

Leadership and Development: Education, Embeddedness and the Performance of Indian Bureaucrats*

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Abstract

The education and local ties of bureaucrats are thought to have causal effects on bureaucrats' performance, and thus on development outcomes. This paper tests these hypotheses in the context of India's senior bureaucracy, the Indian Administrative Service. We build a dataset that links changes in public goods provision within districts to the personal attributes of the IAS officers who served in them, using the quasi-random initial assignment of bureaucrats to account for the endogeneity of officer assignment. The evidence suggests that bureaucrats matter. While the education of IAS officers has no effect on public goods provision, officers born in the state they are assigned to are associated with increased public goods provision. This effect is driven by districts with high literacy and newspaper circulation, suggesting that locally embedded bureaucrats enhance public goods provisioning when they can be held accountable by the public.

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In the ninth book of War and Peace, Tolstoy argues that individuals have no effect upon history, that “in historical events great men ... have not the least possible connection with the event itself.” The opinion was an unusual one at the time, when historiography emphasized the decisive importance of “great men,” but has since become a common one within the social sciences, where an emphasis on broad social and economic forces has often confined the role of individuals to the residuals of quantitative studies or the footnotes of qualitative ones. More recently, the pendulum has begun to swing back towards recognizing that individuals do have a role in influencing political and economic outcomes (??). Similarly, international aid organizations have come to recognize that leadership has an important impact on development outcomes, and have made considerable efforts to encourage and develop leadership in target countries (?).

The recent empirical literature on leadership and development (??????), however, has largely focused on the effects of political leadership. This is surprising given the rich literature on bureaucratic organization in sociology and political science (???), the substantial power exercised by bureaucrats in many parts of the world, and the existence of strongly held assumptions within the policy world of what contributes to effective bureaucratic organization. Among the most important folk theories of bureaucracy are the ideas that educated bureaucracies (?), and bureaucracies insulated from local influences (?), perform better than others. These ideas permeate modern “Weberian bureaucracies,” which are considered to be more effective in promoting development than their traditional counterparts. Eighty six percent of the world’s civil services, for instance, use some sort of exam system to select their recruits (?).

We begin to investigate the efficacy of bureaucrats by examining the effects of the characteristics of Indian Administrative Service (IAS) officers on public goods provision in India. The IAS is a good case to study since, as India’s bureaucratic “steel frame,” it possesses a remarkable level of autonomy and power. If there is a bureaucracy whose effect we should be able to discern, it is the IAS. We focus on the effects of two aspects of individual IAS

officers' backgrounds that have the merits of being widely generalizable, readily measurable, and heavily discussed within the descriptive literature. The first is an individual's level of education. We ask whether bureaucrats with superior education perform better than others. Secondly, we examine the level of embeddedness, or the relationship of an individual to the area in which they serve. We ask whether individuals with strong social ties are better able to improve outcomes, or whether these ties leave them vulnerable to corruption and cooptation that would be resisted by more "objective" outsiders.

To answer these questions, we use a unique dataset on the characteristics and career histories of the entirety of India's upper bureaucracy over twenty years. Early in their careers, IAS officers are assigned to districts, where as the leaders of the local administration they have a wide range of responsibilities, including the improvement of access to local public goods. We test whether the assignment of better educated and more embedded officers leads to better public goods provisioning. We use panel data, a wide variety of controls and fixed effects, and an instrumental variables strategy to minimize the problems of non-random assignment of officers to districts. At least within the very highly educated IAS, officer education—which displays substantial variation—has no effect on district outcomes. Embeddedness, however, does affect performance. Officers from the state in which they work are associated with the construction of more high schools in the districts in which they serve. Interestingly, locally embedded bureaucrats are only effective in districts with high literacy and newspaper circulation. This suggests that the positive effect of social embeddedness is conditional on citizens being able to hold local bureaucrats to account.

In the next section, we develop a theory of how bureaucrats might affect public goods provisioning. Section 2 will describe the Indian context, and Section 3 the data and empirical strategy. Section 4 provides the analysis of the results while the last section will discuss their broad implications.

1 Theory

An immense descriptive literature notes the importance of bureaucrats to the development process (???). This is especially thought to be the case in weakly institutionalized settings, where individuals, rather than institutions, dominate. To the extent that the literature has tested hypotheses, it has focused on the relationship between bureaucrats and their political masters. ?, ? and ? focus on the differences in the efficacy between political and merit-appointed officials within the US bureaucracy. ? focus on the use of transfers as a mechanism of political control within the IAS. Despite many complaints among Indian bureaucrats and journalists about the negative effects of frequent transfers, ? find no effect of transfers on public goods provision. Another strand of the literature has shown that personality has a strong effect on the performance of specific types of government professionals, such as doctors and teachers (??).

In this paper, we focus on assessing the impact of two specific characteristics of bureaucrats—their embeddedness and education. We will implicitly be examining the larger question of whether bureaucrats matter, since evidence that bureaucrat characteristics influence development outcomes amounts to evidence that bureaucrats themselves matter.

1.1 Embeddedness

Bureaucracies face the problem of getting their local agents to work for the welfare of the local population, rather than engaging in rent seeking. While modern bureaucracies have developed extensive schemes of monitoring, rewards and punishment to discourage self-seeking behavior, the effectiveness of these devices is limited, particularly in rural areas far from the central government. In such environments, the social ties between bureaucrats and the population are potentially very important.

Officers with many social ties to an area—that is, those that are “embedded” in their communities (?)—might have strong incentives to work hard to provide public goods. This

is the case for three reasons. Firstly, more embedded local leaders might simply care more about what happens to the local population, or to people from the same ethnic group. This parallels the large literature on coethnic favoritism in public service provision (???). Secondly, populations will find it much easier to sanction locals than outsiders, as they are strongly linked to embedded bureaucrats socially, and are more likely to have repeated dealings with them (?). Finally, local officers might be able to work more effectively with local elites and populations, due to their superior command of the local language and culture. Shared social links would thus give local leaders a technical advantage over outsiders.

Our account of the virtues of embeddedness has some parallels with the literature on representative bureaucracy, which finds that women and members of traditionally under-represented minorities benefit from the recruitment of women and minority members to bureaucracies (????), and that such bureaucracies also improve overall welfare (?). The embeddedness and representative bureaucracy literatures both examine whether bureaucratic behavior is influenced by personal traits. However, these literatures examine different counterfactuals. Instead of studying whether bureaucrats vary in their effectiveness depending on whether they are male, female, or members of majority or minority groups, the embeddedness literature and this paper compares whether locally-drawn bureaucrats are more or less effective than bureaucrats with no local ties at all.

Importantly, the embeddedness of bureaucrats could potentially cut both ways. As governments have long worried, too close a connection with an area could lead bureaucrats to be “captured” by local elites, and to serve their interests over those of the population as a whole. In India, for instance, civil servants are attractive marriage partners for local business families, and thus become entangled in doing favors for their in-laws. Elites are frequently thought to prefer the targeted provision of goods towards themselves, rather than the broad provision of public goods to many. In the context of India, this is particularly thought to be the case with respect to education, over which Brahmins—the old Hindu elite—used to have a monopoly (?). In contrast with the idea that embeddedness makes bureaucrats more

desirous and able to provide public goods, this theory predicts that embedded officials will have lower levels of effectiveness, at least in the provision of public goods.

This double dynamic fits with anecdotal evidence on the negative policy effects of dictators from small ethnic groups or socially isolated backgrounds. It also fits with our fieldwork among bureaucrats in the North Indian state of Bihar, where some subjects argued that officers from outside the state were more corrupt than the “local boys.” One informant commented that South Indian officers “steal everything and take it back to Chennai.” Certainly those retiring where they worked might value their reputation more than others. Similarly, ethnographies of the IAS note that bureaucrats themselves are aware of the tension between the development-promoting and capture-increasing properties of local officials, with locals complaining that outsiders “are only interested in consolidating their position” while outsiders “each have a story of a local man asking him to decide a case, because the local man was so entangled in kinship and other obligations that he felt he could not be objective.” (?, p. 129-130).

