half smaller than those for government schools, suggesting that if any effect in this specification, it is smaller and weaker.

Table A1: Absence by Years to Election in Government Schools

	Absent					Log Absence				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to Election	−0.011*	−0.009	−0.012***	−0.011***	−0.011***	−0.022	−0.017	−0.024**	−0.022**	−0.022**
	(0.006)	(0.006)	(0.004)	(0.003)	(0.003)	(0.013)	(0.012)	(0.010)	(0.008)	(0.007)
Year FE	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
School FE	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Number of Schools	1,212,848	1,212,848	1,212,848	1,212,848	1,271,157	1,209,967	1,209,967	1,209,967	1,209,967	1,271,157
Observations	9,891,508	9,891,508	9,891,508	9,891,508	11,196,710	9,727,643	9,727,643	9,727,643	9,727,643	11,196,710

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered at the constituency-year level in parentheses. The dependent variable in columns 1-5 is a dummy variable that takes the value of one if the school reports any teacher absenteeism in that year and the log number of absences per teacher in columns 6-10. Each specification includes controls for the number of teachers in each school, a dummy for whether the school is in a rural area. Columns 1-4 and 6-9 include a lagged dependent variable. "Years to Election" is a variable equal to the number of years that the school is from an election.

Table A2: Absence by Years to Election in Private Schools

	Absent					Log Absence				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to Election	−0.004***	−0.004***	−0.004***	−0.004***	−0.003	−0.009***	−0.007***	−0.007***	−0.007***	−0.006
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.004)
Year FE	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
School FE	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Number of Schools	504,027	504,027	504,027	504,027	569,555	498,844	498,844	498,844	498,844	569,555
Observations	2,700,260	2,700,260	2,700,260	2,700,260	3,228,432	2,657,511	2,657,511	2,657,511	2,657,511	3,228,432

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at the constituency-year level in parentheses. The dependent variable in columns 1-5 is a dummy variable that takes the value of one if the school reports any teacher absenteeism in that year and the log number of absences per teacher in columns 6-10. Each specification includes controls for the number of teachers in each school, a dummy for whether the school is in a rural area. Columns 1-4 and 6-9 include a lagged dependent variable. "Years to Election" is a variable equal to the number of years that the school is from an election.

A2 "COOKING THE BOOKS" OR REDUCED ABSENTEEISM?

This paper uses rich administrative data to answer an important political problem. While the use of administrative data is increasingly common (Lindgren, Oskarsson and Dawes, 2016; Gulzar and Pasquale, 2017), I do not take the quality of this data at face value. Instead, in this section, I verify the quality of the data by triangulating against independently collected sources (Herrera and Kapur, 2007). Administrative data suffers from the additional concern that bureaucrats have an incentive to misreport in ways that make their performance look better (Martínez, 2022), on top of all the data quality concerns of other sources of data. Verified against other sources of data, however, administrative data provides great potential as it allows us to answer big questions at scale, especially as the data gathering capacity of states improves (Jerven, 2013; Jensenius and Verniers, 2017).

A concern with the self-reported nature of the DISE school report cards is that head teachers and district-level officers might be "cooking the books", or falsely reporting lower rates of absenteeism, around elections to make bureaucratic effort look greater with no underlying change in behavior. The empirical evidence of "cooking the books" would be substantively similar – lower absenteeism in election years – although the mechanisms would be different – perceived pressure to modify government data rather than hold providers accountable. Reported absenteeism of 12 percent in the DISE data and 14 percent in the IHDS data in Table 1 is lower than absenteeism in independent audits conducted in 2005 (Chaudhury et al., 2006; Muralidharan et al., 2017), suggesting either a secular decline in absenteeism or in the *reporting* of absenteeism, suggestive evidence of "cooking the books".

To separate whether schools are "cooking the books" or there is electoral pressure on teachers, I use the IHDS school surveys, an independent survey of schools conducted in 2011-2012 and contemporaneously to the DISE school report cards data collection to test whether I find similar patterns in this data. The IHDS data collects a broad range of demographic and socioeconomic data, and also conducts a school survey of the largest private and government school in each village they survey households. Visits to schools are otherwise unannounced and unexpected by school staff and replicate the randomized audits in Chaudhury et al. (2006).

I use the second wave of the Indian Human Development Survey (IHDS) for data on teacher absenteeism and reasons for absenteeism. The IHDS survey is a nationally representative survey of 1,503 villages and 971 urban neighborhoods across India (Desai, Vanneman and National Council of Applied Economic Research, New Delhi, 2015-07-31.). The 2011-2012 round was the second round of a panel survey that surveyed the same villages in 2004-2005. The survey asked a small number of questions about the largest government and private school in each surveyed village, and the next two largest schools, irrespective of whether they were public or private. For every teacher in the school, the surveyors checked if the teacher was present on the day of the survey, and, if they were absent, whether they were absent on officially sanctioned government work. In this sense, the survey replicates the data collection in Chaudhury et al. (2006), randomly auditing schools on staff absenteeism.

