EFFECT OF TEACHER TRANSFERS ON STUDENT LEARNING: EVIDENCE FROM HARYANA

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Abstract

Studies have shown that Indian states lack transparent rules governing public schools for teacher transfers, which are instead heavily influenced by political factors and lead to a decline in student test scores. In this paper, we study how mass transfers induced by a Government policy rolled out in 2016-17 in Haryana, an Indian state, to make teacher transfers transparent, affects student learning. Using a balanced school panel data from 2014-15 to 2017-18 created from the Management Information System (MIS) and District Information System for Education (DISE) datasets covering the universe of government primary only schools in Haryana and leveraging the varying intensity with which the transfer policy impacts schools, we find a negative effect of teacher transfers on percentage of first-class holders in grade 5. Heterogeneity analysis shows that the negative effect is driven by bigger schools and schools with better Pupil Teacher Ratio at baseline (2015-16) and the impact is true for both boys and girls. The study suggests that the scheme introduced by the Government with the stated objective of protecting academic interest of students and optimizing job satisfaction amongst its employees in a fair and transparent manner is in fact harmful for student learning due to significant disruption and an increase in Pupil Teacher Ratio. The results hold more relevance in the light of other Indian states having implemented or planning similar online teacher transfers policy after Haryana.

Key words: Teachers, Schools, Transfers.

1 Introduction

One of the Sustainable Development Goals set up in 2015 by the United Nations General Assembly is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The foundation for the way an individual thinks and her career trajectory is majorly set in school thus pushing Governments to provide accessible and quality school education to children. Since teachers are an important input in the education production function, teacher management becomes crucial. Thus, one of the ways in which school education can be affected is through transfers of teachers, which occur frequently in government schools. Teachers transfers from one school to another can lead to disruption in classes which can adversely impact student learning. On the other hand, if teacher transfers result in moving teachers from overstaffed schools to understaffed schools, better student teacher gender or caste matches or lower Pupil Teacher Ratio, teacher transfers may lead to better learning outcomes. The overall effect is thus an empirical question.

Teacher transfers in Government schools happen due to both demand and supply side factors. Demand side factors include teachers' aversion to working in remote areas (Fagernäs and Pelkonen (2020) , Kremer et al (2005)), home location, family reasons, gender and caste segregation (Fagernäs and Pelkonen (2017)) whereas supply side factors include political factors , reward for good work, promotions and rationalization, on disciplinary grounds (NUEPA (2016)) and teacher peer effects. There is a political angle surrounding teacher transfers with teachers and politicians having mutual gains (Beteille (2009)).

In this study, we assess the impact of teacher transfers on student academic performance. Teacher transfers require administrative control over a large number of schools across which reallocation is possible. Government schools are therefore the natural candidates for this study since teachers can be transferred across schools in the system. We leverage the Teachers Transfer Policy implemented in Haryana in 2016 to assess this impact. Under the policy, every teacher serving in a zone for at least five years has to be involuntarily transferred to another school. One of the aims of the transfer policy was to make transfers transparent and hence the entire process of transfer in and transfer out is done online using the Management Information System (MIS) portal. After Haryana, other Indian states (Punjab in 2019, Assam in 2020) have also started implementing online teacher transfers policy . In light of other states implementing similar policies, understanding the impact of such online transfers policy on student learning outcomes becomes all the more important.

We use the District Information System for Education (DISE) data for accessing information on student academic performance quantified by the percentage of students in class 5 scoring above 60 % and other school, teacher and children characteristics averaged at the

school level. We use the Management Information System (MIS) data set for creating our main independent variable which is the pool of eligible teachers in a school. Merging the two data sets , we create a balanced panel of 6,394 government primary schools from the year 2014-15 to 2017-18. Using this data , we see in figure 1 that under the teacher transfers policy, around 16000 transfers occurred during the academic year 2016-17, which was a major change compared to the other three years during which hardly any transfers take place. We thus define 2014-15 and 2015-16 as pre - policy years and 2016-17 and 2017-18 as post policy years. Since existing studies have shown that transfers are correlated with political variables, we use the number of teachers in the eligible pool for transfer under the policy to estimate the impact. Our empirical methodology relies on using the variation in the intensity with which the policy impacts schools controlling for a series of fixed effects and time trends.

We find that teacher transfers lead to a significantly negative impact on student academic performance. In terms of the effect size of transfers on student academic performance, we find that one standard deviation increase in the pool of eligible teachers in a school leads to a decrease in percentage of students scoring above 60 percent by 5.83 %. Put another way, our results show that if a school goes from no teachers in eligible pool to a maximum of 21 teachers in the eligibility pool, the percentage of first class holders decrease by a massive 57.8 %. Additionally, we find that the transfers policy leads to an increase in Pupil Teacher Ratio which could be one of the mechanisms for the negative impact we find. We also find heterogeneity in the effects of transfers with schools with higher number of teachers and better Pupil Teacher Ratio at the baseline (2015 -16) experiencing this negative impact. Furthermore, we find that the composition of the class at the baseline also drives these results. Schools which had a lower proportion of girls enrolled in the baseline year and a lower proportion of students belonging to socially backward classes (Scheduled Class (SC) and Other Backward Classes (OBC)) were impacted significantly negatively by the transfers.