At least in poor countries, the fear of elite capture has historically been more influential than the hope of improvement due to embeddedness. This is the case to the extent that the use of outsiders, who are more likely to be autonomous, is thought to be a defining characteristic of modern bureaucracies (???). Imperial China, the cities of Medieval Italy and *ancien regime* France banned high officials from serving in their own provinces, to enable them to keep an arms distance from local elites (??). The Indian Civil Service, initially recruited entirely from Britain, was especially proud of its outsider status, which it argued enabled the government to float above the corruption and vested interests of rural Indian life. Even today, its IAS successor maintains strict rules about the number of local officers allowed to serve within states and the length of time an individual is allowed to remain in a single post. Too much familiarity, in the eyes of the Indian bureaucracy, is not a good thing.

Embeddedness may therefore improve or worsen bureaucratic performance, depending on whether its positive effects outweigh its negative ones. We posit that whether the negative

effects of embeddedness outweigh its positive effects is likely to depend on the degree to which embedded bureaucrats can be held accountable for their actions. Note that factors such as literacy and information, which have been associated with accountability (??), could crucially condition the relationship between embeddedness and public goods. Specifically, we argue that locally embedded bureaucrats are likely to be more effective in places with high literacy and information.

1.2 Education

Bureaucracies have for long emphasized the importance of education. For example, the Imperial Chinese civil service placed a high value on academic knowledge, and the exam system by which it was selected meant that educational advancement became virtually synonymous with bureaucratic recruitment (?). The Northcote-Trevelyan Report of 1854, which spurred the development of the United Kingdom’s civil service, recommended that “for the superior situations endeavors should be made to secure the services of the most promising young men of the day, by a competing examination on a level with the highest description of education in this country” (?). Following this idea, a small corps of highly educated officials gradually became the standard for western, “Weberian” bureaucracies. By one count, 86% of countries have some form of exam system for the recruitment of senior bureaucrats, and in all but two of 35 countries the majority of civil servants have university degrees (?). Education was particularly important to the Indian Civil Service, the precursor to the IAS, which switched to a fully meritocratic system of recruitment in 1855. Today, the Indian bureaucracy remains open only to college graduates after a brutally competitive set of exams.

Education could increase bureaucratic effectiveness through several pathways. Additional education, or increases in the quality of that education, might help individuals become better leaders by imparting knowledge, skills and intellectual perspectives that they would not otherwise have received. A more educated officer, for instance, might be more aware of recent work on the value of early immunizations. Education is also thought to enable individuals to

quickly master complicated situations and sets of facts, even if they lack specific knowledge. Of course, education is also a process of socialization, and being in an academic environment may affect individuals' preferences, possibly making them more pro-social and less family oriented. Finally, there might be some basis to the prejudice against "book learning." Too much education, in such a formulation, could give an individual purely theoretical knowledge that is not only irrelevant to the ground level tasks of a government official but actually harmful, discouraging pragmatic or empirical problem solving. Bureaucrats' education may therefore have a positive or a negative effect on the provision of public goods.

The importance of leaders' education has mixed empirical support from the literature on non-bureaucratic decision makers: ? find that better educated Indian village politicians perform better and ? find that the education of national leaders affects national economic performance. On the other hand, ? does not find a robust link between leader education and market-liberalizing reforms. ? show that more specialized IAS officers have more successful careers, although this does not directly address the question of their performance.

2 The Context

The Indian Administrative Service (IAS) is the most important group of bureaucrats in India, eclipsing in both prestige and administrative importance both the other central civil services, such as the Indian Police Service, and the "subordinate" civil services recruited at the state level. The IAS is the direct descendant of the colonial era Indian Civil Service, and maintains the traditions and structure of that organization, which viewed itself as a small elite cadre that provided a "steel frame" for the colonial state. Like the other central services, the IAS has a dual nature. While its members are recruited by the central government, and its officers staff central government offices, most officers, especially at the beginning of their careers, also staff senior posts in the state governments, where they exercise supervisory authority over local civil servants. This structure is consistent with the IAS's self-image as

objective and highly educated outsiders, bringing order to the chaos of Indian society.

Regular recruitment to the IAS occurs through a national exam conducted by the Union Public Service Commission and open to all college graduates. While there are special provisions for members of underprivileged caste groups, the key to success for all is the examination, which covers a wide range of topics (some optional) but is mostly focused on general knowledge of history and politics. The IAS has very high (albeit declining) status within Indian society, and a large industry of test preparation has grown up around the exam. Only the very highest ranked test takers (usually around 70 a year out of the approximately 400,000 who take the preliminary exam and 7,500 who sit the main exam) score well enough to enter the IAS, after which they undergo a period of training on civil service history and practice at an academy in Mussoorie. Joining them at the academy are a small number of officers who are recruited after good performance in the state civil service, who are for that reason generally older than their counterparts.¹

After graduation, officers are posted to the IAS cadre of a particular state, in which they will spend the majority of their careers, as transfers between cadres are almost unheard of. Assignment to cadres is governed by strict rules. While up to a third of a cadre may be “local” (natives of the state in which they serve), at least one two-thirds must be outsiders. Freshly minted officers ranked highest within their batch (based on the civil service exam and interview) are able to choose their own states, although, as we describe below, they are unable to choose their initial district assignments within states. Remaining officers are allocated to cadres using a complicated system based on the alphabetical ordering of states and students’ rank within their batch. This system was designed to ensure the even distribution of talent among the states, and ensures that assignment of officers to states contains a sizable element of chance (?).

Within each state the fundamental unit of administration is the district, as it was in colonial times. The head of the district administration—variously called the district magis-

¹Approximately 25% of the IAS officers in our data were recruited through this mechanism. The remaining were “regular recruits,” in that they took the civil service examinations.

trate, district collector or deputy commissioner—is frequently from the IAS, although some are officials from the state civil service at the end of their careers. These officers are assisted by a large number of additional officials, including sub-divisional and district development officers, the more important of whom are also often recruited from the IAS. In colonial times, the district administration’s responsibilities were confined to law and order and tax collection. More recently, its responsibilities have extended to supervising a wide variety of subordinates and activities. Indeed, many commentators have emphasized the profusion of responsibilities for district officers as a major cause of administrative failure in India (??).

Importantly for this study, the district administration plays a crucial role in local development activities. Villages that want schools, roads or electric power must approach the district administration, directly or via a prominent local figure. While Indian districts do possess elected district boards (known as zilla parishads), their autonomy is sharply limited, and they are thought to have little effect on official policies (?). More real checks on local bureaucratic powers come from the local population. The populace can hold bureaucrats to account directly through social suasion, and indirectly, through politicians. Many officers we encountered in fieldwork feel that these demands, from politicians above and the people below, have become more insistent in recent years, as the Indian political system has become more representative of non-elite groups. Nevertheless, local bureaucrats retain substantial autonomy over the provision and quality of local level public goods.

On their first assignment to a state, officers are assigned to quasi-randomly chosen districts as assistants to the district officer, often titled subdivisional officers. They spend six to ten years in these assignments, gradually assuming greater responsibility in the district administration, until they become district officers themselves, typically in their early thirties. After this, officers typically move between district assignments and positions within the state or central secretariats, with the latter becoming more common until an officer is finally too senior for district assignments. After about 20 years of service, the records of officers are reviewed by the central government, and those considered the best are “empaneled,”

which means that they are eligible for senior appointments within the central government. As detailed below, the later assignments of bureaucrats are politicized, both as bureaucrats themselves have built up the capital and reputation with which to lobby for particular posts, and as politicians reward or punish bureaucrats for their actions.

The salaries and tenure of IAS officers are guaranteed by the central government and Indian constitution, and they enjoy such extensive protections that even egregiously corrupt IAS officers are difficult to remove. Elected state officials, however, have the power to transfer officers between different posts. Politicians are prone to exercise these powers on officers later in their careers (since by this point they have great deal of information about the personal traits and political opinions of officers) and around elections (possibly to control the bureaucracy; see ?). Partly for this reason, IAS officers tend to move rapidly between posts. Iyer and Mani find the average tenure in a given post to be sixteen months, and that only 56% of district officers stay for more than a year.

3 Dataset and Empirical Strategy

The empirical analysis presented here is based on the complete records of service for all the 4,793 members of the IAS as of March 7, 2007, obtained from the Union Public Service Commission. The fact that fewer than 5,000 officers are largely responsible for running a country of over 1.2 billion people is indicative of the power of IAS officers. For each officer, the record of service gives a complete list of the posts held and the dates during which they were held, in addition to certain biographical details. For this analysis, we confined ourselves to the positions that IAS officers held in the country's districts, thereby ignoring the large number of other positions (i.e., those in the state capitals, New Delhi or at parastatals) they held. The data were reorganized to yield, for each of the approximately 300 districts in India in 1971, a list of the IAS officers that served in them, along with the officers' dates of service and biographical details. The majority of the officers held district officer positions, with the

remainder serving as district development officers and subdivisional officers.

