

Contract Teachers in India

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Abstract

In this paper we use non-experimental data from government schools in Uttar Pradesh and Madhya Pradesh, two of the largest Indian states, to present average school outcomes by contract status of teachers. We find that contract teachers are associated with higher effort than civil service teachers with permanent tenures, before as well as after controlling for school fixed effects. And higher teacher effort is associated with better student performance after controlling for other school inputs and student characteristics. Given that salaries earned by contract teachers are one fourth or less of civil service teachers, contract teachers may be a more cost-effective resource. However, contracts “as they are” appear weak. Not only do contract teachers have fairly low average effort in absolute terms, but those who have been on the job for at least one full tenure have lower effort than others who are in the first contract period.

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1. Introduction

The debate over contract versus regular teachers with permanent tenure in government schools continues to engage academics, policy-makers and the general public in India and across the developing world. Many state governments in India faced with rapid rise in school enrolments and fiscal tightening have hired contract teachers in large numbers. Contract teachers have renewable contracts and do not have professional training unlike regular teachers. Their salaries are generally a fraction of the salary of regular teachers who are civil servants. The significant presence of contract teachers has raised the question of whether they are having an adverse impact on education quality or not. This concern is largely due to the lower educational qualifications required for someone to become a contract teacher and the little or no pre-service and in-service training they are given. Appositely, weak accountability of regular teachers as reflected in their high absence rates and low teaching activity when present in schools has also been an issue of serious concern. Contract teachers, on the other hand, are given performance-based contracts. Their contracts can be cancelled if their performance is adjudged dissatisfactory by the village education committee or other local community bodies that have the authority to hire them. This is expected to provide them with stronger incentives to perform.

In this paper, we use data collected from government schools of two large Indian states of Madhya Pradesh (MP) and Uttar Pradesh (UP) on schools, teachers and students in primary grades to compare the performance of regular and contract teachers. Performance is measured along three dimensions: (a) teacher attendance; (b) teacher engagement in teaching; and (c) student test scores.

The paper compares average teacher and student outcomes by contract status of teachers. It does not present the causal impact of a contract teacher relative to a regular teacher since the data are non-experimental. Even though experimental evidence is considered the gold standard for identifying causal estimates, they are often done to test impacts of specific interventions in specific contexts. Studies such as this one that use observational data are also pertinent for policy-makers as they present ‘as-is’ relationships between various factors and educational outcomes. For governments in their business-as-usual management of the public education system, it is useful to refer to analysis of these average relationships since they are in the actual context within which they operate.

The paper is structured as follows. In section 2, we provide a brief review of the background behind hiring of contract teachers in India and the evidence on the effect of contract teachers on education quality. In section 3, we describe the data used. In section 4, we describe state norms for hiring contract teachers in the study states and a theoretical motivation behind the behavior of teachers facing different contract status. Section 5 present empirical results on teacher performance by contract status and determinants of test scores. Section 6 concludes. All the tables and figures are presented in the appendix.

2. Background and Literature Review

Historically, the policy of hiring contract teachers was first used by some Indian states to provide additional support to single teacher schools, to run non-formal-education centers for out-of-school children, and for formal schools in remote and tribal areas. In the last fifteen years contract teachers have increasingly been used in lieu of regular teachers in mainstream formal schools by governments faced with tightening fiscal situations. This has raised the fear that institutionalizing a mechanism of low-cost non-professional teachers will disintegrate the basis for providing education of good quality.

Contract teachers hired by the public education sector in India are of many types, community and para-teachers among them.² All types of contract teachers, however, differ significantly in terms of salary and conditions of employment from the regular teachers in the public education system. Contract teachers are generally employed for a period of one to three years and at a fraction of the salary of regular teachers. Their contracts are renewable subject to satisfactory performance and more easily terminated unlike regular teachers who are civil servants. Contract teachers are not hired centrally by the central or the state governments, but by sub-state administrative bodies at the village or the district level. This is done with the additional motivation to decentralize the use of resources and decision-making to the local community.³ The community also acquires stronger oversight on teacher performance through the extra mechanism of social norms if the teacher is a local resident.

While contract teachers face stronger incentives to perform due to the nature of their contract, they do not have formal training like regular teachers. The minimum level of educational qualifications required to be eligible for a contract teacher position is also low – usually a higher secondary school certificate. Low education levels and lack of professional qualifications of teachers can have an adverse influence on learning outcomes of students if teachers with better educational and professional credentials are more effective.

The evidence on comparative teacher effort across contractual status of teachers varies across studies and countries. For India, there are only a few analytical studies comparing the performance of teachers across contract types. In a large scale non-experimental nationally representative World Bank study of government primary schools in India, Kremer et al (2005) found that contract teachers were no more likely to be absent than regular teachers. Muralidharan and Sundararaman (2009) in their experimental study of providing an extra contract teacher to schools randomly found that absence rate for contract teachers was in fact lower at 16% compared to 27% for regular teachers, and the difference was significant.

² In India, education is a state subject which means that each state has the freedom to work out its own policies in the education sector using the national policies on education as a guiding framework. This is one of the reasons behind the variety of contract teacher types and their terms of employment across Indian states. Contract teachers are called para-teachers by many states in India.

³ The 72nd amendment to the Indian Constitution decentralized management and implementation of 28 subjects, including education, to the local community.

Findings for other developing countries on teacher absence by contract types are again mixed. A study done for Peru found that contract teachers were 12-13% more likely to be absent than regular teachers (Alcazar et al, 2006); whereas in Togo, contract teachers on an average chose to come only half-a-day less than regular teachers in a year (Vegas and De Laat, 2003).

For engagement in teaching activities, Muralidharan and Sundararman (2008) found that 46% of the contract teachers engaged in teaching activity conditional on presence compared to 39% of the regular teachers and this difference was significant.

As in the case of teacher attendance and effort, the empirical evidence for the effect of contractual status on learning outcomes is also mixed. In the study by Kremer et al (2005) in India, the contractual status of a teacher was found to have no statistically significant impact on child test scores, after controlling for a large set of other school, teacher and child related factors. In a study done for three countries in Africa – Mali, Togo and Niger – contract teachers had a positive effect on low ability students in low grades and a negative impact on high ability students in high grades (Froelich, Bourdon and Michaelowa, 2007). However, the study on Togo by Vegas and Laat (2003) found that students of regular teachers outperformed those of contract teachers.

Duflo, Dupas and Kremer (2007) is one of the very few studies to provide experimental evidence on the effect of contract status of teachers on education quality. In this study of schools in Kenya, student performance as measured by test scores increased for students taught by a contract teacher.

In most studies on contract teachers, the effect of the contract type on educational outcomes is confounded by the effects due to sorting of candidates by quality across contract types, and the extra-school monitoring mechanisms such as social norms that may differ across contract types.