We conduct multiple robustness checks to see if our results hold up. We examine if the policy year with massive teacher transfers experienced a significant change in multiple school characteristics like Boys' Toilets , number of Girls' Toilets , Classrooms, Playground, Library Books, Computers, Road Access, Computer Assisted Learning (CAL) Lab and presence of library. We do not find a significant change in any of these school characteristics building our confidence that the results are not driven by a significant change in any of the school infrastructure variables. Secondly, we also check if our results are robust to controlling for school characteristics in a time varying manner and we find that our results do not change.

Our study contributes to multiple strands of literature. Firstly, we connect with the literature that acknowledges that teachers are a key input in the educational production function (Glewwe et al (2011)). Secondly, existing analysis on the potential effects of teacher turnover and the recruitment process on learning are limited in the context of developing countries. In a developed country context, some studies have found a relationship between teacher turnover and weaker test scores (Ronfeldt et al (2013) , Hanushek, Rivkin and Schiman (2016)). In India, Fagernäs and Pelkonen (2020) find a negative impact on student scores due to teacher transfers induced by political factors. Our study, on the other hand, evaluates the impact of teacher transfers induced by an online teacher transfers policy implemented by the Government to make transfers more transparent. Since teacher transfers are limited to government schools and we find that these lead to negative student learning outcomes, our findings can provide a new angle to the literature on the relative effectiveness of private versus public schooling (Muralidharan and Sundararaman (2015), Singh (2015)). Finally, more generally we contribute to the literature investigating management practices in public sector institutions (Bloom et al (2015), McCormack and Propper (2014), Rasul and Rogger (2018)).

The paper is organised as follows: we begin with a background of the education system in Haryana and the teachers transfer policy. Section 3 describes the data-sets used and the summary statistics of the variables used in our analysis. Section 4 discusses the empirical model, section 5 goes through the main results and section 6 explores if the results show heterogeneity. In Section 7, we check if our results are robust to further checks and section 8 concludes.

2 Background

In Haryana, most of the government schools are primary only schools and in these grades, since basic knowledge of multiple subjects is provided, teachers do not require specialisation by subject. Thus, a primary teacher can teach any grade from 1 to 5.

The teachers transfer policy[1] was introduced in Haryana in June, 2016 so as to conduct government teacher transfers in the state in a fair and transparent manner. In Haryana, all Government Schools of a district are categorized into seven zones for the purpose of transfer of teachers. The initial zones are closer to cities and district headquarters whereas the latter ones cover more rural and backward areas. Under the policy, any teacher who has spent at least five years in a particular zone will have to shift involuntarily to another school.

School wise vacancies are assessed before carrying out the transfer exercise. All teachers

[1] Teacher Transfers Policy (2016) Document

then select zones in order of their preference. The teachers further opt for a preference ordering across available schools, so that their claim could be considered against multiple vacancies within a zone. In case the teacher does not get her preferred choice, she is given any available school in the same zone. In case there is no school available in the said zone, she is considered for the next zone of preference and so on.

Decision for allotment to a vacancy is based on the total composite score of points earned by a teacher, out of 78 points. Age is given the highest weight-age of 58 points, out of total 78 points. To take care of categories like women, women headed households, widows, widowers, differently abled persons, serious ailment, and teachers showing improvement in results, a privilege of maximum 20 points can be availed by the teachers of these categories. All transfers have to be implemented within 15 days of issuance. The transfer exercise is carried out through application Software with 1 % cases checked manually on random basis.

The policy was implemented to streamline teacher transfers as there were reports of massive corruption [2] involved in teachers transfers. There is widespread corruption in teacher transfers in Government schools, with teachers having links with local politicians and willing to pay for transfers more likely to be transferred to a school and area of their choice. This policy made transfers more transparent as every transfer along with the score determining the transfer would be visible on the Management Information System (MIS) portal. Every teacher is able to see the scores of other teachers and thus determine her score relative to other teachers scores limiting political factors affecting these transfers.

3 Data & Summary Statistics

We use the Management Information System (MIS) data which is a proprietary data of the Department of Education, Haryana provided to us under the Chief Minister's Good Governance Associates (CMGGA) Programme to create our main independent variable. MIS data has the teacher profile of all government school teachers in Haryana. We are able to track each teacher right from her date of joining the system and can find out the schools in which she has served along with the duration of service in each school. We use this to create our Eligibility variable. Under the Teachers Transfer Policy, drives are run for bulk transfers. In 2016, a drive was run for transfers of primary teachers and these transfer orders were published in September 2016. A teacher is classified as eligible for the Teacher Transfer Policy if she has served for more than five years in the same zone right before the transfer drive. Thus we find out the number of teachers in a school who have been serving in the same zone between August 31, 2011 and August 31, 2016. Those who joined after August 31, 2011

[2] Newspaper Article (Hindustan Times)

are automatically flagged as ineligible for a transfer since they wouldn't have completed five years of service by August 31, 2016. Thus, we find out the total teachers eligible for transfer in a school. Similarly, we use the MIS data to calculate the total number of teachers in a school on the first day (1^{st} April) of every year academic year.