It is worth emphasizing the unusual nature of our data. Few studies have been able to leverage comprehensive data on bureaucrats—even though these should be, in principle, readily available—to understand their effects on any sort of policy outcomes. Those studies that have done so have focused on rich-world bureaucracies (?), rather than poor world ones. That said, our data on district officers is incomplete for two reasons. Firstly, because our portrait of the IAS is a snapshot in time, some, but not all, officers who held district positions will have already retired. Secondly, we have no information on the state civil service officers who hold district posts.

We measure our dependent variable, the provision of local public goods, as the proportion of villages with high schools. Schools are generally provided by the district administration and are beneficial to a wide section of the population. These data come from the decennial census of India, the “village directory” of which lists the availability of a wide variety of public goods in each rural village (urban areas are excluded.) We focus on the provision of high schools for a variety of reasons, while recognizing that different public goods could have different determinants. We do not estimate the effects of bureaucrats on goods relating to communications, transportation and health since these are frequently privately provided, which makes them a poor test of the influence of bureaucrats. Another good, primary schools, suffers from ceiling effects (approximately 80% of villages had them in 1991, and there was virtually no increase in the 1991-2001 period) and, along with middle schools, are inconsistently defined across India’s states (for example, the definition of primary schools in Gujarat subsumes middle schools). We additionally report results on phones—which are installed by a parastatal, and over which local bureaucrats have no control—to test whether our results are driven by wider social and economic trends rather than by bureaucrats.²

²While this paper focuses on bureaucratic predictors of public goods provision in India, several other factors have also been found to be significant predictors of public good provision. We control for these below. These include caste diversity (?), the historical land tenure system (?), previous control by princely states (?) and the local level of political information (?). Interesting for our work, which focuses on the characteristics of individuals, it seems that there is no relationship between criminality and corruption of representatives and the public goods supply (?).

Since few of the officers we have data on were active in the 1970s, our analysis employs data from the 1991 and 2001 censuses, giving us two observations for each district. During this period, many Indian districts were split into smaller districts or otherwise reorganized. We therefore follow the literature in using 1971 districts as our unit of observation throughout, with subsequent split districts being added to recreate the parent districts (?). For the small number of cases where a new district was created from multiple 1971 districts, data for the original 1971 district were created using the proportion of the population of the old district that was in the new districts.

Our key independent variables are measures of bureaucrats' embeddedness and education. In order to measure bureaucrats' education, we use the "division" of IAS officers' undergraduate degrees—ranked one through three, with one being the highest—which is the official measure of their performance on their final university exams. We average this measure across all officers who served in each district during the previous decade, weighted by their time in the district. Such a measure might be thought to have little variation, since the IAS is recruited from among the best test takers in the country. However, only 54% of IAS officers have a first class bachelor's degree, which might be due to the tendency of recruits to neglect their university studies in favor of preparing for the IAS exams, or might reflect a lack of correspondence between university and government examinations. In a robustness test we also employ the proportion of IAS officers with a graduate degree of any kind (this measure is also weighted by bureaucrats' time in district) as an independent variable. This, too, displays substantial variation, since 62% of IAS officers in our data have graduate degrees.

Our measure of embeddedness is the the proportion of IAS officers serving in the state from which they are from, also weighted by each bureaucrat's time in district. As mentioned above, within each cadre a third of the officers are locals (born in the state in which they are working) and two-thirds are outsiders (born in another state).

We start our analysis using OLS to model our measure of public goods as a function

of IAS officers' education and embeddedness. Note, however, that the estimated partial correlations between the characteristics of IAS officers and public goods outcomes could suffer from endogeneity bias, due to three reasons. First, omitted variables could explain influence both public goods provisioning and the bureaucrats posted to districts. These variables would bias the estimated effects of education and embeddedness. Second, the estimated effects of education and embeddedness could be biased due to reverse causality, as bureaucrats could be assigned to districts based on the prevailing level of public goods. And third, our key independent variables—embeddedness and education—likely suffer from measurement error, for previously-discussed reasons.

Although personnel assignments are formally controlled by the establishments division of the state secretariat, which strives to balance the interests of fairness among the officers with certain principles grounded in the search for efficiency, such as reserving larger districts (especially large urban districts) for more senior officers, the personnel assignment process late in bureaucrats' careers is informally influenced by other factors. First, bureaucrats themselves intrigue for posts, lobbying their seniors to receive positions that are considered career enhancing or pleasant to live in.³ Second, politicians seek to place loyal bureaucrats in key posts especially in areas where the party in power is weak (?), and also seek to use the variable desirability of posts as a way to reward and punish bureaucrats through transfers.

For an ideal test of the leadership influence hypothesis, we would want bureaucrats to be randomly assigned to districts, and for personal characteristics to thus be uncorrelated with those of districts. In order to approximate this experiment, we proceed on two fronts.

First, we use an extensive set of covariates, to control for confounds that could explain both the assignment of bureaucrats and the provision of public goods. These controls include district fixed effects, which control for many of the time-invariant factors that affect

³There seems to be no consensus on which districts are considered desirable. On the one hand, the officers we interviewed favored work in rural districts, where they would have more autonomy and enjoy a high level of prestige. On the other hand, urban areas offer higher levels of creature comforts and social contacts, especially for officers with school age children. Very poor tribal districts suffer from the additional disadvantage that they frequently suffer from insurgent activity that makes the lives of officer difficult and dangerous.

bureaucratic assignment and public goods provision, such as district size (recall that the establishment division explicitly assigns more senior bureaucrats to larger districts, and so this controls for that), climate and proximity to state capitals (the latter two could affect the attractiveness of districts to bureaucrats, and public goods as well). Since districts are nested within states, the district fixed effects also control for all state-invariant confounds. Importantly, this controls for the fact that the highest ranked candidates in the IAS exams are able to choose their state cadres. In addition to district fixed effects, we also include a year fixed effect, since we have data for two periods,. This controls for the effects of country-wide shocks such as national policies on our independent and dependent variables. The demographic controls that we include are log population and log number of villages. The economic and social controls we include are the proportion of the population that is rural, the proportion of the population that are workers, the proportion of the population who are agricultural laborers (highly correlated with rural poverty—see ?), and the proportion of the historically underserved scheduled caste and scheduled tribe communities. Since officers might find service unpleasant in areas where the Indian state is weak, we include a control for the murder rate, which also captures the presence of insurgent movements, especially the Maoist Naxalite guerillas who are prominent in many rural areas of Central and Eastern India. Lastly, to control for the potentially politicized distribution of resources, we control for the proportion of time the local representatives’ party was in power at the state and national levels.

Second, we note that the initial assignment of IAS officers to districts within states is quasi-random, and use this fact as the basis an instrumental variables strategy. Recall that we had argued that the assignment of IAS officers to districts was influenced by both politicians and the bureaucrats themselves. IAS officers early in their careers have had little time to build up the kinds of social networks that would enable them to lobby for postings. In the early stages of their careers, officers would also be largely unknown to the powerful politicians said to control district postings. The positions that they occupy, as subdivisional

officers and block development officers, are also remote from the law and order issues that are of greatest concern to politicians.

To take the most extreme example, officers in their first posting are fresh out of Mussoorie and are a blank slate to the politicians and civil servants who will be making the assignments. In most states, in fact, these assignments are considered an extension of officer training (??). This is explicitly recognized by the official documents on assignment procedures that we were able to obtain (??), which recognize that while late career officers will be able to lobby successfully, early career officers will have to go where they are sent. This usually means that officers are sent to relatively undesirable locations, which sometimes become objects of nostalgia among senior bureaucrats. (?).

The apolitical assignment of IAS officers early in their careers to districts allows us to use the education levels and proportion of local officers in the first five (this number is arbitrarily chosen) years of their career to instrument for the education and proportion of local in the overall groups of officers assigned to that district. Online Appendix Table ?? confirms that these instruments are indeed uncorrelated with a number of observable confounds.⁴ Further, the traits of initial assignees are necessarily correlated with the traits of all assignees, since the former is a part of the latter. Figure ?? plots these first stage relationships, and confirms that the early assignment variables are robust predictors of the overall traits of local bureaucrats. Lastly, the traits of early-career officers should also only affect public goods outcomes through their effect on all bureaucrats' traits, thereby satisfying the exclusion restriction.

