PRIMARY EDUCATION IN INDIA AND IMPACT OF 12th FIVE- YEAR PLAN ON IT

Introduction:

Investing in education is arguably one of the most critical components of enabling the "Inclusive Growth" agenda of the Government of India. Among the several studies carried out on the correlates of long-term economic growth in the nineties, the correlation between average years of education in a country and its growth rate has been among the most robust . Concurrently, micro-evidence on the returns to education consistently finds positive returns to primary education in developing countries ranging from 7 to 10% per extra year of schooling . Thus, investments in education are essential for aggregate economic growth as well as for enabling citizens to participate in the growth process through improved wages and employment. At the same time, recent evidence suggests at both the macro and micro levels that what matters for both growth as well as employability are not years of education as much as the quality of education represented by learning outcomes and skills. Cognitive skills as opposed to years of schooling are more robustly correlated with economic growth. They show that the share of basic literates as well as the share of high performers has independent and significant effects on growth and that these types of human capital complement each other. While the results above are based on cross-country regressions. In addition to being an engine of productivity and growth, education quality also determines the extent to which citizens can broadly participate in the growth process. It is a common refrain among employers in India that the majority of college graduates are not 'employable' due to a lack of skills commensurate with their paper qualifications. The weak correlation between years of education and actual knowledge is even more pronounced at the primary schooling level (see section 2). However, while India has made considerable progress in improving primary education when measured by the quality of schooling inputs (including 3 student enrollment and retention), the progress on learning outcomes has been minimal. It is therefore an urgent priority for primary education policy in India to improve the quality of education measured not just in terms of inputs and student enrollment/retention, but also in terms of learning outcomes. The past decade has also seen a growing body of high-quality empirical research on primary education in India that can inform primary education policy in a meaningful way. However, the current policy framework for primary education in India (including those in the Right to Education Act) does not reflect the insights from this body of research. The main purpose of this paper is to bridge this gap by distilling the insights from rigorous academic research based on large samples and careful attention to identifying causal relationships, and pointing out the policy priorities that the evidence points towards. This paper does not seek to conduct a comprehensive academic review of this literature with a detailed discussion of econometric identification issues. Rather, it seeks to present education policy makers in India at both the Centre and State-level with a

succinct summary of the most credible quantitative research on education over the past decade and then focus on drawing out and discussing the policy priorities suggested by the evidence.2 In the interests of keeping the scope of this paper manageable, one area that will not be covered is private schools and the optimal structure for leveraging and regulating non-state actors in primary education.3 The paper is organized into 4 main sections.

School quality as measured by inputs has improved considerably in the last decade

A positive consequence of the substantial attention paid to primary education under the past decade by the government of India as well as state governments under campaigns such as the Sarva Shikhsa Abhiyan (SSA) has been the considerable improvement in the quality of government schools as measured by the availability of various kinds of inputs. This can be seen in the trends in the DISE data between 2004 and 2010. In addition to seeing changes in school facilities and teacher quality and quantity in official government reported data, these improvements are also confirmed in data collected completely independent of the government. Das, Holla, Kremer, and Mohpal (2013) present results from an all-India panel study of village schools that revisited the rural sample of the nationally representative school survey conducted in 2003 as part of the nationwide study on teacher absence reported in Kremer, Chaudhury, Hammer, and Rogers (2005). Muralidharan (2013) report very significant improvements in input-based measures of schooling quality from this nationally representative panel data. For instance, pupil-teacher ratios have fallen by nearly 20% (from 47.4 to 39.8); the fraction of schools with toilets and electricity has more than doubled (from 40% to 84% for toilets and 20% to 45% for electricity); the fraction of schools with functioning midday meal programs has nearly quadrupled (from 21% to 79%); and the overall index of school infrastructure has improved by 0.9 standard deviations (relative to the distribution of the school infrastructure index in 2003). At the same time, school enrollment rates have increased steadily to the point that 96.7% of children aged 6-14 are now enrolled in school (Pratham 2012). These are considerable achievements, and should not be regarded lightly given the scale of the Indian primary education system, which is the largest in the world. It highlights that the 4 Indeed, the investments in high quality administrative data on schools and the creation of the Education Management Information Systems (EMIS) under which the DISE data are made available has also been a significant positive feature in education administration in the past decade. 5 Indian state does have capacity to execute on goals when undertaken in a "mission mode". These results also suggest ground for optimism that the Indian state is able to make progress on outcomes that are measured and made into a policy priority. However, as we will see below these improvements in school quality as measured by inputs have not translated into improvements in learning outcomes, which may be partly explained by the fact that education policy in the past decade has not prioritized learning outcomes.