We use the District Information System for Education (DISE) data for the academic years 2014-15 to 2017-18 for accessing information on our dependant variable which is the percentage of students scoring above 60 % in class 5 in a school and various other school, teacher and children characteristics. The data has detailed information on facilities provided by government primary schools like library, playground, computers, Computer Assisted Learning (CAL) Lab to name a few. It also provides us with information on grade level composition in terms of proportion of girls and students belonging to socially backward classes (Scheduled Caste (SC) and Other Backward Classes (OBC)). For every year, the data includes a teacher level file which we use to calculate the average age and experience of teachers in a school in an academic year.

Finally, we merge the MIS and DISE datasets to create a balanced school panel for the years between 2014-15 to 2017-18 containing 6,394 government primary only schools. Table 1 shows the summary statistics for variables used in our analysis categorised into student academic performance, children characteristics, school characteristics and teacher characteristics.

Looking at the academic performance of students in class 5, we find that in the first year of our panel 2014-15, only around a quarter of the students are able to score more than 60 percent in class 5 examinations. We see an improvement in these first class percentages overtime with the overall percentage almost doubling from 25.9 % in 2014-15 to 49.6 % in the academic year 2017-18. There is heterogeneity in the performance of boys and girls as well. In 2014-15, around 29 % of girls are first class holders whereas the number for boys is around 8 percentage points lower at 21.8 %. We see an improvement in both boys and girls first class percentages between 2014-15 and 2017-18 with the absolute difference of around 8 percentage points between the two remaining the same.

The composition of classes within children characteristics reveals that classes are almost equally split between boys and girls and on an average 80 % of students belong to socially backward classes (SC and OBC).6 % primary only government schools in Haryana are boys only, 7 % are girls only and a large 87 % are co-educational schools. PTR has been falling overtime from 32.3 in 2014-15 to 24.6 in 2017-18. We see a dip in total students enrolled in these schools over the years from around 143 students per school in 2014-15 to around 111 in 2017-18. This is in line with studies showing greater demand for private schools among parents overtime. On an average, around 2.9 teachers per school were eligible for the teachers

transfer policy in the year 2016 whereas on an average, the total teachers at the start of the academic year 2016-17 were 3.6 showing that a large percentage of total teachers were eligible for transfers. We also see that school characteristics like number of computers, library books, playground, toilets are changing over time. In the latest year in the panel, that is, 2017-18, the average teacher age was around 41 years with an average teaching experience of around 13 years.

3.1 Correlates of Teacher Eligibility

Since we are using teacher eligibility to look at the effect of transfers on student learning, next we try to understand what factors it is associated with. In table 2, we regress the number of teachers eligible in a school for transfer under the Teachers Transfer Policy on broadly three set of characteristics in the pre policy year 2015-16, calculated at the school level : school facilities, teacher characteristics and student characteristics. We find that bigger schools are more likely to have a higher number of eligible teachers since we see a significant positive correlation of eligible teachers with total teachers, total students and number of classrooms. This is expected since bigger schools will have more teachers creating a larger pool for eligible teachers.

We also find that schools functioning in rural areas are more likely to have a higher number of eligible teachers. Few school characteristics like number of library books and number of computers are positively correlated with the number of eligible teachers. We also find schools with older teachers and less experience to have more eligible teachers. The above exercise of looking at the correlates of eligible teachers shows that the number of teachers eligible for transfer in a school is not random and is correlated positively with the size of schools and other school characteristics.

4 Empirical Model

This section discusses an empirical model to test the impact of teacher transfers on student academic performance. Since existing studies show that being transferred in and out of schools is correlated with political factors, we use the pool of eligible teachers under the Teachers Transfer Policy to identify the effect of transfers on student academic performance.

We consider the following as our main specification:

$$Score_{sbzt} = \alpha_1 + \sum_{t=-1}^{2} \beta_t \, Eligible_{sbz} * Acad\,Year_t + BaselineChar_{sbz} * Acad\,Year_t + \rho_z * t + \gamma_t + \delta_s + \epsilon_{sbzt} \quad (1)$$

where $Score_{sbzt}$ represents the percentage of students in class 5 scoring above 60 % in school s in block b in zone z in academic year t. In the above specification, t taking values from -1 to 2 indicate years 2014 - 15, 2015 - 16, 2016 - 17, 2017 - 18 respectively with t being 2015 - 16 (the latest pre policy year) taken as the base year.

We leverage the varying intensity with which the policy impacts schools to estimate the impact of transfers on student academic performance and thus interact the number of eligible teachers in a school with academic year t. We control for year fixed effects (γ_t) to take into account any factors impacting schools in common across different years. We also control for school fixed effects (δ_s) to take into account all observable and unobservable school time invariant factors affecting student academic performance. We introduce trends by zone ($\rho_z * t$) to allow for schools in different zones to follow a trend in the student academic performance. We also include baseline (2015-16) school characteristics like teacher age, total teachers and total students interacted with time fixed effects ($BaselineChar_{sbz} * Acad\,Year_t$). We weight all our regressions by the total students in a school in the year 2015-16.