In Table A3, I look at the probability that a teacher is absent from the school on the day of the survey, absent from the school on the day of the survey to conduct official work, or present at the school on the day of the interview and present for the interview as a function of whether their school is a

government or private school. As expected, teachers are four percentage points more likely to be absent from a government school (columns 1-2), and about two percentage points more likely to be absent for officially sanctioned duty (columns 3-4). Given that government schools have fewer teachers (Panel C of Table 1), conditional on being at the school teachers in government schools are also more likely to be present at the IHDS interview as there are likely fewer teachers to answer the survey and schools are smaller (columns 5-6). These results confirm common sense expectations of what we think differences in teacher absenteeism should look like between government and private schools, with government schools showing consistently higher levels of absenteeism.

Table A3: Absence by School Type

	Absent		On Official Duty		Absent from Interview	
	(1)	(2)	(3)	(4)	(5)	(6)
Government School	0.042***	0.046***	0.014***	0.016***	−0.037***	−0.038***
	(0.004)	(0.004)	(0.002)	(0.002)	(0.007)	(0.006)
Village Fixed Effects	N	Y	N	Y	N	Y
Observations	30,874	30,874	30,874	30,874	26,471	26,471

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors are in parentheses. Linear models of the effects of working in a government school on either absence from school on the day of the interview, absent from the school for official government-sanctioned work, or absent from the interview conditional on being present at the school on the day of the interview. All models control for gender, age, religion, and caste, while even-numbered columns also include village fixed effects.

I then replicate the election cycle analysis from Equation 1 using IHDS data. In Figure A1, I present results for the event study model using IHDS data. As the IHDS data contains information on whether a teacher was absent from the school on the day of the survey and whether they were on official duty, I plot both results together. The results using self-reported data from the DISE panel data and the IHDS independent audit data are remarkably consistent on absenteeism. In both data sources, there are strong effects of the electoral cycle, with teachers far more likely to be absent from the school the further we move from the election. Teachers in government schools have a 10 percent probability of being absent from school on the day of the IHDS survey, and this increases to greater than 20 percent more than two years from the election on either side (Panel A of Figure A1).

I also look at electoral cycles in private schools using the same data. Theoretically, we should expect that politicians should be able to exert lower levels of control on private schools as they cannot sanction private school teachers through transfers and other mechanisms of control. Empirically, as we can see from Table 1, there are significant differences between government and private schools. It is unclear, however, how these differences should matter for teacher absenteeism. While absenteeism is lower in general, teachers in private schools are also more likely to be from non-dominant religions and upper castes. Private schools are also more likely to be in urban areas and employ a greater number of teachers. Each of these variables results in differing predictions for absenteeism: while upper-caste teachers are more likely to be able to resist pressures from politicians, the greater urban location of schools should

Figure A1: Absence Over Electoral Cycle Using IHDS Data

A: Probability Absent in Government Schools
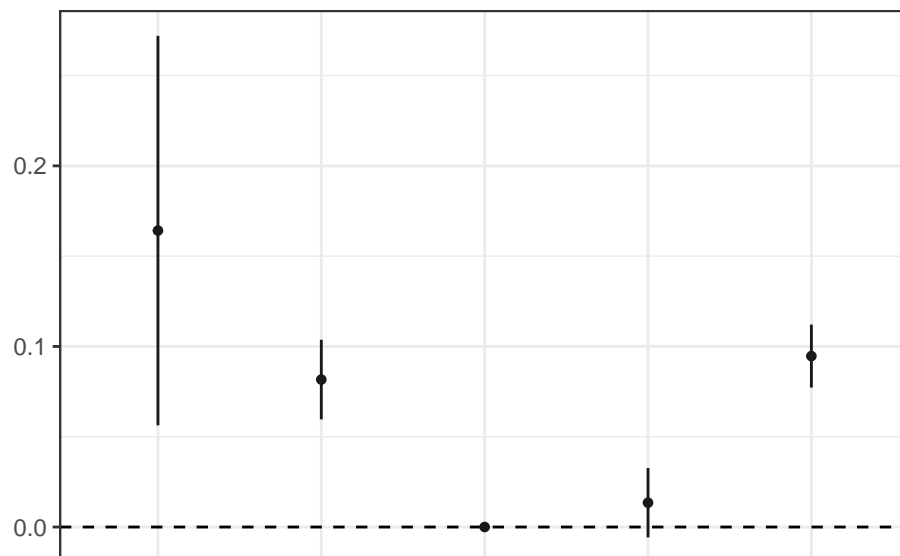
B: Probability Absent in Private Schools
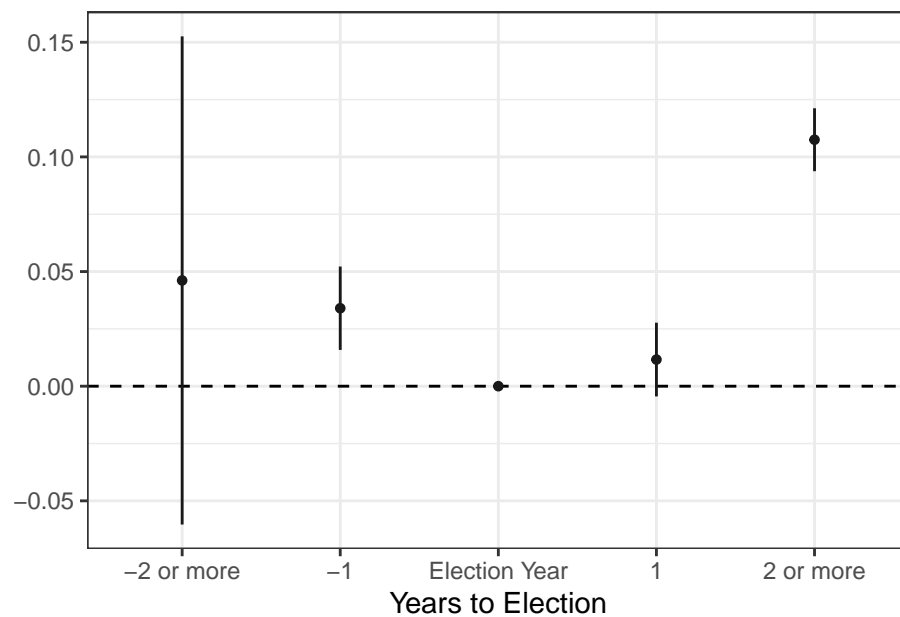
Notes: This figure presents results of a linear model of the probability of a teacher being absent in government schools the day IHDS surveyors surveyed the school running the model in Equation 1. The dependent variable is a dummy variable that takes the value of one if the teacher was absent from the school on the day of the survey. The lines represent 95% confidence intervals with standard errors clustered at the constituency-year level. There are 13,880 teacher observations in government schools and 15,196 teacher observations in private schools, and the election year mean level of absence is 0.11 in government schools and 0.07 in private schools. This figure corresponds to columns 1 & 2 in Table A10. Both models control for gender, age, religion, caste, and the distance the teacher lives from the school.