Student learning levels

While the most prominent set of public discourses on the state of Indian primary education (including those leading up to the Right to Education law) have focused on the low quality of school inputs and schooling conditions (most notable among these was the PROBE Report published in 1999), a new wave of discourse focused on the levels of learning was initiated by Pratham with the publication of the Annual Status of Education Report (ASER) in 2005. This has now become an annual exercise that measures learning outcomes of school-age children in nationally representative samples, with samples large enough to estimate learning levels precisely at the district level. However, unlike measures of school quality based on inputs (which have shown an upward trend) the picture here is bleak. The most recent ASER report (Pratham 2012) finds that less than 50% of children who are enrolled in the fifth standard are able to read a simple paragraph at the second-standard level, and that less than 27% of children enrolled in the third standard are able to solve a two digit subtraction problem with borrowing and less than 55% of children enrolled in the fifth standard are able to solve the same problem. Over the years, the ASER data suggest that not only are the levels of learning low, but that the trends in learning levels are in fact negative. Since basic reading and arithmetic are foundational skills, the low levels of learning suggested by the ASER data are especially alarming since they suggest that the Indian education system is doing well at enrolling children in school, but failing when it comes to teaching them even basic skills (Pratham 2012). These figures are based on representative household surveys, and present average achievement levels regardless of whether a student attends a private or a government school.

When the figures are broken down by school type, the data consistently show that students in private schools score higher on every measure. Thus, the learning levels for students in government schools are even lower than the ones reported above. 6 The ASER testing tools are meant to enable a rapid assessment of learning levels and do not span the full range of question difficulty representing the syllabus. It is useful therefore to also look at results from the nationwide School Learning Study conducted in 2010 (Educational Initiatives 2010) by Educational Initiatives, who are one of India's leading testing and assessment firms. These assessments included a broad range of questions including publicly released items from the international TIMSS tests, which would enable a global comparison. The main findings here are consistent with those from the ASER reports. Learning levels are low, and in particular scores on questions that require application of concepts are consistently lower than those on questions representing rote learning. The report also finds that the mean score across Indian public schools on the common TIMSS questions in the standard 4 language test is less than half that of the international mean (less than 30% compared to over 60%).6 Muralidharan and Zieleniak (2013) use a unique longitudinal data set in the state of Andhra Pradesh collected by following a cohort of students over five years and find that not only are learning levels low, but so are the learning trajectories over time. They use item response theory (IRT) to create item characteristics

of a 3-parameter logistic model (difficulty, discrimination, and guessing parameters) for a database of over 900 questions each in math and language that were administered as part of the APREStudies over five years. Using overlapping questions over years and a set of identical questions that were administered simultaneously to students across grades 1 to 5, they estimate learning trajectories, defined as the probability of a typical student in a given grade getting a question correct over time as they progress through the grades. Their findings suggest that for most questions of intermediate levels of difficulty, less than 20% of students who do not correctly answer a grade N-level question at the end of grade N, are able to answer it correctly at the end of grade N+1. These results suggest that spending additional years in school, while no doubt useful in terms of added learning, has remarkably low effectiveness in improving learning outcomes - especially given the considerable economic cost of an additional year in school. They also find evidence of increasing variance in absolute learning levels of students over time.6 The results are not reported in standard deviations (Educational Initiatives 2010). 7 Note that this probably understates the increase in variance because of a higher probability of students dropping out from the lower end of the learning distribution. The studies mentioned above are all unanimous in suggesting that learning levels in India are low by any absolute standard. But the magnitude of India's 'learning deficit' is particularly stark when placed in an international comparative context.

Even more striking is the finding of the recent PISA assessments carried out in two of the more advanced Indian states in terms of learning levels – Himachal Pradesh and Tamilnadu – which finds that the 2 tested Indian states ranked 72nd and 73rd out of a total of 74 tested entities for which results were reported (not all were countries). Combining these results with those of the SLS (2010) suggests that many of the more educationally backward states like UP, Bihar, and Jharkhand would lag even further behind in international comparisons (and drag down the population-weighted all-India means much further).