To recap, our main empirical strategy is to estimate the following equation:

$$P_{it} = \alpha + \beta E_{it} + \gamma L_{it} + \delta \mathbf{X}_{it} + u_{it}$$

where P is our measure of public goods, E is our measure of IAS officers' education, L is our measure of IAS officers' embeddedness, $\mathbf{X}$ is a vector of controls, i indexes districts, t indexes time, and u is a normally distributed error term.

⁴That said, and to improve the precision of our estimates, we control for these factors.

In order to instrument for bureaucrats' education and embeddedness, we use the two-stage least squares estimator to additionally model:

$$E_{it} = \zeta + \eta Y_{it} + \tau \mathbf{X}_{it} + v_{it}$$

$$L_{it} = \kappa + \lambda Z_{it} + \rho \mathbf{X}_{it} + w_{it}$$

where Y and Z are instruments for education and embeddedness, respectively, and v and w are normally distributed error terms.

4 Results

We start our analysis of the effects of IAS officers on public goods provisioning by plotting the bivariate relationships between embeddedness and public goods, and education and public goods, in Figure ?? . The left hand plot suggests that local officers are associated with greater provisioning of high schools. The right hand plot suggests a weaker, possible curvilinear relationship between bureaucrats' formal education and high schools.

These relationships are formally investigated in Table ?? (full results are in Online Appendix Table ??). Regression 1 models the proportion of villages with high schools as a function of IAS officers' embeddedness and education. It confirms that embedded officers are associated with a greater proportion of villages with a high school. More educated officers, however, are not associated with a greater proportion of villages with high schools. This result remains if we account for the possibly curvilinear relationship between education and public goods provisioning suggested by the bivariate plot (results presented in Online Appendix Table ??). The coefficient on the embeddedness measure suggests that increasing the proportion of local officers by a standard deviation (.27) will increase the proportion of villages with high schools by 1.8 percentage points. Since an average of 13% of villages had high schools, this is equivalent to a 14% increase in the proportion of villages with high schools.

Regressions 2 repeats this model, while controlling for various possible confounds that could influence public goods provisioning and the assignment of bureaucrats. The control set was discussed previously, and contains the logarithm of the district population, the log number of villages, the proportion of the district that is rural, the proportion of workers and agricultural laborers, the proportion of scheduled castes and tribes, log murders per capita and the proportion of representatives in the state and national ruling coalitions. Regression 3 adds district and year fixed effects to this specification, thereby additionally controlling for unobserved district and year-specific confounds. The successive addition of controls attenuates the estimated partial correlation of embeddedness and high schools. In regression 3, with the full control set, the estimated effect of embeddedness on the proportion of villages with high schools is only statistically significant at the 10% level.

In regression 4 of Table ??, we present the results of our preferred 2SLS specification. The first two columns show the results of the first stage regressions for bureaucrats' embeddedness and education, where the embeddedness and education of new recruits—defined as those in their first 5 years of service (as discussed later, the results are robust to defining new recruits as those in the first 4 years of service)—are used to estimate overall embeddedness and education. Importantly, the traits of the early-career officers are positively associated with the overall traits of officers to a statistically significant degree, even after controlling for confounds and district and year fixed effects. The first stage F -statistics for these regressions are also well above 10, which is the conventional threshold for a strong instrument.

The last column presents the results of the second stage regression. As before, the educational qualifications of bureaucrats do not have a statistically significant effect on school construction, while local officers have a positive impact. These results are not driven by the endogeneity in the assignment of officers. The coefficient on embeddedness suggests that increasing the proportion of local IAS officers' from the mean by a standard deviation (.27) increases the proportion of villages with high schools by 0.62 percentage points or 5%.

Our use of an instrumental variables strategy means that the estimates of the causal

effects of education and embeddedness that we recover are local average treatment effects (LATEs). In other words, our estimates are particularly indicative of the effects of early-career officers' education and embeddedness. Although the effects of education and embeddedness of late career IAS officers' might, in principle, be different from the estimates we have presented here, we do not have clear priors on how this might affect the thrust of our results. In the case of embeddedness, early-career local IAS officers might do more for their districts than late career officers, since they are closer to their roots. But the reverse might be possible, too, if IAS officers later in their careers wish to give back to their communities as they are closer to retirement. As for bureaucrats' education, recall that we had failed to find a positive effect between this variable and high schools. Since people's formal qualifications are likely to become less important with time, we would expect the education of late-career bureaucrats to also have a null effect.

The evidence presented thus far suggests two broad conclusions. First, bureaucrats' education—which displays a substantial degree of variation—does not cause variation in outcomes. Second, embedded officers increase the proportion of villages with high schools to a statistically and substantively significant degree, and that bureaucratic leadership thus matters for development outcomes.

4.1 Robustness Checks

Our preferred 2SLS results, which show that embeddedness has a positive causal impact on the proportion of villages with high schools is robust to a variety of different specifications. These are summarized in Table ?? (full results presented in Online Appendix Table ??).

We start with three robustness tests of our identification strategy. Recall that we identify the causal effect of IAS officers' education and embeddedness, leveraging the fact that their initial assignments to districts are quasi-random. The fact that the highest ranked officers are able to choose their states does not pose a problem for this strategy, since our empirical

strategy leverages within-state (in fact, within-district) variation.⁵ Although the qualitative literature suggests that assignments of officers within states is quasi-random, one might still be concerned that the highest ranked officers are able to influence district assignments. In order to address this concern, we control for the mean exam rank of the IAS officers assigned to each district (regression 1). As expected, the estimated effect of embeddedness on public goods is unchanged.

In a second robustness test of our identification strategy, we present the reduced-form effect of the embeddedness and education of early-career bureaucrats on high schools (regression 2). Consistent with our main results, bureaucrats' embeddedness significantly increases the provision of high schools, while their formal education does not. In the last robustness test of our identification strategy, we redefine early-career bureaucrats as those within four, instead of five (both numbers are arbitrary), years of starting as IAS officers. Regression 3 presents the results from this strategy, and shows that doing so strengthens our results.

Note that since our panel only covers two time periods, concerns of Nickell bias (?) prevent us from including a lagged dependent variable along with district fixed effects. In regression 4, we substitute the district fixed effects in our preferred specification with a lagged dependent variable and state fixed effects. Doing so slightly attenuates the estimated relationship between embeddedness and high schools, although it remains significant at the 11% level.

In regression 5, we present a placebo test of the effects of bureaucrats, by examining the effects of their embeddedness and education on phones, which are not controlled by the district administration. As expected, the proportion of local officers does not affect the presence of phones.

Lastly, regression 6 uses an alternate measure of bureaucrats' education—the proportion of officers in a district with graduate degrees—to see if this is robustly associated with improved public goods provisioning. Education continues to have no statistically distinguish-

⁵Recall that districts are nested within states.

able effect on public goods. This gives us some confidence that our results are not driven by the range of the degree category variable, or biases in university grading.

4.2 Mechanisms

In the theory section, we discussed how embeddedness might work to improve public goods provisioning. We are able to test two of the possible mechanisms here. First, locally embedded officers might enjoy a technological advantage, insofar as they might perform well due to the fact that they speak the local language. We test this possibility in regression 1 of Table ?? (full results are in Online Appendix Table ??), by controlling for the proportion of IAS officers that speak the state language. (Following our main specification, we instrument for this term using the proportion of early-career IAS officers that speak the state language.) If embeddedness works through giving officers who speak the same language as locals an advantage in the provision of public goods, controlling for this variable should attenuate the magnitude and statistical significance of the coefficient on embeddedness. However, the estimated positive effect of embeddedness only increases with this addition, suggesting that embeddedness does not work through language.⁶

A second way in which embeddedness might improve outcomes is if citizens are able to hold embedded politicians to account. This might particularly occur in districts with literate populations, and those with high newspaper circulation. In low literacy and information districts, the positive effects of embeddedness might be outweighed by the negative effects of elite capture. We test these propositions by interacting embeddedness with lagged literacy (from the census) and lagged per capita vernacular newspaper circulation (from ?; unfortunately, this measure only varies at the state level). These tests are predicated on the assumption that literate populations are better able to hold politicians to account, and that more informed populations are able to do the same (?). Since both literacy and newspaper

⁶Since Hindi is spoken in multiple North Indian states, these states are assigned many officers who speak the local language but are not from the state. Outside of the North, the local origin and language variables are perfectly collinear.

circulation are potentially endogenous to high school construction, we use their lagged values. We instrument for the interaction terms using the interaction of the instruments for embeddedness with our measures for literacy and newspaper circulation.⁷

Regressions 2 and 3 suggest that embeddedness has a statistically significant and positive effect on high school construction in high literacy and high information districts. Figure ?? plots the marginal effects of these interaction terms, suggesting that embeddedness has no discernible effect on high schools at low levels of literacy (that is, in the 25% of observations with literacy rates below 23%) and also those with low levels of newspaper circulation (approximately 70% of districts have high enough newspaper circulation for locally embedded officers to positively impact the proportion of villages with high schools).