allow for easier monitoring from politicians who do not have to travel as far to monitor teachers. I test whether patterns in the data are suggestive of greater or lower levels of monitoring in the private sector below.

Again, results between the DISE census and IHDS audits are similar for private schools (Panel B of Figure A1). While we still observe differential absence across the electoral cycle, once again the rate of absenteeism in private schools is much lower than in government schools. As we start from a lower baseline level of absenteeism, the differences over the electoral cycle are much smaller. The results are not as consistent for private schools as they are for government schools. The point estimates are both smaller and inconsistently significant. Teachers in private schools are between 5-10 percentage points more likely to be absent outside of the election period, although not always significant.

Taken together with the DISE data used in the main body of the manuscript, the two sources of data allow me to triangulate between two otherwise imperfect data sources (Herrera and Kapur, 2007), and draw broader conclusions on the drivers of absence in Indian public service. While the IHDS data effectively provides a randomized audit of a select number of government and private schools in the country, designed to be representative of the country as a whole, the DISE data allows me to generalize the results to *all* schools in India. The consistency in the results between the two sources provides support that the electoral cycles I discover are real and not the product of data quality, manipulation by teachers or school officials, or a result of self-reporting.

A key question surrounding data quality is how self-reported data provided by organizations like DISE compare to independent evaluations of absence from random audits such as in Banerjee and Duflo (2006); Chaudhury et al. (2006). The levels of absence found in this paper are much lower than absence found by independent evaluations of service worker absenteeism from other papers in India. Average levels of absence self-reported in the DISE dataset reach 13 percent for the *year*, far shorter than the levels of absence recorded on random spot checks in Chaudhury et al. (2006) of 25 percent on any given day. For education in India, the DISE data serves as the only comparable source of data available to the government and broader public, and is used by the former to assess the state of schools. While the data is almost certainly biased downwards, it does have important implications for decision-making as this is the dataset used by policymakers. Finding similar results in the IHDS data adds confidence that the self-reported data is not being systematically manipulated in election years and that we are seeing real decreases in absenteeism. Across all specifications, results are comparable in direction between both sources of data.

This is a larger problem for any study in the social sciences that relies on administrative data. In contexts of low capacity, low attention, or poor measurement, the quality of this data may deviate from common sense understandings or reality. This paper provides one path forward – triangulate administrative data with other sources of high-quality data collected from other sources (Herrera and Kapur, 2007). The benefits of using administrative data are too great to simply ignore them, but we should be cautious in how we employ them and the conclusions we draw from them, ensuring that they are verified through other means. I provide one way forward in this paper by independently verifying results from an administrative dataset against a second source of data collected by a different organization for a different purpose, with different incentives in data collection. It provides one way forward for students of political

science interested in employing large data moving forward.

A2.1   Election Work

Next, I look at whether teachers are more likely to be absent for government-sanctioned purposes in an election year. Teachers often lament that their time is taken up by official work, comparing themselves to postal workers who move paper from one destination to another (Aiyar and Bhattacharya, 2016), and that this work increases in election years as they are required to engage in preparing election booths that are often located in schools (Neggers, 2018).

Exploring absence for official work gives us purchase on some remaining questions. First, it allows us to explore if schools are "cooking the books" for absenteeism and are more likely to mark teachers as absent for official work in particular years. Second, it allows us to see whether teachers do engage in a greater amount of work and sanctioned absence during election years. Finally, it allows us to separate *bureaucratic* pressure – which should lead to a greater level of absenteeism in an election year as the electoral bureaucracy, independent of political actors, would pressure teachers to be more absent in election years – from *political* pressure, which should reduce absenteeism in election years.