The annual ASER reports show a steadily increasing trend in private school enrollment from 18.7% in 2006 to 25.6% in 2011 – with these increases being broad based across states. These numbers highlight that India has a share of private school enrollment that is comparable to a country like Chile – that has a fully voucher-based school system! 8 It is beyond the scope of this paper to compare the effectiveness of private and government-run schools, but these data indicate that in spite of considerable increases in spending on government schools, parents do not perceive this spending to be generating enough quality in the government schooling experience for them to retain their children there. While it is true that parents value many things in schools (with learning outcomes being only one component in a vector of schooling attributes that parents care about), the trend towards increasing private school share in primary education combined with the low levels of learning outlined in the previous section suggest that there are considerable systemic weaknesses in translating increasing education spending into superior outcomes in government-run schools.

Reviewing the Evidence on Causes and Correlates of Learning Outcomes

The main factors that determine the performance of a school system include the level of inputs provided (facilities, teachers, and student inputs), the pedagogical processes employed in classrooms, and the overall governance of the school system. In addition to these supply-side factors, a further key determinant of educational attainment is the extent of demand for education from parents and students. Each of these areas has seen considerable empirical research in the past decade and this section briefly summarizes the evidence on these broad classes of issues that are relevant to the translation of spending into outcomes. Inputs The most important components of education spending in the past decade have been on improving school facilities and infrastructure, improving teacher salaries and training, hiring more teachers to reduce pupil-teacher ratios, and expenditure on student benefits such as textbooks, and mid-day meals. The PAISA Report (Accountability Initiative 2012) shows that these three categories of expenditure account for 90% of the SSA budget (in the most recent year, 44% was spent on teachers, 36% on schools, and 10% on students - though the last category does not include spending on mid-day meals). However, as the discussion below shows, the empirical studies to date do not find significant correlations between these investments and either intermediate measures of system performance (such as teacher absence) or measures of outcomes (such as student test scores).

School Infrastructure

In the absence of rigorous randomized evaluations studying the impact of infrastructure improvement on learning outcomes in India, the broadest evidence to date comes from Muralidharan et al (2013). Using village-level panel data from a nationally-representative sample of over 1,250 villages across 19 Indian states, they find no correlation between changes in average village-level school infrastructure (between 2003 and 2010) and changes in enrollment in government schools, though they do find a small positive effect on the number of students attending school. They also find no correlation between changes in average village level school infrastructure and either teacher absence or student test scores, even though as noted earlier they find significant improvements in almost all measures of school infrastructure. Analysis using the five-year panel data set of student learning outcomes collected as part of the APREStt project also finds no correlation between the infrastructure index in the school and measures of student test-score gains.8 Thus, almost all the existing evidence points to a limited impact of improvements in school infrastructure on learning outcomes. The reasons for this are not obvious. One possibility is that these investments make schools more appealing to teachers and students, but have no impact on the teaching and learning process - which may be the main determinant of learning. Another possibility is that infrastructure may be built but not used. For instance, the APREStt project collected matched data between school facilities and household behaviors and the data suggests that over 75% of children who attend schools that have a toilet still report relieving themselves in the open in school. A final possibility is that the returns to infrastructure investments need to be evaluated over the depreciation lifecycle of the corresponding infrastructure. It is possible that

the cumulative impact of investments in buildings over a 30.8. Calculations by author using the APRESt data. Note that these are not experimental results, but by controlling for lagged test scores, this analysis mitigates several of the usual omitted variable concerns. This could be for logistical reasons such as lack of water in the school toilet or the lack of staff to clean the toilet, due to which teachers may prefer to keep the toilets closed. Alternatively, these results could reflect the difficulty of changing behavioral norms with respect to sanitation. 10 year depreciation lifecycle may be significantly positive, while the annual effect on learning outcomes is too small to be measured statistically. This last possibility should caution us against interpreting the results to date as suggesting that infrastructure investments should not be made. More broadly, the results should not be interpreted as saying that school infrastructure does not matter for improving learning outcomes (they may be necessary but not sufficient), but the evidence does suggest that investment in infrastructure by itself is unlikely to have a significant impact on improving learning levels and trajectories. This is essential to point out because the staffing patterns of education department offices around the country suggest that the dominant concern for the department is typically infrastructure and facilities, while there are almost no staff at the district and block levels
whose main task is to focus on academics and pedagogy.