An alternative interpretation of these results is that rather than ensuring greater accountability, literacy and vernacular newspaper circulation are simply markers of citizens' preference for high schools. In other words, the causal effect of embeddedness on the proportion of villages with high schools in districts with high literacy and newspaper circulation could reflect a preference for high schools over other goods. In order to explore this possibility, we turn to data from the 2006 World Values Survey conducted in India. In an admittedly imperfect test for the preference hypothesis, we examine whether more educated people (our proxy for literacy) and those who read newspapers in the past week (our proxy of vernacular newspaper circulation) place an increased emphasis on education (for this analysis, the dependent variable is a dummy for whether respondents think that inadequate education is the most serious problem in the country), while controlling for respondent age, gender, income and state fixed effects. As we can see in Online Appendix Table ??, it is not the case that individuals with more education and exposure to the media think that education is an urgent issue. This suggests that it is unlikely that citizen preferences explain the heterogeneous treatment effects that we have uncovered.

⁷Since the newspaper circulation variable only varies at the state level, and since our specifications include district fixed effects, the uninteracted effect of newspaper circulation “drops out” of the regression. The interaction of lagged newspaper circulation and embeddedness remains.

5 Conclusions

Around the time that Tolstoy was repudiating the role of “great men,” Karl Marx advanced a more nuanced view of the importance of leadership, arguing that “men make their own history, but they do not make it as they please ... but under circumstances existing already, given and transmitted from the past” (?). Our investigation of the effects of IAS bureaucrats on public goods provisioning in India provides more support for Marx than for Tolstoy. It suggests that bureaucrats matter, that some of their characteristics help explain variation in development outcomes, and that their contexts—specifically whether they serve under conditions that favor accountability—condition their effects.

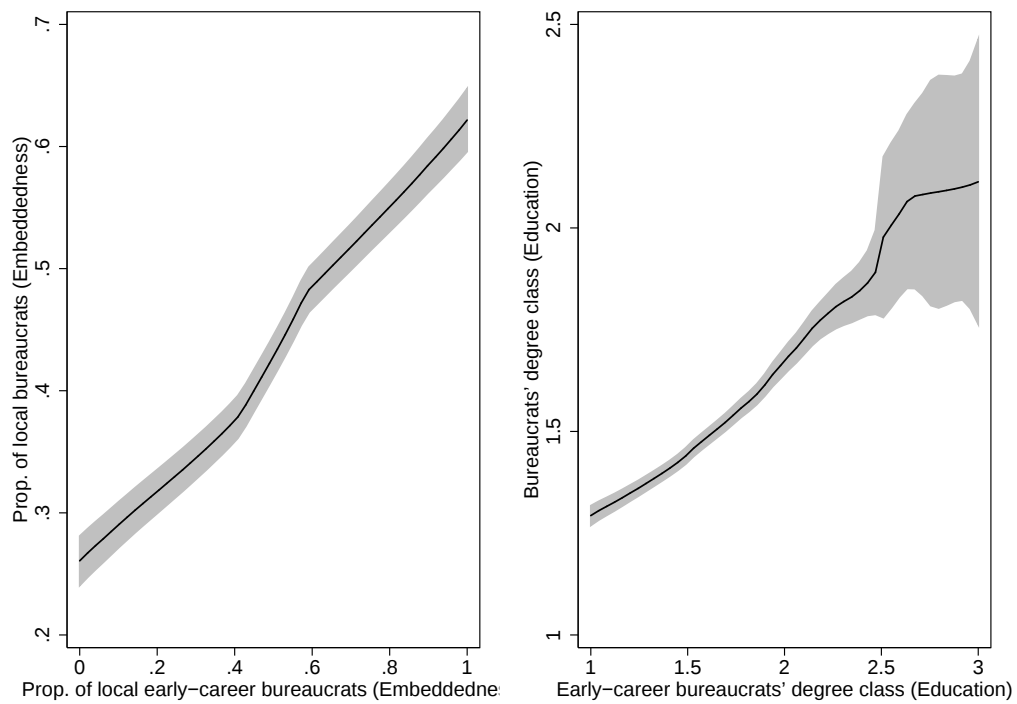
These findings extend the empirical literature on leadership, by showing that, at least in some countries, development outcomes are influenced not only by politicians but also by unelected bureaucrats. This is particularly relevant in India, where the role of bureaucrats has received little attention in the extensive literature on public goods.

Our findings also further the literature on leadership and development by moving beyond analyzing whether leaders matter, to analyzing the specific attributes of leaders that matter. We find that while the embeddedness of bureaucrats has a positive effect on public goods, their formal education does not explain variation in public goods provisioning. Recall, however, that many traditional bureaucracies, including the IAS, structure their recruitment and assignment processes on precisely the opposite basis: that high intellectual achievement and a lack of local ties are desirable. If confirmed in other work, our findings suggests the desirability of radical changes in the way bureaucracies are staffed.

Lastly, our findings suggest that embedded bureaucrats fail to boost public goods in districts with low levels of literacy and newspaper circulation. We argue that this suggests that locally embedded bureaucrats perform better when they can be held accountable. Interestingly, since India used to have lower levels of literacy and newspaper circulation, these findings suggest that the IAS might have been right to have been suspicious of embeddedness in the past. Future work could similarly move beyond simply examining whether embedded-

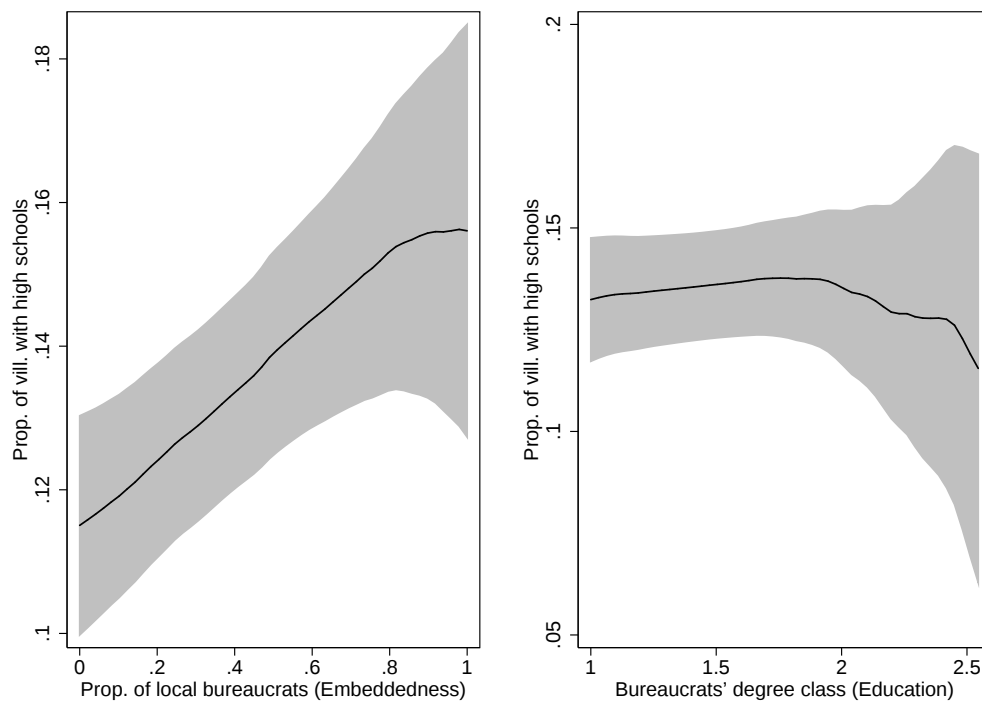
ness has net positive or negative effects, to understanding the circumstances in which these effects obtain.