I run the model in Equation 1 on a subset of all teachers reported as absent on the day of the survey using a dummy for whether they were absent on official government duty such as census collection or election-related administration. We observe an opposite electoral cycle than we do in 2 and A1: teachers are more likely to be absent on official Government duty the year before, in an election year, and the year after an election than they are further away from elections (Panel A of Figure A2). Teachers are between 10 and 20 percentage points less likely to be absent for official work the further we move from an election. While this is consistent with official policy, where teachers are commissioned to help with formal government duties, it also provides evidence that the reduced absenteeism we see in 2 and A1 is despite their increased absenteeism for official work. We see increased absenteeism outside of the electoral period even while formal demands on a teacher's time outside of school are increasing around elections.

Finally, Panel B of Figure A2 presents the results of absence for official work among private school teachers. Lending support to political attention turning solely to Government schools results in private schools are noisy and inconsistent. Teachers in private schools are no more or less likely to be absent for official work the further we move from an election.

This section suggests that teachers and headmasters are unlikely to be "cooking the books" and systematically forging data around elections. Using data from an independent school-level survey, I find remarkably similar results to those from a national census of Government and registered private schools. Teachers in government schools are between 10 and 15 percentage points more likely to be absent from schools on the day of the unannounced school-level survey the further we move from an election, despite being more likely to be absent for official government duty around elections. Again, similar to the national-level census of schools, I do not observe these patterns in private schools, with noisy estimates for teacher absenteeism over the electoral cycle.

Figure A2: On Official Duty Over Electoral Cycle Using IHDS Data

A: Probability on Official Duty in Government Schools
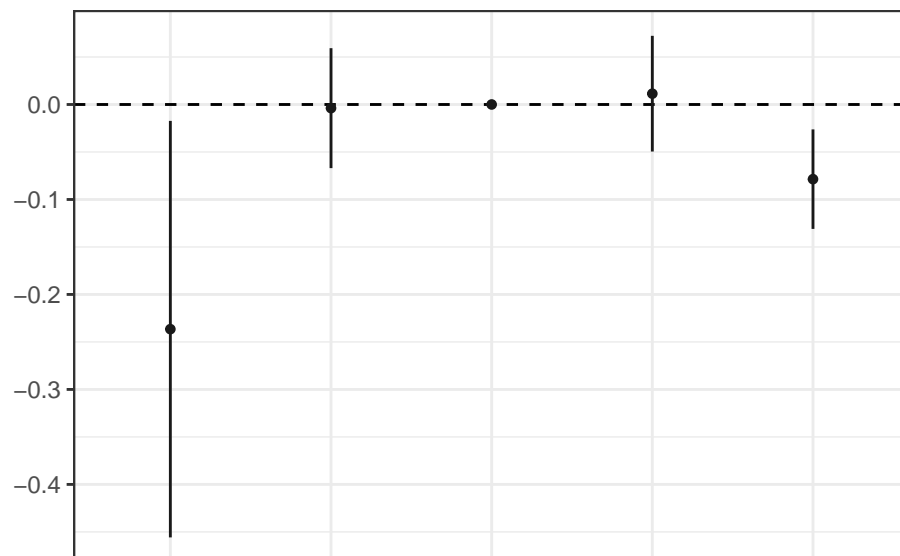
B: Probability on Official Duty in Private Schools
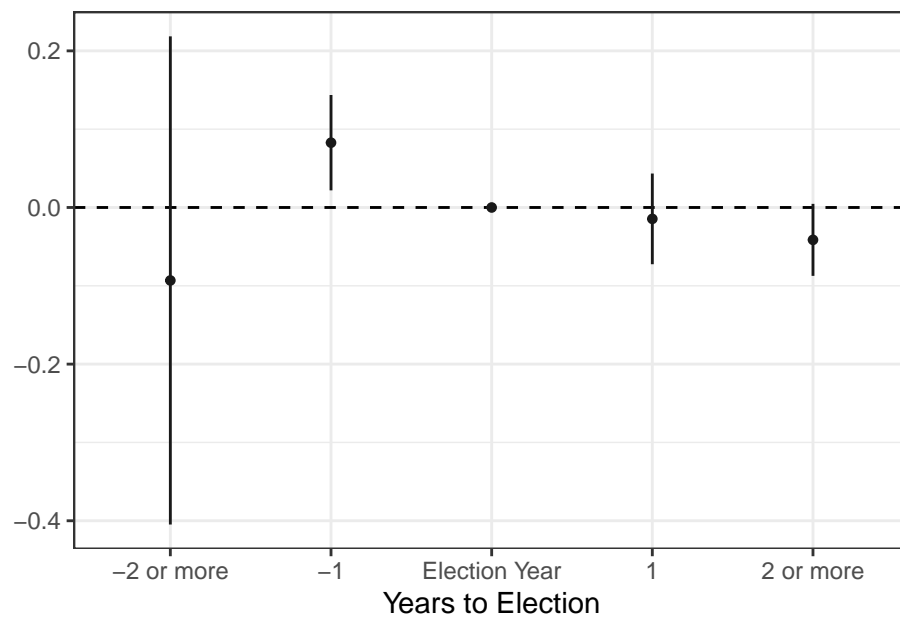
Notes: This figure presents results of a linear model of the probability of a teacher being absent in private schools the day IHDS surveyors surveyed the school, running the model in Equation 1. The dependent variable is a dummy variable that takes the value of one if the teacher was absent from the school on the day of the survey for official work. The lines represent 95% confidence intervals with robust standard errors. There are 2,244 teacher observations in government schools and 1,858 teacher observations in private schools. The election year mean is 0.03 in government schools 0.01 in private schools. This figure corresponds to column 1 in Table A11. The model also controls for gender, age, religion, caste, and the distance the teacher lives from the school.