Teacher Quality and Quaintly

The other major component of investment in inputs has been increasing teacher salaries and training, and reducing pupil-teacher ratios. The evidence summarized below again points to very limited impacts of these investments on improved learning outcomes. While there has been no experimental evaluation of the impact of varying individual teacher characteristics in India, there have been quite a few studies that control for lagged test scores and estimate the impact of teacher characteristics on learning outcomes in a value-added framework. The first point to highlight is that none of these studies to date finds a significant positive relationship between teacher training and increases in test scores of students taught by the corresponding teacher. Muralidharan and Sundararaman 2011b; Muralidharan 2012)11, and if anything the correlations typically point to a negative relationship between teacher salaries and gains in student test scores 10 Thanks to Rukmini Banerjee for highlighting this point in her discussion. 11 The results from Muralidharan and Sundararaman (2011b) referred to here are based on the tables of heterogeneous treatment effects of the performance-pay interventions as a function of teacher characteristics. The specifications used our standard value added specifications and the results reported above are 11. The evidence on the impact of reducing pupil-teacher ratios on improved learning outcomes is also quite mixed, with most studies not finding much of an impact. However, while the test scores of the children who received this remedial instruction went up significantly, they find no impact on the test scores of the students who remained in the original classroom with a smaller class size. These results suggest that reducing class-size may have a limited impact on

improving test scores. Muralidharan and Sundararaman (2013) study the impact of school level pupil-teacher ratio (PTR) on test score gains by using longitudinal data on test scores and changes in PTR over time and find significant but modest gains from reducing the school level PTR. Their estimates imply that reducing school level pupil-teacher ratio by half would at most yield gains in test scores of 0.25 standard deviations per year. Jacob, Kochar, and Reddy (2008) study the impacts of class size on learning outcomes on Andhra Pradesh using a control-function approach and also find significant but small effects of class-size reductions on test scores. Further, the panel data analysis conducted by Muralidharan (2013) finds no correlation between changes in mean pupil-teacher ratio in a village and changes in normalized mathematics test scores. They also find evidence of a possible mechanism for this finding, which is that there is a very robust negative relationship between pupil-teacher ratio and teacher absence. In other words, reductions in pupil-teacher ratio over time were strongly correlated with increases in teacher absence. Thus, the impact of reducing class size by hiring additional teachers was mitigated by increased levels of teacher absence in the schools. This is consistent with the experimental evidence presented in Muralidharan and Sundararaman (2013) where they find that schools that were randomly selected to receive an additional contract teacher saw a significant increase in the absence rates of the regular teachers. In other words, the marginal rate of teacher absence may be considerably higher than the average, which could limit the impact of reducing pupil-teacher ratio on improving learning outcomes. The coefficient on the linear term (the main effect of the characteristic) and not the interaction term (which measures the heterogenous impact of the performance pay program as a function of the characteristic). Similar findings are reported by Duflo, Dupas, and Kremer (2012) in an experimental study of contract teachers in Kenya, suggesting that this may be quite a general result. Finally, a related issue is the one of distribution of teachers across schools. While budgetary considerations lead to a focus on average PTR's, in practice there is wide variation in PTR's across schools. Chin (2005) shows that Operation Blackboard in India which redistributed teachers from large to small schools led to a significant increase in primary school completion rates for girls and the poor even though there was no increase in the average number of teachers per school and no reduction in mean class size. Summarizing the research on PTR on learning outcomes, we see that the best studies do find some positive impacts of class-size reduction on student test scores. Nevertheless, these estimated impacts are modest in magnitude, and given the high cost of class-size reductions, it may not be very cost effective to aim to improve test scores by reducing class sizes. Thus even a 20% reduction in pupil-teacher ratio (which is a very expensive intervention) would not yield large test score gains (around 0.05 standard deviations/year) and would be considerably less cost effective than achieving the same class-size reduction using contract teachers (Muralidharan and Sundararaman 2013) or introducing modest amounts of performance linked bonuses . The evidence also suggests that in addition to average PTR's, it may also be important to pay attention to the distribution of teacher resources across and within schools, and that it may be possible to

improve learning outcomes at no additional cost simply by rationalizing the allocation of teachers across schools, and by providing smaller class sizes to earlier grades.