3. Data Description

The survey was conducted in the two states, MP and UP, across 400 *gram panchayats*⁴ (villages). In each of the states four districts were chosen purposefully and were matched across states in terms of the literacy rate. 50 villages were randomly chosen from two randomly chosen blocks within each district. A block is an administrative unit between a district and a village. This gives a total of 200 *gram panchayats* in each state. One government primary school was randomly selected in every *gram panchayat*. All teachers teaching grades 1 to 5 are part of the sample. 45 students from each school, 15 randomly selected from each of grades 2, 3, 4, are in the sample. The survey was administered in 2006, towards the end of the school year.

⁴ A *gram panchayat* (GP) is the lowest administrative unit within a district. A GP typically includes two to three revenue villages, and the local government is formed at the GP level. The terms *village* and *GP*, used interchangeably in the paper, always mean the GP.

Measured outcomes

Visits were made to sample schools to collect the following information.

- Teacher attendance and activity: Four unannounced visits were made, one every 2-3 weeks, to record attendance and activity. Teacher attendance is 1 if teacher is present in school, 0 otherwise. Activity is a measure of whether a teacher is actively engaged in teaching when the team arrives. It is 1 if the teacher is engaged in one or more of the following activities- teaching, writing on the board, supervising written work, teaching by rote or another method, 0 if teacher is absent, chatting, sitting idle/standing outside classroom, keeping order but not teaching, doing non teaching work. *Teacher attendance* and *activity* variables are constructed as averages over the four visits and interpreted as fraction of visits a teacher was present (or engaged in teaching). Both variables take values between 0 and 1.
- Test scores of sample students who were tested on competency and curriculum based language and math tests that lasted 20 minutes per child. The language test was a test of reading and writing skills. The math test was a test of number recognition, addition, subtraction, multiplication and division. Separate tests were given to each of the three grades. Although competencies tested were mostly common across grades, test items were different. The total test score is constructed separately for language and math tests as the percent of correct answers.
- School facilities survey.

Additional data was collected on socio-economic characteristics of students such as parents' education, caste category, and wealth and on characteristics of teachers such as age, education, experience, caste category, wealth, type of contract and training.⁵ Data on students were collected in interviews with parents conducted at their homes while the same on teachers were collected from individual teachers at the school. Table 1 presents a summary of variables in the data.

4. Model hypothesizing the behavior of teachers by contract status

4.1 State norms for selection of contract teachers

Madhya Pradesh

Contract teachers (called *samvida shikshak*) are hired on a 3 year renewable contract by the block *panchayat*⁶. Applicants have to satisfy certain minimum eligibility criteria (18-

⁵ There are broadly four social classes or caste categories in India: General castes (those who are neither OBC, nor SC/ST), Other Backward Classes (OBCs), Scheduled Castes (SCs) and Scheduled Tribes (STs). Populations in SC or ST social groups are historically the most disadvantaged and belong to the bottom of the caste and socio-economic hierarchy. Those in the general castes or OBCs are in the high or middle caste groups and socio-economically ahead of the SC/ST classes.

⁶ A block is an administrative unit between a district and a GP. Block *panchayat* is the elected government at the block level.

35 years of age, minimum education of grade 12, reservation if any by caste and gender). They are to be selected according to their rank in terms of qualification (based on a weighted combination of grade attained in an exam conducted for all such applicants, teaching experience and pre service training if any). Contract teachers, once selected, cannot be transferred out of their assigned schools. If absent more than entitled leave days, their salary can be reduced in proportion to their excess absence. There are also former contract teachers (called *shiksha karmi*) who have been made permanent recently, except that their salaries are much lower than that of regular civil service teachers. Regular teachers and *shiksha karmis* are no more being recruited.

Uttar Pradesh

The village education committee (VEC) is involved in selection of contract teachers (called *shiksha mitras*). An additional contract teacher can be hired if the pupil-teacher ratio in the school exceeds 40, up to a maximum of two contract teachers and up to a maximum ratio of 3:2 of regular to contract teachers. For selection of contract teachers, VEC is required to follow state guidelines outlining eligibility criterion (18-35 years of age, minimum education of grade 12, preferably a resident of the *gram panchayat*⁷, and if there are reservations by caste and gender) and is expected to rank applicants in order of qualification (grades obtained in grade 12 and 10). The VEC sends a list of ranked applicants to the district education office which is supposed to select the top most ranked applicant. The contract is for a 10 month period and renewable by the VEC. With a two-thirds majority, it can remove the contract teacher anytime.

4.2 Determinants of contract and regular teachers' performance

Contract teachers and regular teachers face different incentives to perform and hence we expect their performances to differ. A permanent civil service teacher is hired at a given salary not tied to performance. This is akin to a fixed wage contract in agency theory. Their recruitment is permanent. Neither their effort nor outcome (student performance) is monitored in practice, even though a system of monitoring from the district education office is in place. In this case of fixed wage and no monitoring of effort or outcome, worker effort as predicted by the agency model will be at its minimum. A contract teacher faces a renewable contract that can be severed if the teacher underperforms. All else being the same, a contract teacher will therefore put in higher effort compared to a regular teacher with fixed wage and permanent tenure. However given the non experimental nature of our data, we cannot test this hypothesis separately from the contract characteristics that are correlated to teacher performance. Teachers are not randomly assigned to contract types; selection into contract types is likely to be endogenous. Contract teachers may differ from regular teachers on several characteristics, the most obvious being educational and training credentials but also by gender, age and experience, caste and local residence. Being on contract is likely to be correlated with these other characteristics, observed and unobserved, that influence school outcomes.

⁷ If the VEC cannot find a suitably qualified candidate within the *gram panchayat*, it can consider candidates from neighboring *panchayats*.

Our strategy is as follows. We first present mean teacher characteristics by contract type. We then do a propensity score analysis to predict contract status based on teacher characteristics and examine the common support region of propensity scores. We find that the common support region for propensity scores is not large, implying contract status is sufficiently confounded with other teacher characteristics. We therefore relate teacher effort and learning outcomes to the entire bundle of characteristics that distinguish contract teachers from regular teachers i.e., we report average differences in teacher effort and learning outcomes by contract type.

5. Empirical Results

5.1 Teacher characteristics by contract status

There are significant differences in characteristics of teachers by contract status (Table 2). In both states, contract teachers are younger, a greater fraction female, have fewer years of experience and are less likely to have any pre service training. These differences are significant at lower than 5 percent significance levels. In UP, contract teachers are less likely to belong to high or middle castes (and more likely to belong to low castes [SC/ST caste category]) compared to regular teachers, while in MP their caste characteristic is not different from regular teachers.⁸ In UP, contract teachers are more educated, while in MP their education level is not different from that of regular teachers. In UP contract teachers are local – on average a regular teacher travels 10 km to come to school and a contract teacher only 1 km. In MP, there is no difference between the distances contract and regular teachers travel to school. This is likely to be due to differences in hiring practices in the two states. In UP, contract teachers are required to belong to the *gram panchayat* they teach in while in MP, there is no such residence requirement.