Our coefficient of interest is $\beta_{2016-17}$ and to check if there are no pre existing trends in student academic performance differing by number of eligible teachers in a school , we will examine the significance of $\beta_{2014-15}$. Our estimates should be taken as Intent to Treat estimates since transfers are taking place at the primary level and our dependant variable is being measured at grade 5 level.[3]

5 Main Results

We estimate our main specification presented in equation (1) and the results can be seen in column (3)[4] of table 3. We add controls parsimoniously as we go from the left to right specifications in the table. In column (1), we include school fixed effects and year fixed effects and find that coefficient of # Eligible * 2016-17 is significantly negative. In column (2), we add time trends based on zone and find that the significant negative coefficient remains. In our main specification, presented in column (3), we further add time fixed effects based on

[3] Using our data, we can map a teacher to the primary school she is teaching in and not the exact grades.

[4] In column (4), we control for time varying school characteristics and find that our results go through. More on this in section 7 on Robustness Checks.

three baseline (2015-16) variables - total teachers, total students and teacher age . We see that our coefficient of interest remains statistically significant and negative.

The coefficient of # Eligible * 2014-15 in all specifications in the table is found to be insignificant and shows that there was no pre-existing trend in academic performance of students in class 5 varying across schools with different number of eligible teachers. This builds our confidence in the assumption that the schools would have taken the same trend between 2015-16 and 2016-17 had there been no policy reinforcing that the significant negative coefficient on 2016-17 is because of the transfers induced by the policy.

We also find that the coefficient of # Eligible x 2017-18 is not significant in all specifications in the table. This could imply that the negative effect of transfers were short lived being only seen for the academic year in which the transfers take place and that the loss in learning is compensated within an year. Additionally, this could also be because the negative effect of transfers is relevant only for certain grades and since the class 5 kids in 2017-18 must have been in class 4 when the policy was implemented, we don't see an impact through the coefficient on 2017-18. Due to unavailability of data on academic performances of students in other grades, we are unable to check the above.

We report the full set of results in Appendix table A1. In the table, year fixed effects show that academic performance has been increasing significantly every year from 2014-15 except for 2016-17. In our main specification presented in column 3, we also find that schools in particular zones are experiencing a time trend. The reference category for zone time trends is zone 7. We see that compared to zone 7 which covers the most backward areas, the relatively better off zones 1 , 2 , 3 and 4 are experiencing an increasing trend in academic performance of students.

In terms of the effect size of transfers on student academic performance, we find that one standard deviation increase in the pool of eligible teachers in a school leads to a decrease in percentage of students scoring above 60 % by 5.83 %. Additionally, if a school goes from no teachers in eligible pool to maximum of 21 teachers in the eligibility pool, the percentage of first class holders decrease by a massive 57.8 %.

We also find that transfers lead to an increase in Pupil Teacher Ratio in schools suggesting that this could be one of the mechanisms for the negative effect of transfers on student learning. The results can be seen in table 4.

6 Heterogeneity Analysis

In this section, we assess if there is heterogeneity in the impact of transfers on student academic performance. DISE data also provides information on percentage of girls and

boys holding first class in grade 5. Thus, in table 5, we examine the impact of transfers by gender. The number of observations drop in this table majorly because of the presence of boys only and girls only schools. For boys only schools, the data on girls first class holders is missing and vice versa for girls only schools. Since the coefficient of # Eligible x 2014-15 is statistically insignificant for all specifications in the table , we find that there are no pre-existing trends for both dependant variables varying across schools with different eligible teachers. Using our main specification in columns (3) and (6), we learn that the transfers leads to a significant negative effect on both boys and girls academic performance. A one standard deviation increase in the number of teachers in eligible pool lead to a 4.99 % decrease in percentage of girl first class holders whereas the same increase in the number of teachers in eligible pool lead to a 5.87 % decrease in percentage of boys first class holders.

Next, we check if there is heterogeneity in the effects based on baseline (2015-16) characteristics. These results are presented in table 6. Firstly, we interact the variable # Eligible x 2016-17 with an indicator variable for schools with above median Pupil Teacher Ratio (PTR) in 2015-16 to see if the effects varied across schools with different baseline PTR. Column (1) shows that the negative effect is seen only for schools with below median PTR showing that the schools which were doing better in terms of pupil teacher ratio pre policy were being negatively impacted by the transfer policy. In column (2), we find that above median schools in terms of baseline total students experienced a decrease in student learning outcomes. Next we check if the composition of students in class 5 in the base year drives our results. We see that schools with lower than median proportion of students belonging to socially backward classes (OBC SC) and lower than median proportion of girls in class 5 see a significantly negative impact on student academic performance due to the transfers policy.