A3   CALCULATING THE FISCAL COST OF ABSENCE

In this section, I calculate the total amount of money lost to absenteeism as a function of teachers' wages, and the total amount of money recovered in election years from the highest level of absenteeism. Table A4 provides calculations of the estimate of how much money is lost and recovered between election and non-election years.

Table A4: Calculating the Fiscal Recovery of Reduced Absenteeism

	Highest Wage Estimate	Lowest Wage Estimate
Average Monthly Wage (₹)	11,368	5,418
Average Daily Wage (₹)	454.72	216.72
Average Absence per School (Days)	5.34	
Average Number of Teachers per Year	4,632,792	
Wages Lost in Average Year (₹)	11,242,064,130	5,357,978,840
Wages Lost in Average Year ($)	244,392,698	116,477,801
Reduction in Absenteeism per School (Days)	1.65	
Wage Recovery in Year Before Election (₹)	3,482,341,705	1,659,687,488
Wage Recovery in Year Before Election ($)	75,703,081	36,080,163
Share of Wages Lost Recovered (%)	31	

All costs in 2010 prices. The high wage estimate is taken from Muralidharan et al. (2017) and the low wage estimate is taken from Kingdon and Sipahimalani-Rao (2010). The mean level of absence is the mean government school absence in the entire DISE dataset, and the average number of teachers per year is the mean number of teachers in the DISE dataset across all years. The wages lost due to absenteeism in the average year in Rupees (₹) is the average daily wage multiplied by the mean number of absences and by the mean number of teachers. The wages lost in USD Dollars ($) divides the number by the exchange rate in 2010. The reduction in absenteeism is calculated by taking the difference in the point estimates from "1 Year After Election" and "1 Year from Election" in Column 4 in Table A7. The wage recovery multiplies the reduction in absenteeism by the average daily wage and the average number of teachers, while the share of wages lost recovered divides the wage recovery by the wages lost.

A4 MATCHING SCHOOLS TO ASSEMBLY CONSTITUENCIES

As the DISE school report card data does not identify which Assembly Constituency a school is located in, I use geographic information on the school to place the school in an Assembly Constituency. This matching proceeded in four steps:

1. Using the precise location of the school
2. Using the location of the village in which the school is located
3. Using data from Adukia, Asher and Novosad (2019) (AAN) to cross-reference unmatched schools to geographic locations
4. Using the postal pincode of the school to match the school to the Assembly Constituency

I provide a further description of each step below, and a matching rate table in Table A5. The overall match rate for both public and private schools was 85.5 %

Table A5: Matching Rate by Matching Strategy

Matching Strategy	Government Schools				Private Schools			
	Remaining Unmatched	Number Matched	Match Rate (%)	Overall Match Rate (%)	Remaining Unmatched	Number Matched	Match Rate (%)	Overall Match Rate (%)
GIS	1,494,885	979,532	65.5	65.5	682,771	271,953	39.8	39.8
Village Match	515,353	179,373	34.8	12.0	410,818	265,354	63.6	38.9
AAN	335,980	81,536	24.3	5.5	145,464	17,388	12.0	2.5
Pincodes	254,444	40,324	15.8	2.7	128,076	27,497	21.5	4.0
Total		1,280,765		85.7		582,192		85.3

Notes: The Matching Strategy column identifies the strategy used to match schools to assembly constituencies. The Remaining Unmatched columns report the number of schools left to match after all previous matching strategies, the Number Matched columns report how many schools were matched using that particular matching strategy, the Match Rate columns report the percentage of schools matched of all remaining schools left to match, and the Overall Match Rate columns report the percentage of schools matched by that strategy out of all the schools in the data set for government and private schools respectively

A4.1 School GIS

The Government of India provides georeferenced information on many schools in India at https://schoolgis.nic.in/. I scraped the site and merged the locations with the DISE school report cards using the school code provided in each data set. I then used a spatial join with Assembly Constituency shapefiles to identify the Assembly Constituency in which the school was located.

A4.2 Village Codes

Next, the first nine digits of each school's school code identifies the village in which a school is located. For unmatched schools located in a village with a matched school, I coded that school as located in the same assembly constituency.

A4.3   Adukia, Asher and Novosad (2019)

Adukia, Asher and Novosad (2019) provide a crosswalk between DISE village codes and Census of India village codes. For any remaining unmatched schools, I use the nine-digit DISE village code to match schools to Census villages. Then, I use village-level shapefiles to spatially join villages to Assembly Constituencies, and code schools in the Assembly Constituency they are located.

A4.4   Postal Pincodes

Finally, for the remaining unmatched villages, each school observation in the school report cards data reports the postal pincode in which the school is located. I geo-reference these pincodes using Google Maps and take the centroid of the pincode. Using the latitude and longitude of the centroid, I place this in Assembly Constituencies and code the school as being in that Assembly Constituency.

A4.5   Differences Between Matched and Unmatched Schools

I then test for differences in matched and unmatched schools. Figure A3 plots the differences in means. Given the large sample size and high match rate, most variables have significant differences, although their substantive sizes are small. For example, rural schools are eight percent more likely to be matched, but given that 85.5 % of schools are matched and of those, 86% are rural, this means that 83% of schools in the population are rural. These differences are unlikely to lead to systematic bias in the results.