Since there are significant differences in observed characteristics and therefore likely differences in unobserved characteristics of contract versus regular teachers, effort can differ by contract status not only due to the incentives in the contract but also due to these other differences that may influence effort. If contract status is too confounded with other characteristics of teachers, analyzing difference in effort by contract, conditional on observed characteristics will not be meaningful. To test for this we estimate a propensity score function to predict contract status based on observed characteristics of teachers listed in table 2. Figure 1 and 2 present the histogram of propensity scores. There is little overlap in propensity scores between contract and regular teachers in both states; the common support region is very small.

This implies that contract status is sufficiently confounded with other characteristics and it is not possible to evaluate the various characteristics of contract teachers separately. Instead we present mean differences in effort by contract type without and with school fixed effects. That is, the average difference in effort is related to the entire bundle of differences between contract and non-contract teachers. The school fixed effects

⁸ Footnote 5 describes the caste categories in India.

regressions estimate similar mean differences in teacher effort across contact types within schools.

5.2 Teacher effort by contract status

5.2.1 Average effort

Average attendance and activity rates are 60 percent and 19 percent for regular teachers, and 75 percent and 37 percent for contract teachers in UP (Figure 3 and Table 3). In MP, average attendance and activity rates are 60 percent and 19 percent for regular teachers, and 75 percent and 37 percent for contract teachers (Figure 4 and Table 3). Contract teachers have higher average attendance and activity levels compared to regular teachers in both states, although absolute effort levels are low for both types of teachers.

Tables 4-5 present mean differences in effort by contract status of teachers. The regression equations are as in (a) and (b) below. The dependent variables are *teacher attendance_{ijk}* and *teacher activity_{ijk}* for teacher *i* in school/village *j* in block *k*. X_{ijk} is a dummy variable for a teacher's contract status and ε_{ijk} is the error term. Standard errors are clustered at the school level.

$$\text{Teacher attendance}_{ijk} = a + bX_{ijk} + \varepsilon_{ijk} \quad (\text{a})$$

$$\text{Teacher activity}_{ijk} = a + bX_{ijk} + \varepsilon_{ijk} \quad (\text{b})$$

The average difference in effort between contract and regular teachers is significant in both states. In UP, contract teachers' attendance is 15 percent points (25 percent) higher and activity 18 percent points (95 percent) higher compared to regular teachers. In MP, contract teachers' attendance is 10 percent points (16 percent) higher and activity 13 percent points (52 percent) higher compared to regular teachers. All of these differences are significant at *p* values below 5 percent. Note that compared to regular teachers former contract teachers also have 11 percent higher attendance and 40 percent higher activity rates.

5.2.2 Average effort controlling for school fixed effects

The regression equations in (c) and (d) are same as in 5.2.1 except f_{jk} is a vector of school fixed effects. Standard errors are clustered at the school level.

$$\text{Teacher attendance}_{ijk} = a + bX_{ijk} + f_{jk} + \varepsilon_{ijk} \quad (\text{c})$$

$$\text{Teacher activity}_{ijk} = a + bX_{ijk} + f_{jk} + \varepsilon_{ijk} \quad (\text{d})$$

In UP, the differences in effort by contract are somewhat larger in magnitude now and remain significant at *p* values below 1 percent level (Table 4). In MP, the difference in attendance between contract and regular teachers is a little larger in magnitude than before and significant at *p* value of .07 while the difference in activity is also a little

larger and significant at p value of .02 (Table 5). To summarize contract teachers have higher attendance and teaching activity rates compared to regular teachers in both states, without and with including school fixed effects. This implies that not only are differences in effort between contract and regular teachers are significant between schools but also within schools.

Even though contract teachers have higher effort levels compared to regular teachers, in absolute terms contract teachers are also fairly inactive (Table 3). 34 percent of contract teachers in MP and 38 percent in UP are in their first contract tenure. The remaining have had their contract renewed at least once. In further analysis, we examine if being within or beyond the first contract tenure is correlated with a contract teacher's effort. In the above regressions, we separate the contract teachers into two categories: those within their first contract period and otherwise. Results are in tables 4-5. In UP, contract teachers in the first contract period have significantly higher attendance (22 percent higher) and activity rates (57 percent higher) than those who have completed one or more tenures. In MP, contract teachers in the first contract period have significantly higher attendance (60 percent higher) but no different activity rates. Overall, contract teachers in the first contract period have higher effort levels than those beyond the first contract tenure.⁹

Possible Mechanisms that may explain differences in effort by contract type

One possible reason for higher effort on part of contract teachers compared to regular teachers can certainly be the difference in contract incentives. Other reasons can be the different characteristics of contract teachers compared to regular teachers. For instance, being local would reduce the cost of coming to work and may also enhance accountability to the community. Besides, some of the characteristics of contract teachers may create less of a social distance between the teachers and the community. As Dreze and Saran (1995) observe in a study in India, absenteeism is often facilitated by the existence of a nexus between the local elites and teachers. Teachers from higher socio-economic strata enjoy protection from the local elites, who often share common caste and class backgrounds. Contract teachers tend to have fewer of the characteristics that would lend them a socially powerful status compared to regular teachers, which possibly results in increased local accountability for the former. They are more likely to be female, from low caste, less experienced and less likely to be trained. In fact recent studies from developing countries including India document higher absenteeism among more powerful teachers: male, more experienced and more educated (Chaudhury et al 2006). These characteristics, more likely in regular teachers as our data show, possibly contribute to a larger social distance vis-à-vis the parent community.

⁹ Compared to regular teachers, contract teachers in the first tenure period have significantly higher attendance and activity rates in UP and significantly higher attendance rates in MP. Contract teachers who have completed at least one tenure also have significantly higher attendance and activity rates than regular teachers in UP, while in MP they have do not differ from regular teachers in attendance but have significantly higher activity rates (Tables 4-5).

However, we also find that contract teachers have absolute low levels of effort, and those who have had their contracts renewed at least once exert even lower effort compared to those in their first tenure period. It could be that contract enforcement formally or informally via social norms is weak and there is evidence to support that local school committees, who often have oversight over contract teachers, in practice do not have the information on their mandated roles and responsibilities vis-à-vis teachers, or do not exercise them.

5.3 Are contract teachers associated with higher scores after controlling for observed student and school correlates?

If contract teachers put in higher effort due to the stronger incentives they face, an extra contract teacher should matter more for scores compared to an extra regular teacher. This would be a straightforward prediction from the standard agency model.