7 Robustness Checks

As mentioned in the section on summary statistics , we see that there is temporal variation in characteristics within a school. We conduct two robustness checks to see if our main results deviate significantly. Firstly, we control for various school characteristics in a time varying manner. The results for this robustness check are presented in table A2. We group school characteristics into three with group I including number of boys' toilets, number of girls' toilets, availability of playground, library, Computer Assisted Learning (CAL) lab, group II including number of classrooms, library books and computers and group III indicating whether the school is approachable by a road. Controlling for these groups sequentially, we see that the results in all three specifications qualitatively remain the same.

Secondly, as a robustness check, we see if there is any significant change in school characteristics like number of Boys' Toilets , number of Girls' Toilets , Classrooms, Playground, Library Books, Computers, Road Access, Computer Assisted Learning (CAL) Lab and presence of library that may have contributed to the significant negative effect on student academic performance we see in our main results. In table 7, studying the coefficient of # Eligible x 2016-17 in all the columns, we find that none of the school characteristics show a significant change in the policy year.

8 Conclusion

Looking at the trajectory of primary schooling in India, we know that the enrollment in almost universal in primary grades but Annual Status of Education Reports (ASER) have been bringing out that the learning is these grades is still quite restricted. Given the crucial role played by teachers in determining learning outcomes of school children, in this study, we ask whether teacher transfers impact student academic performance. To answer the question, we create a school balanced panel data set containing 6,394 primary only schools in Haryana, a state in India. We use the Teachers Transfer Policy implemented in Haryana in 2016 to improve transparency in transfers which are otherwise shown to be highly correlated with political variables. The policy lead to mass transfers in primary only schools in Haryana in 2016. We first correlate teacher eligibility for the policy with school, teacher and children level characteristics and find that the number of eligible teachers in a school is not random. We then utilise the variation in the intensity with which the policy impacts schools to assess the above impact. We find that teacher transfers lead to a significant negative impact on student learning outcomes. We find significant heterogeneity in our results based on baseline school characteristics and also see that the results are true for both boys and girls.

In light of these results, we learn that even though the policy which leads to massive transfers at the primary level increases transparency in the conduct of these transfers , it is not without a cost since we find that the disruption in schools and the increase in Pupil Teacher Ratio does lead to a significant negative impact on student learning.

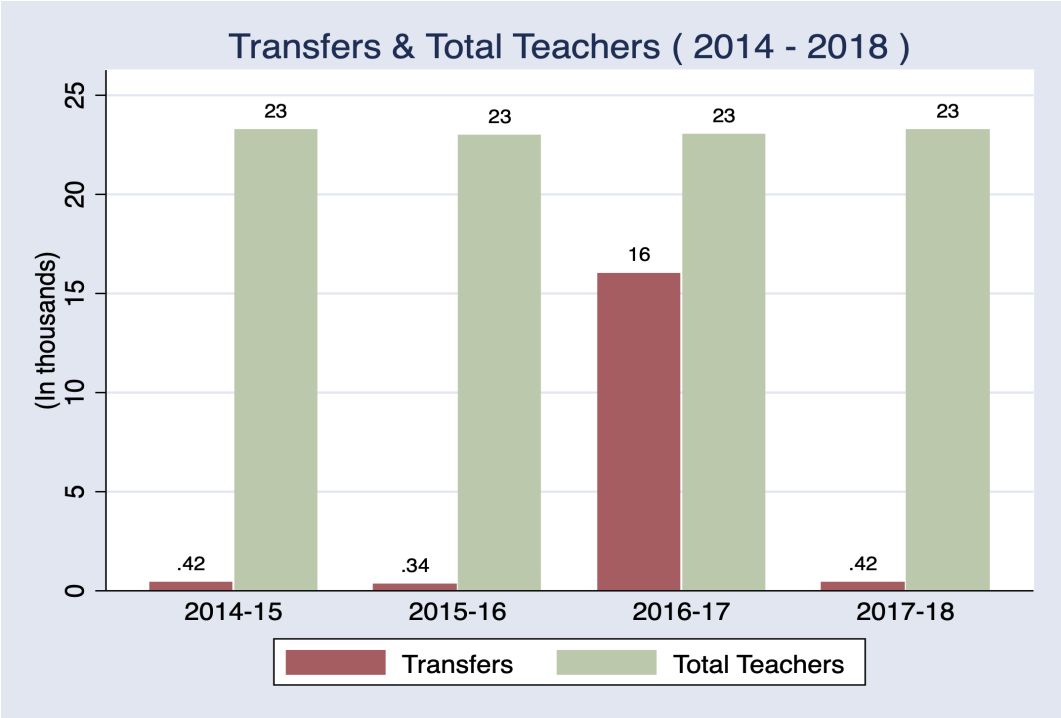

Figure 1: Notes : A teacher is categorised as transferred in year 2014-15 if she is in a school on April 1, 2014 and is observed in another school on October 31, 2014. Total teachers in school in 2014-15 represent the total teachers observed in a school on April 1, 2014. Both variables have been similarly defined for the academic years 2015-16, 2016-17 and 2017-18.