Figure A3: Difference in Means Between Schools Matched to their Assembly Constituency and Unmatched Schools

Notes: Each point estimate is a t-test of the difference between schools I was able to place in an assembly constituency and unmatched schools. For continuous variables, variables are standardized to range from 0-1 by subtracting the mean value and dividing by two standard deviations (Gelman, 2008). The plot is ordered from largest to smallest value.

A5 FULL RESULTS TABLES

This section provides the full results tables for the figures presented in Figures 2 to A2. The results for Panel A of Figure 2 is presented in column 4 of Table A6. The results for Panel B of Figure 2 is presented in column 4 of Table A7. Irrespective of the specification, we still see evidence of an electoral cycle in government schools, with point estimates ranging from 2.3 to 3.8 percentage point reduction in absenteeism in the years before elections. The difference between the point estimate for one year before the election and one year after the election is also significant across all specifications.

Table A6: Any Absence in a Government School over the Electoral Cycle Using DISE Data

	Absent				
	(1)	(2)	(3)	(4)	(5)
-2 Years from Election	−0.035	−0.027	−0.024	−0.013	−0.022
	(0.025)	(0.025)	(0.021)	(0.020)	(0.020)
-1 Year from Election	−0.038*	−0.029*	−0.034**	−0.023**	−0.028**
	(0.018)	(0.016)	(0.015)	(0.010)	(0.010)
1 Year from Election	0.0002	0.014	−0.001	0.018	0.004
	(0.026)	(0.021)	(0.023)	(0.016)	(0.018)
2 Years from Election	−0.014	−0.0002	−0.014	0.008	0.003
	(0.019)	(0.015)	(0.018)	(0.016)	(0.016)
Year FE	No	Yes	No	Yes	Yes
School FE	No	No	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes	No
Number of Schools	1,223,086	1,223,086	1,223,086	1,223,086	1,308,579
Observations	10,898,187	10,898,187	10,898,187	10,898,187	12,239,432

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered at the constituency-year level in parentheses. The dependent variable is a dummy variable that takes the value of one if the school reports any teacher absenteeism in that year. Each specification includes controls for the number of teachers in each school, a dummy for whether the school is in a rural area. Columns 1-4 also include a lagged dependent variable. The election year mean is 0.15 and Column 4 corresponds to Panel A of Figure 2.

The results for Panel A of Figure 3 are presented in column 4 of Table A8. The results for Panel B of Figure 3 are presented in column 4 of Table A9. Columns 1 to 3 provide robustness checks to modeling choices with and without year and school fixed effects, and column 5 runs the analysis without the lagged dependent variable. All specifications include controls for the number of teachers in the school and a dummy for rural schools. Like the results in the main body of the paper, we do not see evidence of an electoral cycle in private schools.

Table A10 presents the analysis from Panel A of Figure A1 in Column 1, and Panel A of Figure A2 in Column 2.

Table A11 presents the analysis from Panel B of Figure A1 in Column 1, and Panel B of Figure A2 in Column 2.

Table A12 presents the full results in Table form of Figure 4.

Table A7: Log Average Absence in a Government School over the Electoral Cycle Using DISE Data

	Log Absence				
	(1)	(2)	(3)	(4)	(5)
-2 Years from Election	−0.176	−0.124	−0.123	−0.054	−0.119
	(0.136)	(0.125)	(0.114)	(0.104)	(0.111)
-1 Year from Election	−0.189*	−0.132*	−0.165*	−0.107**	−0.148**
	(0.092)	(0.074)	(0.082)	(0.048)	(0.054)
1 Year from Election	0.006	0.095	−0.003	0.111	0.019
	(0.132)	(0.097)	(0.121)	(0.078)	(0.102)
2 Years from Election	−0.066	0.013	−0.063	0.057	0.009
	(0.106)	(0.078)	(0.107)	(0.083)	(0.092)
Year FE	No	Yes	No	Yes	Yes
School FE	No	No	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes	No
Number of Schools	1,223,086	1,223,086	1,223,086	1,223,086	1,308,579
Observations	10,898,187	10,898,187	10,898,187	10,898,187	12,239,432

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at the constituency-year level in parentheses. The dependent variable is the log number of average absences per school in columns 6-10. Each specification includes controls for the number of teachers in each school, a dummy for whether the school is in a rural area. Columns 1-4 also include a lagged dependent variable. The election year mean is 0.03 and Column 4 corresponds to Panel B of Figure 2.

Table A8: Any Absence over the Electoral Cycle in Private Schools Using DISE Data

	Absent				
	(1)	(2)	(3)	(4)	(5)
-2 Years from Election	−0.007	−0.007	−0.004	−0.003	−0.006
	(0.010)	(0.011)	(0.007)	(0.008)	(0.008)
-1 Year from Election	−0.011	−0.012	−0.007	−0.007	−0.005
	(0.011)	(0.011)	(0.008)	(0.007)	(0.008)
1 Year from Election	−0.005	−0.002	−0.005	−0.002	−0.004
	(0.012)	(0.010)	(0.009)	(0.007)	(0.007)
2 Years from Election	−0.008	−0.007	−0.005	−0.003	−0.002
	(0.010)	(0.011)	(0.005)	(0.007)	(0.006)
Year FE	No	Yes	No	Yes	Yes
School FE	No	No	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes	No
Number of Schools	527,151	527,151	527,151	527,151	608,455
Observations	3,027,683	3,027,683	3,027,683	3,027,683	3,592,427

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at the constituency-year level in parentheses. The dependent variable is a dummy variable that takes the value of one if the school reports any teacher absenteeism in that year. Each specification includes controls for the number of teachers in each school and a dummy for whether the school is in a rural area. Columns 1-4 also include a lagged dependent variable. The election year mean is 0.047 . Column 4 corresponds to Panel A of Figure 3.