We cannot use our data to test this prediction due to selection bias. Whether a teacher is on contract will be correlated with unobserved teacher, school and village characteristics that influence student performance. This will result in the estimate on the contract variable to be biased, which cannot be interpreted as the effect of the contract alone. Multi-grade teaching is widespread in the sample, so student performance can only be related to average school and teacher characteristics which precludes controlling for school fixed effects.

In the absence of a valid identification strategy, we shed light on the question indirectly. We examine the correlation between student performance and teacher effort after controlling for other school inputs and student attributes. Positive correlation between teacher effort and scores may suggest that contract teachers are associated with higher scores through higher effort. Once teacher effort is already included in the regression, the percentage of contract teachers may or may not be associated with scores because of the selection bias issue due to the possible correlations with unobserved school or village characteristics.

Test score is regressed on observed student and school characteristics, and block fixed effects. The regression equation is as follows in (e).

$$Y_{ijk} = a + bX_{ijk} + cZ_{jk} + f_k + \varepsilon_{ijk} \quad (e)$$

Y_{ijk} is the score of student i in school/village j in block k . X_{ijk} is a vector of observed student characteristics (age, gender, caste, mother's and father's literacy, wealth), Z_{ijk} is a vector of observed school and teacher characteristics. Since multi-grade teaching is widespread in the sample and therefore it is difficult to identify a teacher to a class, instead of individual teacher characteristics, average characteristics of all teachers in the school are used, along with other school characteristics. Z_{jk} consists of teacher-pupil ratio, index of school infrastructure, percentage teachers with college degree, percentage teachers with graduate degree, percentage teachers with pre-service training, percentage male teachers, percentage general caste teachers, mean teacher age, mean years of

experience, mean days of in service training, mean teacher attendance, mean teacher activity and percentage of contract teachers. f_k are block dummy variables to control for block fixed effects and ε_{ijk} is the error term.

Tables 6 to 9 present the results from these regressions. In UP, teacher activity is positively and significantly correlated with language and math scores in all grades (Tables 6-7). Controlling for activity, teacher attendance is not significant in the regressions. Other school and teacher characteristics, except teacher pupil ratio, are not correlated with scores.

In MP, teacher activity is positively and significantly correlated with language and math scores in all grades (Table 8-9). Other school characteristics including teacher-pupil ratio are not correlated with scores. In both states, the one school characteristic that is positively and significantly correlated with scores in both language and mathematics in all grades is teacher activity. This suggests that contract teachers are associated with higher scores through higher effort.

As an aside, note that although we report test score correlations (not causations) based on a cross section survey, the general nature of our findings is consistent with international evidence on the impact of school and teacher characteristics on student test scores. There is fairly robust evidence that among the school level variables which can be influenced by policy, factors to do with teachers and teaching are the most important for student learning. The broad consensus is that teacher quality is the single most important school variable influencing student learning (Darling-Hammond, 2000; Rockoff, 2004; Rivkin, Hanushek and Kain, 2005). But what it is about teachers that matters is not known. Researchers agree that many important aspects of teacher quality are not captured by commonly used quality indicators such as education, experience, and subject matter knowledge. Our results are broadly parallel to these findings in that teacher activity is positively correlated with student performance, unlike other school and teacher attributes including teacher education, teacher experience and teacher training that are not.

6. Discussion

The results from the paper show that in government schools, contract teachers are associated with higher effort compared to regular teachers; and higher teacher effort is associated with better student performance after controlling for other school, teacher and student characteristics. Attendance and engagement in teaching activity are higher for contract teachers compared to regular teachers in both study states, MP and UP. This difference remains significant and large even after controlling for differences across schools. Furthermore, teacher activity is positively correlated with language and math scores in all three grades tested and in both states, after controlling for other school and teacher attributes likely to be correlated with scores.

Our study is non-experimental as it is based on observational data. In the absence of experimental evidence, it is difficult to estimate the causal impact of providing an extra

contract teacher versus a regular teacher to a school. The few experimental studies that compare the two teacher types conclude positively in favor of contract teachers. Analysis using non-experimental data are also useful as they provide understanding of average relationships between various school and student attributes and school outcomes in an ‘as-is’ scenario. Most non-experimental studies (but not all) in general too find contract teachers performance to be no worse or better than regular teachers. Our study also confirms these results.

Contract teachers now form a sizable part of the teaching force in public elementary education in India. The evidence so far suggests that at least in the short run, contract teachers are a more efficient resource compared to regular teachers. In another recent study that collected data on teacher salaries in the same two states, we find that contract teachers get paid between one-fourth and one-fifth of the salary of regular teachers (Goyal and Pandey, 2008). By hiring contract teachers in lieu of regular teachers, the government buys the same or more learning output at a lower cost.¹⁰ Given that salaries of regular teachers account for 90 percent or more of the states’ budget on elementary education, our findings are relevant for policy. Additionally, of all the school level inputs, teacher effort is the single input consistently correlated with scores across all grades tested. This suggests that policies that induce teacher effort may work better than other input based policies in raising education quality.

Policy-makers are looking at contracts as a way to raise teacher effort. However, based on our findings, an important caveat is that contracts “as they are” will only go so far in raising effort. If we look in absolute terms, contract teachers are also fairly inactive. In UP, only 37 percent of contract teachers were actively teaching. The remaining were either not teaching (38 percent) or absent (25 percent). In other words, even though the threat of insecure contract is associated with higher effort, the size of the association is not very large. Furthermore, we find that contract teachers with at least one tenure period have lower effort compared to those in the first tenure period. Incentives within the contract as well as contract enforcement may be weak. In practice, how much do school oversight committees (or other hiring authorities) verify the performance of contract teachers before deciding to renew the contract? Do they receive adequate information and training regarding their involvement in the process of hiring, renewing or firing contract teachers? As a separate arm of this study, members of the school oversight committees were asked to list the committees’ mandated roles and responsibilities they were aware of. In UP, fewer than 5 percent members stated selecting a contract teacher as one of their responsibilities. In MP, less than 6 percent of members stated verifying teachers’ attendance among their responsibilities.

We also have little idea of the long run impact on education quality of recruiting contract teachers.¹¹ Teacher remuneration policies influence the pool of candidates in the teacher

¹⁰ It is quite plausible that the greater presence of contract teachers may lead to more shirking on the part of regular teachers (Muralidharan and Sundararaman, 2008).