Table 1: Summary Statistics

	2014-15			2015-16			2016-17			2017-18			Pooled		
	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD
Student Performance															
First class Holders	6394	25.96	26.77	6394	40.93	27.39	6394	39.09	27.30	6394	49.63	26.75	25576	38.90	28.35
Boys : First class Holders	5846	21.83	27.31	5865	37.03	30.07	5845	34.01	29.90	5833	44.66	30.46	23389	34.38	30.58
Girls : First class Holders	5903	29.34	30.48	5929	44.71	30.90	5912	43.50	31.10	5913	53.91	29.93	23657	42.87	31.84
Children Characteristics															
Girls (Prop.) in 5	6394	0.51	0.23	6394	0.51	0.24	6394	0.52	0.24	6394	0.52	0.24	25576	0.52	0.24
OBC students (Prop.) in 5	6394	0.37	0.29	6394	0.37	0.29	6394	0.35	0.29	6394	0.34	0.29	25576	0.36	0.29
SC students (Prop.) in 5	6394	0.43	0.27	6394	0.43	0.28	6394	0.45	0.29	6394	0.46	0.29	25576	0.44	0.28
Girls (Prop.) in 1-5	6394	0.51	0.20	6394	0.52	0.20	6394	0.52	0.20	6394	0.52	0.20	25576	0.51	0.20
OBC students (Prop.) in 1-5	6394	0.37	0.27	6394	0.36	0.27	6394	0.34	0.27	6394	0.33	0.27	25576	0.35	0.27
SC students (Prop.) in 1-5	6394	0.43	0.25	6394	0.45	0.26	6394	0.46	0.27	6394	0.47	0.28	25576	0.45	0.27
School Characteristics															
Pupil Teacher Ratio	6390	32.31	17.58	6303	32.65	19.33	6321	31.09	22.45	6390	24.59	12.47	25404	30.15	18.59
# Computers	6394	0.07	0.72	6394	0.07	0.73	6394	0.07	0.71	6394	0.07	0.78	25576	0.07	0.73
# Library Books	6394	569.20	449.27	6394	577.59	421.77	6394	565.06	400.76	6394	542.43	395.16	25576	563.57	417.46
Ind : Playground	6394	0.78	0.41	6394	0.80	0.40	6394	0.80	0.40	6394	0.83	0.38	25576	0.80	0.40
Ind : Library	6394	1.00	0.07	6394	1.00	0.04	6394	1.00	0.03	6394	1.00	0.04	25576	1.00	0.05
CAL Lab	6394	1.99	0.10	6394	1.99	0.09	6394	1.99	0.09	6394	1.99	0.09	25576	1.99	0.09
# Girls' Toilets	6394	1.69	1.27	6394	1.80	1.32	6394	1.90	8.52	6394	1.83	1.32	25576	1.81	4.40
# Boys' Toilets	6394	1.46	1.08	6394	1.57	1.07	6394	1.57	1.07	6394	1.60	1.10	25576	1.55	1.08
# Classrooms	6394	5.26	2.74	6394	5.30	2.75	6394	5.34	2.73	6394	5.38	2.77	25576	5.32	2.75
Approachability by Road	6394	0.98	0.14	6394	0.98	0.14	6394	0.98	0.14	6394	0.98	0.14	25576	0.98	0.14
Total students	6394	143.43	131.67	6394	117.43	102.81	6394	110.68	97.45	6394	111.27	102.27	25576	120.70	110.20
Boys' Schools	6394	0.06	0.24	6394	0.06	0.24	6394	0.06	0.23	6394	0.06	0.23	25576	0.06	0.24
Girls' Schools	6394	0.07	0.26	6394	0.07	0.26	6394	0.07	0.25	6394	0.07	0.25	25576	0.07	0.25
Co-educational Schools	6394	0.87	0.34	6394	0.87	0.34	6394	0.88	0.33	6394	0.88	0.33	25576	0.87	0.33
Teacher Characteristics															
Total Teachers	6394	3.64	2.34	6394	3.59	2.42	6394	3.60	2.41	6394	3.64	2.34	25576	3.62	2.38
# Eligible	6394	2.92	2.12	6394	2.92	2.12	6394	2.92	2.12	6394	2.92	2.12	25576	2.92	2.12
Teacher Age	6394	38.64	4.60	6394	39.64	4.60	6394	40.64	4.60	6394	41.28	4.49	25576	40.05	4.68
Teacher Experience	6394	10.20	4.56	6394	11.20	4.56	6394	12.20	4.56	6394	12.81	4.49	25576	11.60	4.65

Table 2: Correlates of Teacher Eligibility

	(1) # Eligible
Total Teachers	0.749***
	(0.0278)
Teacher Age	0.00703*
	(0.00378)
Total students	0.000469
	(0.000696)
Teacher Experience	-0.00985**
	(0.00435)
SC students (Prop.)	-0.0135
	(0.0789)
Girls (Prop.)	0.0475
	(0.0819)
OBC students (Prop.)	-0.0245
	(0.0770)
# Girls' Toilets	0.0174
	(0.0108)
# Boys' Toilets	0.00779
	(0.0147)
Approachable by Road	0.110
	(0.0684)
Ind : Library	0.262
	(0.255)
# Library Books	0.0000547*
	(0.0000326)

Ind : Playground	-0.0335
	(0.0322)
# Classrooms	0.0258***
	(0.00882)
Ind : Rural	0.533***
	(0.0743)
Pupil Teacher Ratio	-0.00218*
	(0.00114)
Electricity : No	-0.221
	(0.155)
Electricity : Yes (Non functional)	-0.0778
	(0.0680)
# Computers	0.0451*
	(0.0240)
Observations	6303
R-squared	0.83
Zone Fixed Effects	Yes
Block Fixed Effects	Yes

Notes : # Eligible indicates the number of teachers eligible for a transfer in a school under the Teachers Transfer policy.