Figure 1: First stage relationships for bureaucrats' embeddedness and education and their instruments



Notes: The local polynomial line is Epanechnikov kernel-weighted, with 95% confidence intervals. See text for details.

Figure 2: Bivariate relationships between bureaucrats' embeddedness and education, and the proportion of villages with high schools



Notes: The local polynomial line is Epanechnikov kernel-weighted, with 95% confidence intervals. See text for details.

Table 1: The effects of bureaucrats' embeddedness and education on the proportion of villages with high schools

Estimator: Equation:	OLS			OLS		2SLS	
	1			2		4	
						1st stage: Embeddedness	2nd stage
Prop. of local bureaucrats (Embeddedness)	0.066** [0.026]	0.026* [0.014]	0.019* [0.011]				0.023** [0.010]
Bureaucrats' degree class (Education)	0.000 [0.021]	0.004 [0.012]	-0.005 [0.011]				-0.008 [0.016]
Prop. of local early-career bureaucrats (Embeddedness)						0.550*** [0.053]	0.034 [0.058]
Early-career bureaucrats' degree class (Education)						0.001 [0.053]	0.512*** [0.059]
Controls?	N	Y	Y			Y	Y
District fixed effects?	N	N	Y			Y	Y
Year fixed effect?	N	N	Y			Y	Y
Observations	569	569	569			569	569
Adjusted R -squared	0.01	0.68	0.96			-0.11	-0.38
Centered R -squared						0.51	0.39
First stage F -statistic						59	38

Notes: The dependent variable for all regressions is the proportion of villages with high schools. Controls are the logarithm of the district population, the log number of villages, the proportion of the district that is rural, the proportion of workers and agricultural laborers, the proportion of scheduled castes and tribes, log murders per capita and the proportion of representatives in the state and national ruling coalitions. Robust standard errors, clustered by district, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table 2: Robustness tests for the effects of bureaucrats' embeddedness and education on the proportion of villages with high schools

DV: Prop. of villages with	High schools 1	High schools 2	High schools 3	High schools 4	Phones 5	High schools 6
Prop. of local bureaucrats (Embeddedness)	0.024** [0.012]		0.040*** [0.014]	0.017 [0.010]	0.015 [0.041]	0.020* [0.010]
Bureaucrats' degree class (Education)	-0.010 [0.020]		-0.012 [0.019]	0.003 [0.009]	-0.014 [0.047]	
Bureaucrats' exam rank	0.048 [0.219]					
Prop. of local early-career bureaucrats (Embeddedness)		0.012** [0.005]				
Early-career bureaucrats' degree class (Education)		-0.004 [0.008]				
Lagged prop. of villages with high schools				0.814*** [0.043]		
Prop. of bureaucrats with graduate degrees (Education)						0.008 [0.017]
Controls?	Y	Y	Y	Y	Y	Y
District fixed effects?	Y	Y	Y	N	Y	Y
Year fixed effect?	Y	Y	Y	Y	Y	Y
State fixed effects?				Y		
Observations	569	569	481	550	571	569
Centered R -squared	0.38	0.38	0.36	0.95	0.80	0.38
First stage F -statistic for embeddedness	40	.	45	128	59	60
First stage F -statistic for education	27	.	29	69	38	38
First stage F -statistic for exam rank	23					

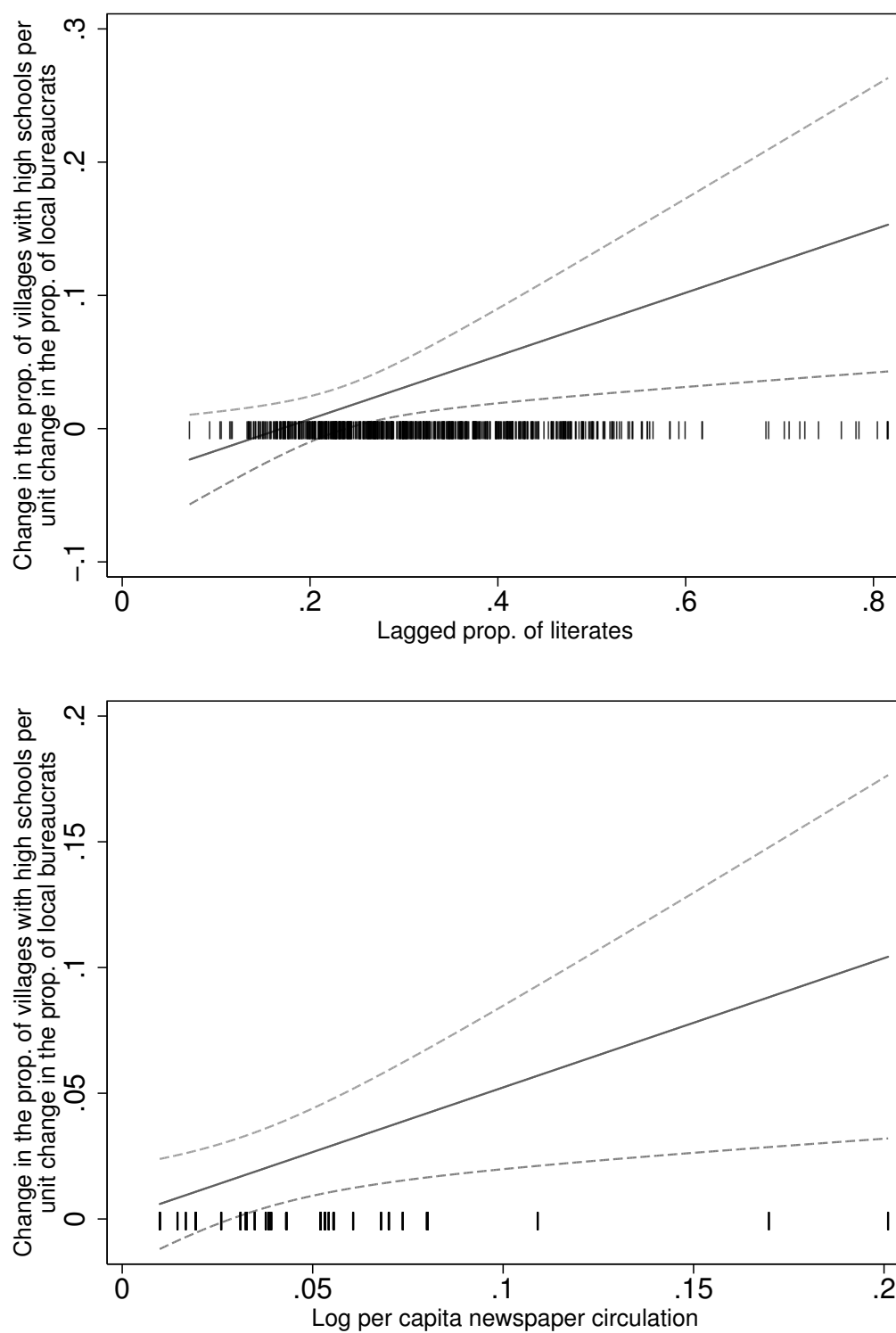
Notes: All estimators are 2SLS. In regression 5, embeddedness and education are instrumented by the embeddedness and education of bureaucrats in their first four years of service. Controls are the logarithm of the district population, the log number of villages, the proportion of the district that is rural, the proportion of workers and agricultural laborers, the proportion of scheduled castes and tribes, log murders per capita and the proportion of representatives in the state and national ruling coalitions. Robust standard errors, clustered by district, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table 3: Mechanisms by which bureaucrats' embeddedness affects the proportion of villages with high schools

	1	2	3
Prop. of local bureaucrats (Embeddedness)	0.030** [0.013]	-0.040 [0.028]	0.001 [0.012]
Prop. of bureaucrats that speak the state language	-0.014 [0.020]		
Lagged prop. of literates X Embeddedness		0.237** [0.113]	
Lagged prop. of literates		-0.027 [0.169]	
Lagged log per capita newspaper circulation X Embeddedness			0.514** [0.253]
Bureaucrats' degree class (Education)	-0.008 [0.016]	-0.007 [0.016]	-0.013 [0.016]
Controls?	Y	Y	Y
District fixed effects?	Y	Y	Y
Year fixed effect?	Y	Y	Y
Observations	569	569	552
Centered R -squared	0.40	0.38	0.39
First stage F -statistic for embeddedness	42	46	40
First stage F -statistic for same language	19		
First stage F -statistic for education	26	26	25
First stage F -statistic for interaction term		33	22

Notes: All estimators are 2SLS. Controls are the logarithm of the district population, the log number of villages, the proportion of the district that is rural, the proportion of workers and agricultural laborers, the proportion of scheduled castes and tribes, log murders per capita and the proportion of representatives in the state and national ruling coalitions. Robust standard errors, clustered by district, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Figure 3: The effects of embeddedness on the proportion of villages with high schools as literacy and newspaper circulation vary, with 90% confidence intervals.