¹¹ Worried with the presence of a sizable contingent of non-professional teachers, commentators have suggested that contract teachers should be provided with some professional training to improve their productivity in the school system. However in cross-section analyses of learning outcomes, teacher training

labor market. The terms of work for contract teachers may discourage people of greater ability to enter the teaching profession. In India, the process of teacher appointment in public education is highly politicized. There is evidence from many states of India that contract teachers are organizing themselves and putting political pressure on state governments to regularize them. This has happened with former contract teachers (*shiksha karmis*) in MP who have been given regular appointments and now are left with weaker incentives. If this process of using the contract teacher system as a by-way to a regular appointment continues, the education system may end up with a large number of non-professional teachers who will have the same weak performance incentives as the current regular teachers.

does not seem to have any significant correlation with test scores. This has been found to be true for studies that look at only public schools and also in studies that compare public and private schools (Goyal 2006a; Goyal 2006b; Pandey and Goyal, 2008). Most teachers in private schools have little or no professional pedagogical training and in general, their students have better test scores compared to counterparts in public schools. While the minimum educational qualifications required for a contract teacher is generally grade 12, many of the actual contract teachers in position have post-secondary education reflecting poor labor market conditions.

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Annex

Table 1 Summary of Key Variables

	UP		MP	
	Mean	Std. Dev.	Mean	Std. Dev.
Mean Student variables				
% Correct score	.23	.29	.29	.29
Grade 4- Math				
Grade 4- language	.27	.35	.33	.34
Grade 3- Math	.17	.28	.26	.30
Grade 3- language	.21	.32	.30	.35
Grade 2- Math	.13	.26	.25	.31
Grade 2- language	.20	.29	.31	.33
All grades: Age (in years)	8.72	1.61	8.95	1.57
Gender (1 if male)	.49	.50	.51	.50
% General caste (neither SC/ST, nor OBC)	.15	.36	.20	.40
% OBC	.40	.49	.31	.46
% SC	.44	.50	.15	.36
% ST	-	-	.34	.47
% Mother literate	.21	.40	.13	.33
% Father literate	.60	.49	.46	.50
Land owned (acres)	1.13	1.65	2.50	4.27
N	Grade 4- 2553 Grade 3- 2673 Grade 4- 2697		Grade 4- 2142 Grade 3- 2190 Grade 4- 2239	
Mean School characteristics				
Enrollment	178	89	119	66
Pupil-teacher ratio	66	39	56	30
Teacher-pupil ratio	.02	.01	.02	.01
% schools with toilet	.33	.47	.38	.49
% schools with drinking water	.83	.38	.72	.45
% schools with playground	.79	.41	.50	.50
% schools with electricity	.01	.07	.07	.25
Number of blackboards	3.75	1.77	3.32	1.84
Index of infrastructure ¹²	5.71	2.02	4.98	2.30
N	200		200	
Mean Teacher characteristics				
Attendance (mean over 4 visits)	.64	.48	.67	.47
Activity (mean over 4 visits)	.25	.43	.30	.46
% of contract teachers	.41	.20	.15	.36
% of former contract	-	-	.45	.50
% of contract teachers in first tenure	.16	.36	.05	.22
% of contract teachers beyond first tenure	.25	.43	.10	.29
Age (years)	38	14	39	9
Non-SC/ST (general caste+OBC)	.80	.40	.69	.46
Male	.60	.49	.80	.40
% with class 12 degree	.42	.49	.48	.50
% with college degree	.32	.47	.30	.46

¹² Index of infrastructure variable is constructed as sum of four indicator variables for whether school has water, toilet, playground, electricity and the total number of blackboards in school.

% with graduate degree	.26	.44	.23	.42
% with pre service training	.59	.49	.36	.48
Days of inservice training in last year	5.83	8	10.95	12
Distance to work (km)	6	10	9	12
Teaching experience (years)	10.9	13	13.8	10
% doing multi grade teaching	.81	.39	.87	.34
N	643		454	

Table 2 Average teacher characteristics

Percentage unless indicated otherwise	UP			MP				
	Regular	Contract	p^1	Regular	Contract	p^1	Former contract	p^2
Age (years)	46	27	.00	45	31	.00	34	.00
% Non- SC/ST	.83	.76	.03	.75	.65	.20	.65	.03
% Male	.71	.45	.00	.93	.72	.00	.70	.00
Highest education- % class 12	.49	.32	.00	.58	.47	.15	.38	.00
% college degree	.24	.45	.00	.25	.36	.13	.33	.08
% graduate degree	.28	.24	.25	.17	.17	.99	.29	.00
% Pre service training	.93	.08	.00	.56	.17	.00	.22	.00
Days of inservice training in last year	5	6	.14	10	10	.98	12	.24
Teaching experience (years)	17	2	.00	21	5	.00	9	.00
Distance teacher commutes to school (in km)	10	1	.00	9	12	.09	8	.63

¹ Robust p values for difference between regular and contract teachers, based on standard errors clustered at school level. ² Robust p values for difference between regular and former contract teachers, based on standard errors clustered at school level.

Table 3 Average teacher attendance and activity

	Attendance		Activity	
	UP	MP	UP	MP
Regular teachers	0.60	0.63	0.19	0.25
Contract teachers	0.75	0.73	0.37	0.37
Former contract teachers	-	0.71	-	0.34

Table 4 OLS: Teacher effort regression in UP

Dependent variable→	Attendance	Activity	Attendance	Activity	Attendance	Activity
Whether contract teacher	0.15	.18	0.17	.19	-	-
	(0.00)**	(0.00)**	(0.00)**	(0.00)**		
Whether contract teacher in first contract tenure	-	-	-	-	0.27	0.30
					(0.00)**	(0.00)**
Whether contract teacher for longer than first contract	-	-	-	-	0.11	0.13
					(0.00)**	(0.00)**
School fixed effect (200 schools)	-	-	YES	YES	YES	YES
R ²	.06	.10	.42	.54	.44	.56
N	643	643	643	643	642	642

Each regression includes a constant term. Robust p values in parentheses are based on standard errors clustered at school level. * indicates significance at 5%; ** indicates significance at 1%.

Table 5 OLS: Teacher effort regression in MP

Dependent variable→	Attendance	Activity	Attendance	Activity	Attendance	Activity
Whether teacher is contract teacher	0.10	.13	.15	0.15	-	-
	(0.03)*	(0.00)**	(0.07)	(0.02)*		
Whether <i>shiksha karmi</i> (former contract teachers)	0.07	.10	.07	0.10	.07	.10
	(0.03)*	(0.00)**	(0.18)	(0.03)*	(.19)	(.03)*
Whether contract teacher in first contract tenure	-	-	-	-	0.43	.34
					(0.01)*	(.22)
Whether contract teacher for longer than first contract	-	-	-	-	0.14	.14
					(0.11)	(.02)
School fixed effect (200 schools)	-	-	YES	YES	YES	-
R ²	.02	.04	.60	.66	.61	.67

N	454	454	454	454	454	454
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Each regression includes a constant term. Robust p values in parentheses are based on standard errors clustered at school level. * indicates significance at 5%; ** indicates significance at 1%.