Table 3: Impact of Transfers on Student Academic Performance

	(1) Score	(2) Score	(3) Score	(4) Score
# Eligible x 2014-15	0.0143	0.0196	-0.811	-0.806
	(0.338)	(0.336)	(0.603)	(0.595)
# Eligible x 2016-17	-0.798**	-0.804**	-1.071**	-1.080**
	(0.333)	(0.334)	(0.509)	(0.512)
# Eligible x 2017-18	-0.205	-0.216	0.348	0.324
	(0.302)	(0.301)	(0.606)	(0.601)
Observations	25576	25576	25576	25576
R-squared	0.47	0.47	0.47	0.47
Mean Outcome	35.89	35.89	35.89	35.89
Year Fixed Effects	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes
Zone Trends	No	Yes	Yes	Yes
BaselineChar FE	No	No	Yes	Yes
SchoolChar	No	No	No	Yes

Notes : The dependant variable *Score* represents the percentage of students in a school scoring above 60%. BaselineChar FE represent interactions of academic year with three characteristics - Total students, total teachers and teacher age in 2015 -16. School characteristics include number of boys' toilets, girls' toilets, availability of playground, library, Computer Assisted Learning lab, number of classrooms, library books, computers and approachability by road. Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Effect on PTR

	(1) PTR
# Eligible x 2014-15	0.857
	(0.668)
# Eligible x 2016-17	4.356*
	(2.421)
# Eligible x 2017-18	0.396
	(0.454)
Observations	25404
R-squared	0.55
Mean Outcome	36.38
Year Fixed Effects	Yes
School Fixed Effects	Yes
Zone Trends	Yes
BaselineChar FE	Yes

Notes : The dependant variable *Score* represents the percentage of students in a school scoring above 60%. BaselineChar FE represent interactions of academic year with three characteristics - Total students, total teachers and teacher age in 2015 -16. Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Heterogeneity of effects based on Gender

	Girls			Boys		
	(1) Score	(2) Score	(3) Score	(4) Score	(5) Score	(6) Score
# Eligible x 2014-15	0.233	0.238	-0.611	-0.128	-0.124	-0.823
	(0.338)	(0.336)	(0.624)	(0.356)	(0.355)	(0.657)
# Eligible x 2016-17	-0.662*	-0.667*	-1.009*	-0.810**	-0.814**	-0.954*
	(0.342)	(0.344)	(0.572)	(0.335)	(0.335)	(0.543)
# Eligible x 2017-18	-0.143	-0.153	0.229	-0.179	-0.188	0.475
	(0.294)	(0.294)	(0.647)	(0.345)	(0.345)	(0.658)
Observations	23657	23657	23657	23389	23389	23389
R-squared	0.46	0.46	0.46	0.43	0.43	0.43
Mean Outcome	39.48	39.48	39.48	31.81	31.81	31.81
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Zone Trends	No	Yes	Yes	No	Yes	Yes
BaselineChar FE	No	No	Yes	No	No	Yes

Notes : The dependant variable *Score* represents the percentage of students in a school scoring above 60%. BaselineChar FE represent interactions of academic year with three characteristics - Total students, total teachers and teacher age in 2015 -16. Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Heterogeneity of effects based on baseline School Characteristics

	(1) Score	(2) Score	(3) Score	(4) Score
# Eligible x 2014-15	-0.816	-0.812	-0.811	-0.811
	(0.603)	(0.603)	(0.603)	(0.603)
# Eligible x 2016-17	-0.964*	-0.344	-1.036*	-1.033**
	(0.536)	(0.630)	(0.531)	(0.506)
# Eligible x 2017-18	0.355	0.349	0.348	0.348
	(0.605)	(0.606)	(0.606)	(0.607)
# Eligible x 2016-17 x PTR (Above Median)	-0.135			
	(0.232)			
# Eligible x 2016-17 x Students (Above Median)		-0.762**		
		(0.368)		
# Eligible x 2016-17 x OBC & SC (Above Median)			-0.0522	
			(0.206)	
# Eligible x 2016-17 x Girls (Above Median)				-0.0657
				(0.216)
Observations	25212	25576	25576	25576
R-squared	0.47	0.47	0.47	0.47
Mean Outcome	35.87	35.89	35.89	35.89
Year Fixed Effects	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes
Zone Trends	Yes	Yes	Yes	Yes
BaselineChar FE	Yes	Yes	Yes	Yes

Notes : The dependant variable *Score* represents the percentage of students in a school scoring above 60%. BaselineChar FE represent interactions of academic year with three baseline characteristics - total students, total teachers and teacher age. Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Robustness : Does any other school characteristic change in the policy year ?