Table A9: Log Average Absence over the Electoral Cycle in Private Schools Using DISE Data

| | Log Average Absence | | | | |
	(1)	(2)	(3)	(4)	(5)
-2 Years from Election	−0.038	−0.040	−0.019	−0.018	−0.033
	(0.054)	(0.058)	(0.041)	(0.043)	(0.045)
-1 Year from Election	−0.057	−0.060	−0.034	−0.037	−0.026
	(0.058)	(0.059)	(0.042)	(0.041)	(0.045)
1 Year from Election	−0.033	−0.020	−0.030	−0.014	−0.025
	(0.061)	(0.051)	(0.050)	(0.038)	(0.042)
2 Years from Election	−0.046	−0.040	−0.030	−0.016	−0.017
	(0.053)	(0.060)	(0.027)	(0.036)	(0.036)
Year FE	No	Yes	No	Yes	Yes
School FE	No	No	Yes	Yes	Yes
Lagged DV	Yes	Yes	Yes	Yes	No
Number of Schools	527,151	527,151	527,151	527,151	608,455
Observations	3,027,683	3,027,683	3,027,683	3,027,683	3,592,427

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at the constituency-year level in parentheses. The dependent variable is the log average number of absences in the school. Each specification includes controls for the number of teachers in each school and a dummy for whether the school is in a rural area. Columns 1-4 include a lagged dependent variable. The election year mean is 0.009 . Column 4 corresponds to Panel B of Figure 3.

Table A10: Absence Over Electoral Cycle in Government Schools Using IHDS Data

	Absent	On Official Duty
	(1)	(2)
2 or More Years Before Election	0.164**	−0.237***
	(0.067)	(0.030)
1 Year Before Election	0.082***	−0.004
	(0.011)	(0.035)
1 Year After Election	0.013	0.011
	(0.009)	(0.034)
2 or More Years After Election	0.095***	−0.079***
	(0.008)	(0.029)
Male	0.003	0.056***
	(0.007)	(0.018)
Age	−0.001***	0.002**
	(0.0003)	(0.001)
Muslim	−0.033***	0.041
	(0.011)	(0.037)
Other Religion	0.044***	0.118***
	(0.014)	(0.038)
Upper Caste	−0.006	0.029
	(0.007)	(0.020)
SC/ST	−0.005	0.007
	(0.008)	(0.021)
Other Caste	−0.052**	−0.187***
	(0.023)	(0.027)
Distance from School	0.002***	−0.001
	(0.0004)	(0.001)
Constant	0.134***	0.128***
	(0.016)	(0.045)
Election Year Mean	0.11	0.03
Observations	13,880	2,244

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors are in parentheses. Linear models of the probability of a teacher being absent from a government school the day IHDS surveyors surveyed the school, as well as the probability a teacher was absent on official duty as outlined in Equation 1. The dependent variable is either a dummy variable that takes the value of one if the teacher was absent from the school on the day of the survey or, conditional on being absent, whether they were absent on official duty on the day of the survey.

Table A11: Absence Over Electoral Cycle in Private Schools Using IHDS Data

	Absent	On Official Duty
	(1)	(2)
2 or More Years Before Election	0.046	−0.093***
	(0.054)	(0.030)
1 Year Before Election	0.034***	0.083**
	(0.008)	(0.036)
1 Year After Election	0.012*	−0.015
	(0.007)	(0.030)
2 or More Years After Election	0.107***	−0.041*
	(0.007)	(0.023)
Male	0.011**	0.020
	(0.006)	(0.015)
Age	−0.0005*	0.005***
	(0.0003)	(0.001)
Muslim	0.009	0.001
	(0.011)	(0.030)
Other Religion	0.044***	0.076**
	(0.010)	(0.030)
Upper Caste	−0.037***	−0.029*
	(0.006)	(0.017)
SC/ST	0.010	−0.054***
	(0.009)	(0.019)
Other Caste	0.034	−0.143***
	(0.032)	(0.045)
Distance from School	0.001***	−0.001
	(0.0005)	(0.001)
Constant	0.086***	−0.014
	(0.011)	(0.034)
Election Year Mean	0.07	0.01
Observations	15,196	1,858

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors are in parentheses. Linear models of the probability of a teacher being absent from a private school the day IHDS surveyors surveyed the school, as well as the probability a teacher was absent on official duty as outlined in Equation 1. The dependent variable is either a dummy variable that takes the value of one if the teacher was absent from the school on the day of the survey or, conditional on being absent, whether they were absent on official duty on the day of the survey.