Table 6 OLS: Are school and teacher characteristics correlated with scores? Grade 4, UP

Dependent variable is test score →	Hindi	Math	Hindi	Math	Hindi	Math
Teacher-pupil ratio	5.00	5.00	5.0	4.9	4.9	4.9
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Index of infrastructure	0.00	0.00	0.00	0.00	0.00	0.00
	(0.91)	(0.70)	(0.88)	(0.62)	(0.85)	(0.62)
% non-sc teachers	-0.03	-0.05	-0.03	-0.05	-0.03	-0.05
	(0.56)	(0.15)	(0.56)	(0.15)	(0.54)	(0.13)
% male teachers	0.01	0.01	0.01	0.01	0.01	0.02
	(0.88)	(0.70)	(0.89)	(0.71)	(0.84)	(0.66)
% teachers with college deg	0.05	0.01	0.05	0.01	0.06	0.02
	(0.27)	(0.72)	(0.29)	(0.83)	(0.23)	(0.62)
% teachers with graduate deg	0.05	0.02	0.05	0.02	0.05	0.03
	(0.25)	(0.56)	(0.25)	(0.57)	(0.21)	(0.47)
Av. teaching experience	0.00	0.00	0.00	0.00	0.00	0.00
	(0.68)	(0.60)	(0.63)	(0.76)	(0.51)	(0.86)
Av. days inservice training in last year	0.00	0.00	0.00	0.00	0.00	0.00
	(0.91)	(0.41)	(0.92)	(0.40)	(0.96)	(0.30)
% teachers with pre service training	0.01	-0.02	0.01	-0.02	0.07	0.04
	(0.80)	(0.64)	(0.80)	(0.64)	(0.32)	(0.41)
% teachers doing multi grade	0.00	0.03	-0.01	0.03	0.00	0.03
	(0.94)	(0.53)	(0.94)	(0.54)	(0.95)	(0.51)
% teachers actively engaged in teaching (mean over 4 visits)	0.13	0.14	0.15	0.17	0.12	0.13
	(0.05)*	(0.01)*	(0.05)*	(0.00)**	(0.09)⁺	(0.03)*
% teachers present in school (mean over 4 visits)	-	-	-0.02	-0.05	-	-
			(0.73)	(0.28)		
% contract teachers	-	-			0.10	0.11
					(0.26)	(0.10) ⁺
Block fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	2553	2553	2553	2553	2553	2553

Robust p values in parentheses clustered at GP level, * indicates significance at 5%; ** indicates significance at 1%; ⁺ indicates significance at 10%. Each regression includes a constant term. Other controls include student characteristics and block fixed effects.

**Table 7 OLS: Are school and teacher characteristics correlated with scores?
Grades 3 and 2, UP**

Dependent variable is test score →	Hindi Grade 3	Math Grade 3	Hindi Grade 3	Math Grade 3	Hindi Grade 2	Math Grade 2	Hindi Grade 2	Math Grade 2
Teacher-pupil ratio	5.83	5.33	5.83	5.33	4.4	3.7	4.4	3.7
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Index of infrastructure	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00
	(0.16)	(0.33)	(0.16)	(0.31)	(0.20)	(0.60)	(0.20)	(0.55)
% non-sc teachers	-0.01	-0.03	-0.01	-0.03	-0.01	-0.02	-0.01	-0.02
	(0.93)	(0.54)	(0.93)	(0.53)	(0.78)	(0.52)	(0.78)	(0.52)
% male teachers	0.03	0.01	0.03	0.01	0.04	0.00	0.04	0.00
	(0.44)	(0.78)	(0.45)	(0.76)	(0.18)	(0.89)	(0.18)	(0.93)
% teachers with college deg	0.09	0.03	0.09	0.03	0.09	0.06	0.09	0.06
	(0.01)*	(0.34)	(0.02)*	(0.31)	(0.01)*	(0.06) ⁺	(0.01)*	(0.06) ⁺
% teachers with graduate deg	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.05
	(0.29)	(0.35)	(0.29)	(0.34)	(0.19)	(0.18)	(0.19)	(0.17)
Av. teaching experience	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.38)	(0.84)	(0.40)	(0.91)	(0.97)	(0.83)	(0.95)	(0.73)
Av. days of inservice training in last year	0.00	0.00	0.00	0.00	0.00	-0.003	0.00	-0.003
	(0.79)	(0.41)	(0.79)	(0.38)	(0.41)	(0.06) ⁺	(0.44)	(0.05)*
% teachers with pre service training	0.04	-0.01	0.04	0.01	0.03	0.02	0.02	0.04
	(0.40)	(0.91)	(0.47)	(0.84)	(0.53)	(0.59)	(0.61)	(0.31)
% teachers doing multi grade	0.01	0.03	0.01	0.03	0.00	0.01	0.00	0.01
	(0.84)	(0.44)	(0.84)	(0.43)	(0.93)	(0.74)	(0.93)	(0.73)
% teachers actively engaged in teaching (mean over 4 visits)	0.11	0.10	0.11	0.10	0.13	0.10	0.13	0.10
	(0.05)*	(0.03)*	(0.05)*	(0.03)*	(0.00)**	(0.01)*	(0.00)**	(0.02)*
% contract teachers	-	-	0.00	0.03	-	-	-0.01	0.04
	-	-	(0.99)	(0.65)	-	-	(0.88)	(0.45)
Block fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2673	2670	2673	2670	2697	2695	2697	2695

Robust p values in parentheses clustered at GP level, * indicates significance at 5%; ** indicates significance at 1%; ⁺ indicates significance at 10%. Each regression includes a constant term. Other controls include student characteristics and block fixed effects.