Notes: The coefficients used to plot the upper and lower figures are from regressions 1 and 2 of Table ??, respectively. The rug plots display the distribution of literacy and newspaper circulation in the upper and lower figures, respectively. See text for details.

Online Appendix for “Leadership and Development: Education, Embeddedness and the Performance of Indian Bureaucrats”

Table A1: Summary statistics for district dataset

	Mean	Std. Dev.	Min.	Max.
<i>Dependent variables</i>				
Prop. of vill. with high schools	0.13	0.15	0.00097	0.95
Prop. of vill. with phone service	0.26	0.26	0.00074	1
<i>Independent variables</i>				
Prop. of local bureaucrats (Embeddedness)	0.41	0.27	0	1
Bureaucrats' degree class (Education)	1.44	0.28	1	2.54
Prop. of bureaucrats with graduate degrees (Education)	0.79	0.21	0	1
Prop. of bureaucrats that speak the state language	0.59	0.30	0	1
<i>Instruments</i>				
Prop. of local early-career bureaucrats (Embeddedness)	0.44	0.34	0	1
Early-career bureaucrats' degree class (Education)	1.43	0.33	1	3
Prop. of early-career bureaucrats with graduate degrees (Education)	0.74	0.29	0	1
Prop. of early-career bureaucrats that speak the state language	0.61	0.35	0	1
<i>Controls</i>				
Log population	14.7	0.76	10.2	16.6
Log villages	7.23	0.81	3.71	9.41
Proportion rural	0.77	0.14	0.20	1
Proportion workers	0.40	0.068	0.25	0.65
Proportion agricultural workers	0.19	0.11	0.0027	0.53
Proportion scheduled castes	0.17	0.072	0.0049	0.52
Proportion scheduled tribes	0.10	0.16	0	0.94
Log murders per capita	1.35	0.49	0	2.98
Prop. of rep. in state ruling coalition	0.55	0.18	0.019	1
Prop. of rep. in national ruling coalition	0.70	0.27	0	1
<i>Interaction terms</i>				
Lagged prop. of literates	0.33	0.13	0.072	0.82
Lagged log per capita local newspaper circulation	0.051	0.030	0.0098	0.20

Notes: Independent variables and instruments are weighted by bureaucrats' time in district. See text for details.

Table A2: Balance tests for instruments for bureaucrats' embeddedness and education

Dependent variables:	Log population	Log villages	Prop. rural	Prop. workers	Prop. agricultural workers	Prop. scheduled castes	Prop. scheduled tribes	Log murders per capita	Prop. of rep. in state ruling coalition	Prop. of rep. in national ruling coalition
	1	2	3	4	5	6	7	8	9	10
Prop. of local early-career bureaucrats (Embeddedness)	-0.157 [0.117]	-0.223 [0.129]	-0.007 [0.016]	0.002 [0.006]	0.004 [0.009]	-0.003 [0.008]	0.024 [0.025]	-0.028 [0.056]	0.022 [0.021]	0.034 [0.033]
Early-career bureaucrats'	0.032 [0.083]	0.032 [0.057]	-0.019* [0.010]	0.003 [0.004]	-0.010 [0.008]	-0.006 [0.008]	-0.002 [0.022]	-0.062 [0.041]	-0.020 [0.019]	0.022 [0.028]
degree class (Education)										
Observations	569	569	569	569	569	569	569	569	569	569
Adjusted R -squared	0.41	0.46	0.18	0.54	0.56	0.46	0.24	0.30	0.20	0.08

Notes: All regressions are OLS and include state and year fixed effects. Robust standard errors, clustered by state, in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table A3: The effects of bureaucrats' embeddedness and education on the proportion of villages with high schools

Estimator: Equation:	OLS			2SLS	
	1	2	3	1st stage: Embeddedness	2nd stage: Education
	4				
Prop. of local bureaucrats (Embeddedness)	0.066** [0.026]	0.026* [0.014]	0.019* [0.011]		0.023** [0.010]
Bureaucrats' degree class (Education)	0.000 [0.021]	0.004 [0.012]	-0.005 [0.011]		-0.008 [0.016]
Log population		0.094*** [0.009]	0.001 [0.033]	0.090 [0.105]	-0.001 [0.023]
Log villages		-0.171*** [0.010]	-0.019 [0.013]	-0.021 [0.063]	-0.018** [0.009]
Proportion rural		0.169*** [0.038]	0.212 [0.296]	0.463 [0.417]	0.212 [0.197]
Proportion workers		0.182** [0.080]	-0.071 [0.145]	-0.480 [0.739]	-0.071 [0.096]
Proportion agricultural workers		-0.072* [0.040]	0.059 [0.095]	-0.325 [0.541]	0.058 [0.064]
Proportion scheduled castes		-0.223*** [0.061]	0.294 [0.376]	0.110 [1.660]	0.296 [0.251]
Proportion scheduled tribes		-0.044 [0.031]	0.161 [0.202]	0.785 [1.237]	0.159 [0.135]
Log murders per capita		-0.069*** [0.009]	0.002 [0.013]	-0.004 [0.065]	0.002 [0.009]
Prop. of rep. in state ruling coalition		-0.010 [0.023]	0.012 [0.019]	-0.035 [0.118]	0.012 [0.013]
Prop. of rep. in national ruling coalition		-0.017 [0.014]	0.004 [0.011]	-0.046 [0.069]	0.005 [0.007]
Prop. of local early-career bureaucrats (Embeddedness)				0.550***	
Early-career bureaucrats' degree class (Education)				[0.053] [0.059]	
District fixed effects?	N	N	Y	Y	Y
Year fixed effect?	N	N	Y	Y	Y
Observations	569	569	569	569	569
Adjusted R -squared	0.01	0.68	0.96	-0.11	-0.38
Centered R -squared				0.51	0.39
First stage F -statistic				59	38

Notes: The dependent variable for all regressions is the proportion of villages with high schools. Robust standard errors, clustered by district, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table A4: The effects of bureaucrats' embeddedness and education on the proportion of villages with high schools, with education squared

Estimator: Equation:	OLS			2SLS		1st stage: Education sq.	2nd stage
	1st stage: Embeddedness		1st stage: Education				
	1	2	3	4			
Prop. of local bureaucrats (Embeddedness)	0.068*** [0.026]	0.025* [0.014]	0.019* [0.011]			0.023** [0.010]	
Bureaucrats' degree class (Education)	0.281** [0.136]	-0.106 [0.087]	-0.019 [0.090]			0.038 [0.231]	
Bureaucrats' degree class squared (Education)	-0.091** [0.042]	0.036 [0.027]	0.005 [0.029]			-0.016 [0.080]	
Log population		0.096*** [0.009]	0.001 [0.034]	0.101 [0.107]	-0.141 [0.113]	-0.490 [0.358]	
Log villages		-0.172*** [0.010]	-0.019 [0.013]	-0.024 [0.064]	0.054 [0.074]	0.164 [0.231]	
Proportion rural		0.168*** [0.038]	0.212 [0.297]	0.510 [0.425]	0.425 [0.543]	1.459 [1.801]	
Proportion workers		0.187** [0.080]	-0.074 [0.147]	-0.476 [0.738]	0.388 [0.862]	1.691 [2.675]	
Proportion agricultural workers		-0.076* [0.040]	0.060 [0.095]	-0.338 [0.549]	-0.164 [0.707]	-0.567 [2.237]	
Proportion scheduled castes		-0.223*** [0.061]	0.294 [0.377]	0.099 [1.670]	0.903 [1.940]	2.832 [6.149]	
Proportion scheduled tribes		-0.044 [0.031]	0.160 [0.204]	0.733 [1.248]	0.316 [1.689]	1.206 [5.439]	
Log murders per capita		-0.068*** [0.009]	0.002 [0.013]	-0.006 [0.065]	0.034 [0.078]	0.037 [0.251]	
Prop. of rep. in state ruling coalition		-0.011 [0.023]	0.013 [0.019]	-0.031 [0.117]	-0.149 [0.141]	-0.485 [0.460]	
Prop. of rep. in national ruling coalition		-0.016 [0.014]	0.005 [0.011]	-0.043 [0.068]	0.056 [0.079]	0.142 [0.242]	
Prop. of local early-career bureaucrats (Embeddedness)				0.549*** [0.052]	0.034 [0.057]	0.105 [0.179]	
Early-career bureaucrats' degree class (Education)				-0.355 [0.287]	0.614* [0.370]	1.140 [1.200]	
Early-career bureaucrats' degree class squared (Education)				0.116 [0.092]	-0.034 [0.120]	0.119 [0.400]	
District fixed effects?	N	N	Y	Y	Y	Y	
Year fixed effect?	N	N	Y	Y	Y	Y	
Observations	569	569	569	569	569	569	
Adjusted <i>R</i> -squared	0.01	0.68	0.96	-0.10	-0.32	-0.36	
Centered <i>R</i> -squared				0.51	0.41	0.40	
First stage <i>F</i> -statistic				41	27	23	