	(1) Boys' Toilets	(2) Girls' Toilets	(3) Classrooms	(4) Playground	(5) Books	(6) Computers	(7) Road Access	(8) CAL Lab	(9) Library
# Eligible x 2014-15	0.0114	-0.0174	0.0476	0.00314	-1.668	-0.000943	-0.000376	-0.00174	-0.000739
	(0.0120)	(0.0178)	(0.0385)	(0.00377)	(3.329)	(0.00161)	(0.000503)	(0.00156)	(0.000670)
# Eligible x 2016-17	0.0148	0.0242	-0.0205	0.00231	-1.126	-0.000532	0.000653	-0.00117	-0.000104
	(0.0152)	(0.0546)	(0.0485)	(0.00248)	(1.890)	(0.000839)	(0.000639)	(0.00159)	(0.000373)
# Eligible x 2017-18	0.0233	-0.0196	-0.0408	0.0196**	-0.764	-0.00475	0.00108	-0.000255	0.000514
	(0.0246)	(0.0208)	(0.0526)	(0.00924)	(2.893)	(0.00855)	(0.000770)	(0.00225)	(0.00117)
Observations	25576	25576	25576	25576	25576	25576	25576	25576	25576
R-squared	0.88	0.35	0.93	0.87	0.92	0.94	0.87	0.88	0.38
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zone Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BaselineChar FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1

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Appendix

Table A1: Impact of Transfers on Student Academic Performance

	(1) Score	(2) Score	(3) Score
# Eligible x 2014-15	0.0143	0.0196	-0.811
	(0.338)	(0.336)	(0.603)
# Eligible x 2016-17	-0.798**	-0.804**	-1.071**
	(0.333)	(0.334)	(0.509)
# Eligible x 2017-18	-0.205	-0.216	0.348
	(0.302)	(0.301)	(0.606)
2014-15	-13.60***	-13.20***	-22.35***
	(1.627)	(1.768)	(6.233)
2016-17	0.168	-0.236	3.148
	(1.409)	(1.413)	(4.994)
2017-18	8.497***	7.690***	12.60**
	(1.443)	(1.513)	(4.987)
Zone 1 x Time		1.012	2.074***
		(0.784)	(0.754)
Zone 2 x Time		1.027	1.401*
		(0.839)	(0.811)
Zone 3 x Time		0.566	1.309*
		(0.764)	(0.779)
Zone 4 x Time		1.841**	2.339***
		(0.802)	(0.796)
Zone 5 x Time		-0.00653	0.116
		(0.552)	(0.525)
Zone 6 x Time		-0.0286	0.152
		(0.722)	(0.702)
Students x 2014-15			-0.00494
			(0.00910)
Students x 2016-17			-0.00648
			(0.00709)
Students x 2017-18			-0.0119
			(0.00903)
Teacher Age x 2014-15			0.218

			(0.165)
Teacher Age x 2016-17			-0.0974
			(0.129)
Teacher Age x 2017-18			-0.128
			(0.125)
Teachers x 2014-15			0.999*
			(0.599)
Teachers x 2016-17			0.494
			(0.451)
Teachers x 2017-18			-0.0875
			(0.575)
Constant	38.19***	37.34***	36.62***
	(0.436)	(0.968)	(0.918)
Observations	25576	25576	25576
R-squared	0.47	0.47	0.47
Mean Outcome	35.89	35.89	35.89
Year Fixed Effects	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes
Zone Trends	No	Yes	Yes
BaselineChar FE	No	No	Yes

Notes : The dependant variable *Score* represents the percentage of students in a school scoring above 60 %. Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1

Table A2: Robustness : Controlling for school characteristics

	(1) Score	(2) Score	(3) Score
# Eligible x 2014-15	-0.818	-0.806	-0.806
	(0.602)	(0.595)	(0.595)
# Eligible x 2016-17	-1.076**	-1.079**	-1.080**
	(0.510)	(0.512)	(0.512)
# Eligible x 2017-18	0.333	0.326	0.324
	(0.605)	(0.602)	(0.601)
Observations	25576	25576	25576
R-squared	0.47	0.47	0.47
Mean Outcome	35.89	35.89	35.89
School Characteristics	I	I + II	I + II + III
Year Fixed Effects	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes
Zone Trends	Yes	Yes	Yes
BaselineChar FE	Yes	Yes	Yes

Notes : The dependant variable Score represents the percentage of students in a school scoring above 60 %. BaselineChar FE represent interactions of academic year with three characteristics - Total students, total teachers and teacher age in 2015-16. School characteristics I include number of boys' toilets, girls' toilets, availability of playground, library, Computer Assisted Learning lab. School Characteristics II include number of classrooms, library books and computers. School Characteristics III include approachability by road. Standard errors, in parentheses, are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1