**Table 8 OLS: Are school and teacher characteristics correlated with scores?
Grade 4, MP**

Dependent variable is test score →	Hindi	Math	Hindi	Math	Hindi	Math
Teacher-pupil ratio	1.11	0.22	0.96	0.14	1.05	0.21
	(0.34)	(0.78)	(0.41)	(0.86)	(0.36)	(0.79)
Index of infrastructure	0.01	0.00	0.01	0.00	0.01	0.00
	(0.12)	(0.72)	(0.10) ⁺	(0.67)	(0.13)	(0.74)
% non-sc teachers	-0.04	-0.04	-0.05	-0.05	-0.04	-0.04
	(0.26)	(0.21)	(0.18)	(0.16)	(0.29)	(0.21)
% male teachers	-0.03	-0.04	-0.03	-0.04	-0.02	-0.04
	(0.52)	(0.34)	(0.54)	(0.35)	(0.64)	(0.37)
% teachers with college deg	0.01	0.02	0.01	0.02	0.01	0.02
	(0.80)	(0.55)	(0.79)	(0.55)	(0.82)	(0.55)
% teachers with graduate deg	0.03	0.03	0.04	0.04	0.04	0.04
	(0.57)	(0.40)	(0.51)	(0.35)	(0.52)	(0.35)
Av. teaching experience	0.00	0.00	0.00	0.00	0.00	0.00
	(0.29)	(0.37)	(0.29)	(0.37)	(0.58)	(0.66)
Av. days of inservice training in last year	0.00	0.00	0.00	0.00	0.00	0.00
	(0.48)	(0.41)	(0.44)	(0.43)	(0.46)	(0.40)
% teachers with pre service training	-0.02	-0.04	-0.01	-0.03	-0.02	-0.04
	(0.63)	(0.23)	(0.72)	(0.26)	(0.59)	(0.22)
% teachers doing multi grade	-0.09	-0.05	-0.09	-0.06	-0.08	-0.05
	(0.14)	(0.24)	(0.12)	(0.22)	(0.16)	(0.26)
% teachers actively engaged in teaching (mean over 4 visits)	0.15	0.18	0.19	0.20	0.14	0.18
	(0.03)*	(0.00)**	(0.01)**	(0.00)**	(0.04)*	(0.00)**
% teachers present in school	-	-	-0.09	-0.05	-	-
	-	-	(0.19)	(0.42)	-	-
% contract teachers	-	-	-	-	-0.11	-0.04
	-	-	-	-	(0.14)	(0.53)
% shiksha karmi teachers (former contract teachers)	-	-	-	-	0.00	-0.01
	-	-	-	-	(0.94)	(0.77)
Block fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	2142	2142	2142	2142	2142	2142

Robust p values in parentheses clustered at GP level, * indicates significance at 5%; ** indicates significance at 1%; ⁺ indicates significance at 10%. Each regression includes a constant term. Other controls include student characteristics and block fixed effects.

**Table 9 OLS: Are school and teacher characteristics correlated with scores?
Grades 3 and 2, MP**

Dependent variable is test score →	Hindi Grade 3	Math Grade 3	Hindi Grade 3	Math Grade 3	Hindi Grade 2	Math Grade 2	Hindi Grade 2	Math Grade 2
Teacher-pupil ratio	1.68 (0.15)	0.71 (0.41)	1.75 (0.14)	0.78 (0.38)	2.41 (0.06) ⁺	1.81 (0.07) ⁺	2.46 (0.05)*	1.85 (0.07) ⁺
Index of infrastructure	0.00 (0.68)	0.00 (0.93)	0.00 (0.70)	0.00 (0.91)	0.00 (0.57)	0.00 (0.61)	0.00 (0.60)	0.00 (0.61)
% non-sc teachers	-0.02 (0.56)	0.02 (0.66)	-0.04 (0.34)	0.00 (0.98)	0.01 (0.71)	0.03 (0.33)	0.01 (0.84)	0.02 (0.46)
% male teachers	0.02 (0.75)	0.02 (0.59)	0.00 (0.97)	0.01 (0.86)	0.03 (0.50)	0.04 (0.25)	0.03 (0.57)	0.04 (0.33)
% teachers with college deg	-0.01 (0.78)	0.02 (0.63)	-0.01 (0.86)	0.02 (0.53)	0.02 (0.58)	0.02 (0.59)	0.02 (0.55)	0.02 (0.54)
% teachers with graduate deg	0.12 (0.02)*	0.10 (0.01)*	0.13 (0.01)*	0.11 (0.01)**	-0.04 (0.33)	-0.06 (0.08) ⁺	-0.03 (0.40)	-0.06 (0.10)
Av. teaching experience	0.00 (0.20)	0.00 (0.51)	0.00 (0.87)	0.00 (0.71)	0.00 (0.78)	0.00 (0.75)	0.00 (0.68)	0.00 (0.47)
Av. days inservice training in last year	0.00 (0.14)	0.00 (0.32)	0.00 (0.20)	0.00 (0.43)	0.00 (0.87)	0.00 (0.98)	0.00 (0.95)	0.00 (0.90)
% teachers with pre service training	0.02 (0.59)	0.00 (0.98)	0.01 (0.73)	-0.01 (0.81)	0.06 (0.09) ⁺	0.07 (0.02)*	0.06 (0.11)	0.07 (0.03)*
% teachers doing multi grade	-0.06 (0.38)	-0.10 (0.07)	-0.06 (0.37)	-0.10 (0.06)	-0.15 (0.02)*	-0.12 (0.02)*	-0.14 (0.02)*	-0.12 (0.02)*
% teachers actively engaged in teaching	0.21 (0.01)**	0.17 (0.00)**	0.20 (0.00)**	0.17 (0.00)**	0.21 (0.00)**	0.12 (0.02)*	0.21 (0.00)**	0.12 (0.03)*
% contract teachers (samvida)	- -	- -	-0.04 (0.56)	-0.04 (0.55)	- -	- -	-0.05 (0.47)	0.00 (0.95)
% shiksha karmi teachers (former contract teachers)	- -	- -	-0.09 (0.03)*	-0.09 (0.01)**	- -	- -	-0.05 (0.27)	-0.04 (0.32)
Block fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2190	2190	2190	2190	2239	2239	2239	2239

Robust p values in parentheses clustered at GP level, * indicates significance at 5%; ** indicates significance at 1%; ⁺ indicates significance at 10%. Each regression includes a constant term. Other controls include student characteristics and block fixed effects.