Table A12: Test Scores Improve in Election Years Relative to Non-Election Years

	All Scores	Government Reading	Schools Math	Writing	All Scores	Private Reading	Schools Math	Writing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 or More Years Before Election	−0.191***	−0.205***	−0.161***	−0.208***	−0.093**	−0.135***	−0.050	−0.094*
	(0.041)	(0.050)	(0.046)	(0.053)	(0.041)	(0.050)	(0.046)	(0.053)
1 Year Before Election	−0.067***	−0.084***	−0.034**	−0.080***	−0.009	−0.037**	−0.002	0.011
	(0.013)	(0.015)	(0.014)	(0.018)	(0.013)	(0.015)	(0.014)	(0.018)
1 Year After Election	−0.088***	−0.064***	−0.098***	−0.102***	−0.043***	−0.037***	−0.039***	−0.054***
	(0.012)	(0.014)	(0.013)	(0.016)	(0.012)	(0.014)	(0.013)	(0.016)
2 or More Years After Election	−0.066***	−0.054***	−0.079***	−0.066***	0.003	−0.006	0.004	0.008
	(0.010)	(0.012)	(0.011)	(0.014)	(0.010)	(0.012)	(0.011)	(0.014)
Male	0.019***	0.015*	0.031***	0.011	−0.004	−0.010	0.021***	−0.020**
	(0.007)	(0.008)	(0.007)	(0.010)	(0.007)	(0.008)	(0.007)	(0.010)
Age	0.011***	0.011**	0.008**	0.014**	−0.007*	−0.005	−0.002	−0.013**
	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)
Class	0.079***	0.088***	0.075***	0.073***	0.074***	0.074***	0.078***	0.069***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)
Local Teacher	0.009	0.005	0.014*	0.006	0.015**	0.016*	0.014*	0.014
	(0.007)	(0.008)	(0.007)	(0.010)	(0.007)	(0.008)	(0.007)	(0.010)
Constant	0.160***	0.189***	0.129***	0.160***	0.494***	0.556***	0.342***	0.579***
	(0.035)	(0.041)	(0.036)	(0.047)	(0.035)	(0.041)	(0.036)	(0.047)
Observations	6,206	6,262	6,241	6,220	4,118	4,160	4,145	4,132
Adjusted R^2	0.186	0.171	0.161	0.100	0.188	0.152	0.179	0.093

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors are in parentheses. I run results for test scores overall, and four reading, math, and writing comprehension separately. The overall scores are a sum of the other three scores and each score is rescaled from 0 to 1. For reading, a child is scored as unable to read, able to read letters, words, paragraphs, or able to read an entire story. In math, a child is scored as unable to recognize a number, whether they can recognize a number, whether they can subtract one-digit numbers, or whether they can divide a two-digit number by a one-digit number. For writing, a child is scored by whether they cannot write, can write a paragraph with two mistakes or fewer, or can write with no mistakes. This presents the results from Figure 4.

A6 USING LOGGED NUMBER OF ABSENCES INSTEAD OF PROBABILITY ABSENT TO MEASURE CHANNELS

Here I present a replication of Columns 1-3 of Table 2 using the logged number of absences rather than the probability that a school reports an absence in Table A13 and estimating Equation 2. The three columns in Table A13 correspond to the same columns in Table 2 and results are substantively similar.

Table A13: Channels of Reduced Absenteeism Using Logged Number of Absences

	Average Number of Absences		
	(1)	(2)	(3)
-2 Years from Election	0.036	−0.120	−0.113
	(0.130)	(0.125)	(0.157)
-1 Year from Election	−0.103	−0.138**	−0.116***
	(0.065)	(0.049)	(0.036)
1 Year from Election	0.184*	0.091	0.180**
	(0.103)	(0.086)	(0.072)
2 Years from Election	0.126	0.031	0.124
	(0.108)	(0.085)	(0.133)
Effective Number of Parties	0.002		
	(0.008)		
Margin of Victory		−0.002	
		(0.002)	
In Governing Coalition			−0.008
			(0.030)
-2 Years from Election x ENOP	−0.021***		
	(0.007)		
-1 Year from Election x ENOP	−0.002		
	(0.004)		
1 Year from Election x ENOP	−0.016**		
	(0.007)		
2 Years from Election x ENOP	−0.016**		
	(0.006)		
-2 Years from Election x Margin		0.006*	
		(0.003)	
-1 Year from Election x Margin		0.003	
		(0.002)	
1 Year from Election x Margin		0.002	
		(0.003)	
2 Years from Election x Margin		0.003	
		(0.003)	
-2 Years from Election x Coalition			0.072*
			(0.037)
-1 Year from Election x Coalition			0.015
			(0.026)
1 Year from Election x Coalition			−0.001
			(0.041)
2 Years from Election x Coalition			−0.056
			(0.055)
Election Year Mean		0.132	
Number of Schools	1,223,024	1,223,080	1,182,729
Observations	10,897,895	10,896,578	7,614,319

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered at the constituency-year level in parentheses. The dependent variable in all regressions is the logged average number of absences in a school year. All columns include controls for the number of teachers in the school, whether the school is in a rural area, a lagged dependent variable, and school and year fixed effects. Column one interacts the year dummies with the margin of victory in the reference year election. Column two interacts the year dummies with the effective number of parties in the reference year election. Column three interacts the year dummies with whether the school is a constituency government by an MLA that is also a member of the ruling coalition at the state level.