Notes: The dependent variable for all regressions is the proportion of villages with high schools. Robust standard errors, clustered by district, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table A5: Robustness tests for the effects of bureaucrats' embeddedness and education on the proportion of villages with high schools

DV: Prop. of villages with	High schools 1	High schools 2	High schools 3	High schools 4	Phones 5	High schools 6
Prop. of local bureaucrats (Embeddedness)	0.024** [0.012]		0.040*** [0.014]	0.017 [0.010]	0.015 [0.041]	0.020* [0.010]
Bureaucrats' degree class (Education)	-0.010 [0.020]		-0.012 [0.019]	0.003 [0.009]	-0.014 [0.047]	
Bureaucrats' exam rank	0.048 [0.219]					
Prop. of local early-career bureaucrats (Embeddedness)		0.012** [0.005]				
Early-career bureaucrats' degree class (Education)		-0.004 [0.008]				
Lagged prop. of villages with high schools				0.814*** [0.043]		
Prop. of bureaucrats with graduate degrees (Education)						
Log population	-0.001 [0.023]	0.002 [0.022]	-0.001 [0.026]	0.026*** [0.009]	0.112** [0.052]	0.008 [0.017]
Log villages	-0.018** [0.009]	-0.019** [0.009]	-0.013 [0.009]	-0.036*** [0.008]	-0.109*** [0.029]	0.001 [0.022]
Proportion rural	0.215 [0.196]	0.219 [0.197]	0.182 [0.216]	0.067*** [0.023]	-1.070** [0.448]	0.216 [0.200]
Proportion workers	-0.069 [0.095]	-0.085 [0.100]	-0.122 [0.118]	0.061 [0.041]	1.182*** [0.374]	-0.068 [0.098]
Proportion agricultural workers	0.057 [0.064]	0.052 [0.064]	0.124 [0.088]	-0.054* [0.029]	-0.500** [0.249]	0.059 [0.064]
Proportion scheduled castes	0.293 [0.248]	0.291 [0.255]	0.199 [0.220]	0.003 [0.042]	-0.235 [0.763]	0.289 [0.247]
Proportion scheduled tribes	0.160 [0.135]	0.175 [0.143]	-0.011 [0.154]	-0.022 [0.015]	0.072 [0.593]	0.145 [0.139]
Log murders per capita	0.002 [0.009]	0.002 [0.008]	0.000 [0.012]	-0.003 [0.005]	-0.044 [0.028]	0.002 [0.009]
Prop. of rep. in state ruling coalition	0.012 [0.012]	0.013 [0.013]	0.007 [0.015]	0.020 [0.012]	0.132*** [0.047]	0.014 [0.014]
Prop. of rep. in national ruling coalition	0.005 [0.007]	0.003 [0.007]	0.011 [0.009]	-0.003 [0.012]	0.095*** [0.029]	0.004 [0.007]
District fixed effects?	Y	Y	Y	N	Y	Y
Year fixed effect?	Y	Y	Y	Y	Y	Y
State fixed effects?				Y		
Observations	569	569	481	550	571	569
Centered R -squared	0.38	0.38	0.36	0.95	0.80	0.38
First stage F -statistic for embeddedness	40	.	45	128	59	60
First stage F -statistic for education	27	.	29	69	38	38
First stage F -statistic for exam rank	23					

Notes: All estimators are 2SLS. In regression 5, embeddedness and education are instrumented by the embeddedness and education of bureaucrats in their first four years of service. Robust standard errors, clustered by district, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table A6: Mechanisms by which bureaucrats' embeddedness affects the proportion of villages with high schools

	1	2	3
Prop. of local bureaucrats (Embeddedness)	0.030** [0.013]	-0.040 [0.028]	0.001 [0.012]
Prop. of bureaucrats that speak the state language	-0.014 [0.020]		
Lagged prop. of literates X Embeddedness		0.237** [0.113]	
Lagged prop. of literates		-0.027 [0.169]	
Lagged log per capita newspaper circulation X Embeddedness			0.514** [0.253]
Bureaucrats' degree class (Education)	-0.008 [0.016]	-0.007 [0.016]	-0.013 [0.016]
Log population	0.000 [0.023]	0.001 [0.021]	-0.016 [0.025]
Log villages	-0.019** [0.009]	-0.019** [0.009]	-0.016* [0.008]
Proportion rural	0.215 [0.197]	0.202 [0.195]	0.201 [0.206]
Proportion workers	-0.074 [0.095]	-0.083 [0.095]	-0.058 [0.096]
Proportion agricultural workers	0.059 [0.063]	0.044 [0.062]	0.038 [0.066]
Proportion scheduled castes	0.294 [0.250]	0.325 [0.251]	-0.350 [0.277]
Proportion scheduled tribes	0.165 [0.135]	0.164 [0.144]	0.242* [0.138]
Log murders per capita	0.001 [0.008]	0.004 [0.008]	0.005 [0.009]
Prop. of rep. in state ruling coalition	0.012 [0.012]	0.010 [0.013]	0.017 [0.013]
Prop. of rep. in national ruling coalition	0.004 [0.007]	0.007 [0.007]	0.005 [0.007]
District fixed effects?	Y	Y	Y
Year fixed effect?	Y	Y	Y
Observations	569	569	552
Centered R -squared	0.40	0.38	0.39
First stage F -statistic for embeddedness	42	46	40
First stage F -statistic for same language	19		
First stage F -statistic for education	26	26	25
First stage F -statistic for interaction term		33	22

Notes: All estimators are 2SLS. Robust standard errors, clustered by district, in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.

Table A7: Conditional logit estimates for whether those with more education, and those who read a newspaper in the past week, think that inadequate education is the most serious problem in India

	1	2	3
Highest education level attained (1=lower, 2=middle, 3=upper)	0.017 [0.114]		-0.067 [0.098]
Dummy for whether read newspaper in last week		0.250 [0.228]	0.346 [0.228]
Age, in years	-0.008 [0.006]	-0.006 [0.006]	-0.007 [0.006]
Dummy for female respondent	-0.092 [0.173]	-0.045 [0.192]	-0.036 [0.185]
Income bracket 2	0.064 [0.225]	0.100 [0.194]	0.053 [0.230]
Income bracket 3	0.695** [0.317]	0.658** [0.301]	0.655** [0.319]
Income bracket 4	0.596 [0.431]	0.577 [0.425]	0.554 [0.436]
Income bracket 5	0.401 [0.383]	0.310 [0.371]	0.347 [0.385]
Income bracket 6	0.274 [0.400]	0.193 [0.394]	0.236 [0.402]
Income bracket 7	0.573 [0.393]	0.468 [0.399]	0.520 [0.387]
Income bracket 8	0.228 [0.569]	0.129 [0.565]	0.147 [0.562]
Income bracket 9	-0.853 [0.814]	-0.931 [0.788]	-0.912 [0.796]
Income bracket 10	-15.005*** [0.667]	-13.789*** [0.647]	-14.010*** [0.662]
State fixed effects?	Y	Y	Y
Observations	1,906	1,920	1,903
Pseudo <i>R</i> -squared	0.02	0.02	0.02

Notes: Data are from the 2006 World Values Survey. The dependent variable is a dummy for whether the respondent thought that inadequate education is the most serious problem in India. Robust standard errors, clustered by state, in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for details.