Figure 1 Histogram of propensity scores of Contract and Regular teachers, UP

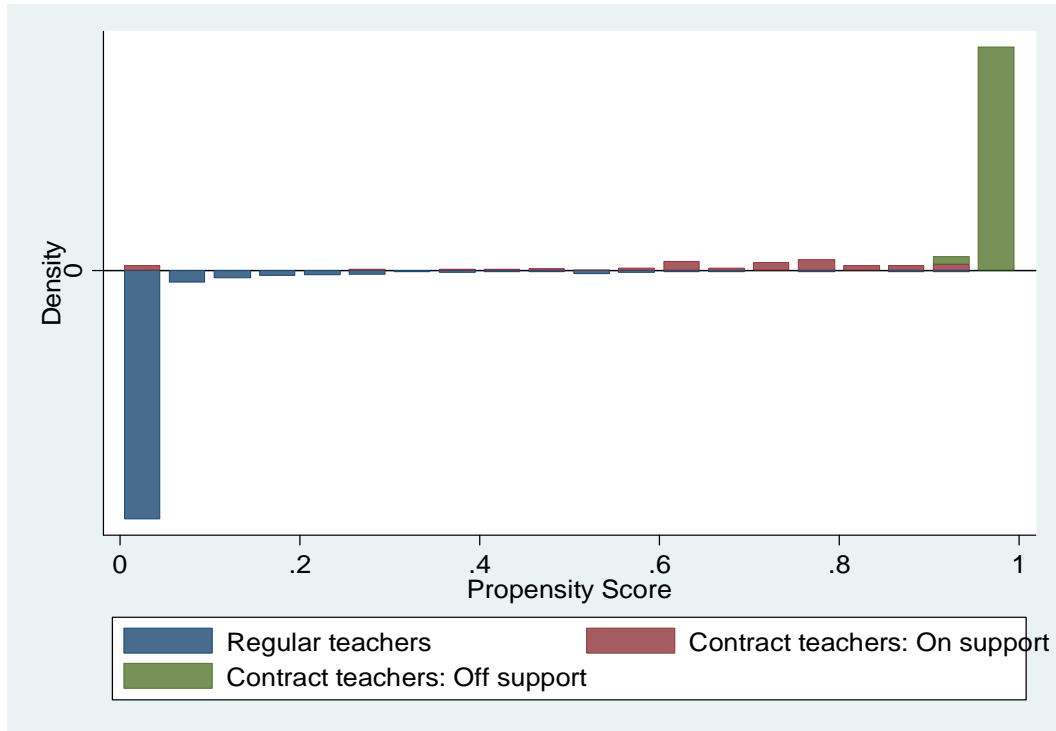


Figure 2 Histogram of propensity scores of Contract and Regular teachers, MP

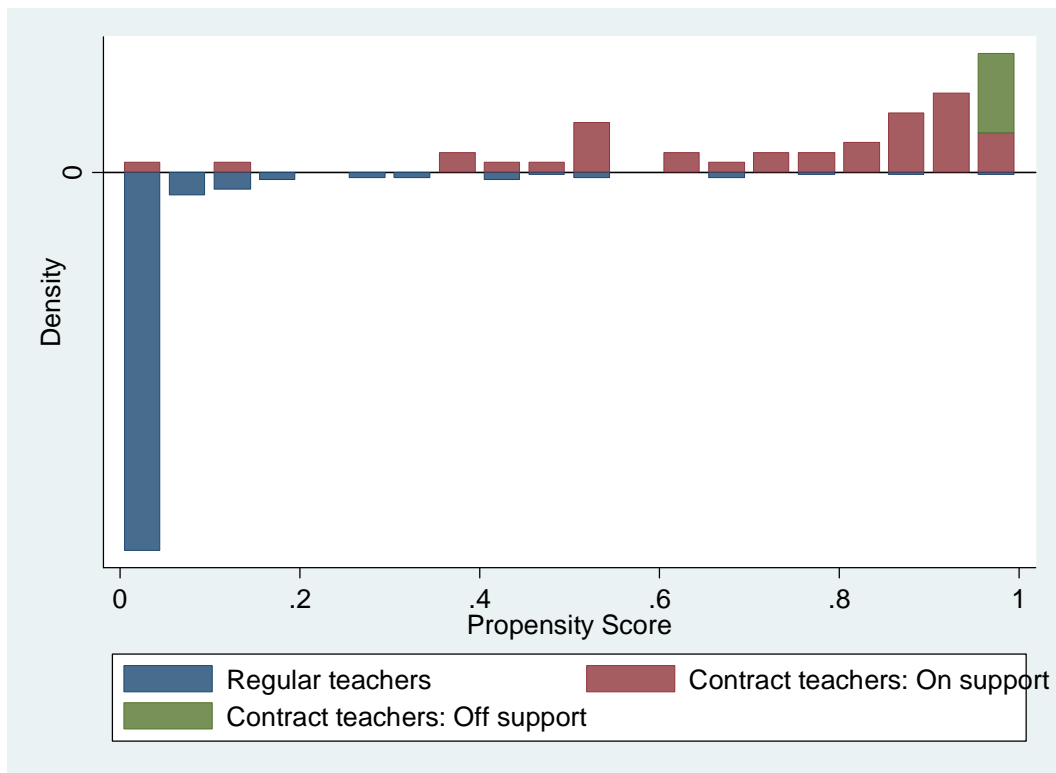


Figure 3 Teacher effort by contract type in UP

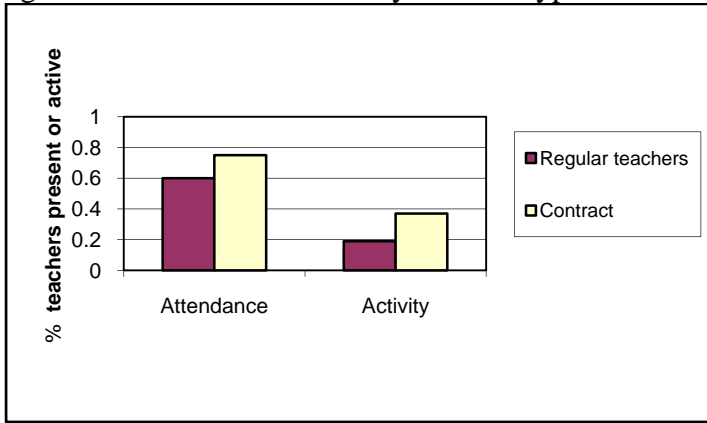
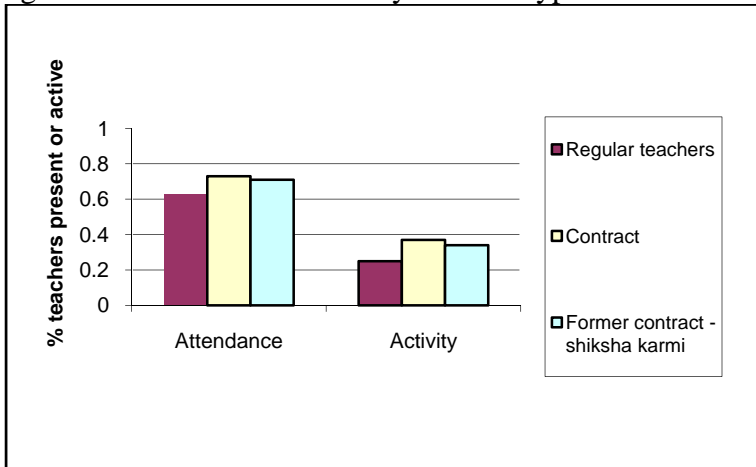


Figure 4 Teacher effort by contract type in MP



Annex

[Table 1]

[Table 2]

[Table 3]

[Table 4]

[Table 5]

[Table 6]

[Table 7]

[Table 8]

[Table 9]

[Figure 1]

[Figure 2]

[Figure 3]

[Figure 4]