Student Grants and Mid-Day Meals

The final major category of inputs is student-based spending including textbooks, uniforms, and mid-day meals. Again, studies to date do not find any significant positive relationship between these categories of spending and improved learning outcomes. Das, Dercon, Habyarimana, Krishnan, Muralidharan, and Sundararaman (2013) present experimental evidence on the impact of a school grant program that stipulated that the funds should be spent on inputs directly used by students. The program was implemented over two years in the major categories of spending were books, stationery, and writing materials (~50%); workbooks and practice books (~20%); and classroom materials (~25%) with similar patterns of expenditure in both years of the program. They find that this program had a significant positive 13 impact on student test scores at the end of the first year, but that the impact in the second year was close to zero, with the cumulative two-year effect being positive but not significant. They show the most likely mechanisms of this result is that households considerably reduce their own spending on their child's education in the second year of the program. Thus, when the program was unanticipated and when the money arrived after parents had already incurred their educational expenditures on books and materials for the school year (as in the first of the program), there was a significant net increase in materials which translated into significant improvements in test scores. However, when these inputs were anticipated, households were able to re-optimize and reduce their own spending. Thus, there was no significant increase in net inputs in the second year which would explain why there was no impact on test scores either. These results highlight the importance of accounting for household re-optimization in response to public spending programs in thinking about the long-term impacts of increased spending, and suggest a possible mechanism for the lack of correlation between increased spending on inputs and improved outcomes. A similar concern exists in the context of mid-day meals, because it is possible for households to adjust the allocation of food within the household in response to the fact that the school going child now has access to one meal in the school. Afridi (2010a) studies the impact of mid-day meal provision and finds that the program substantially increases the total caloric intake of school-going children in rural Madhya Pradesh, by 50% to 100%. Using a differencein-difference estimation strategy that relies on a staggered roll out across schools, attendance rates for girls are estimated to increase by 12 percentage points in rural Madhya Pradesh (Afridi, 2010b) and 5 percentage points overall in Delhi (Afridi, Barooah and Somanathan, 2010). However, these papers do not study the impact of mid-day meals on test scores. Jayaraman, Simroth and Vericourt (2010) use data from thirteen states to construct triple-difference estimates using private schools as a control group and find that the mid-day meal program is associated with a 6.8% increase in enrollment, but had no impact on test scores. Finally, the panel data analysis in Muralidharan (2013) finds that there In technical terms, these results highlight that it is possible for the production function effect of additional inputs on test scores to be positive (this is a partial derivative

of the impact of additional inputs holding other factors constant), while the policy effect might be considerably lower (since this includes re-optimization by other agents). This is clearly a very general theme since the discussion in the previous section of increased absence among preexisting teachers in response to the addition of a new teacher is an illustration of the same point. Correlation between changes in the mid-day meal status of schools in a village, and changes in normalized math test scores. One possible mechanism for this result may be the diversion of teacher time to manage and oversee the mid-day meal process. Analysis of teacher time use data in Andhra Pradesh using the APRESt data, suggests that government school teachers report spending around 10% of their daily time in school overseeing the mid-day meal. Another student input that has been found to have a significant impact on enrollment, but insignificant impact on learning outcomes is the bicycles that have been provided to girls in several states to improve secondary school enrollment. Muralidharan and Prakash (2013) study the impact of the Chief Minister's Bicycle Program that provided girls in Bihar with a bicycle conditional on enrolling in 9th grade. They use a triple difference approach (using boys and the neighboring state of Jharkhand as comparison groups) and find that the program increased girls' enrollment in secondary school by 20% (a five percentage point gain on a base enrollment rate of twenty-five percent) and reduced the gender gap in secondary school enrollment by 25%. They find that the impact of the program was significantly greater in villages where the nearest secondary school was further away, suggesting that a key mechanism for program impact was the reduction in the 'distance cost' of school attendance induced by the bicycle. However, they do not find any significant impact of the cycle program on girls' learning outcomes as measured by their passing rates in the tenth-standard board exam. To summarize, it appears that most of the investments in improving school quality as measured by inputs (regardless of whether these are at the school, teacher, or student level) are either not correlated with improved learning outcomes or only weakly so. There may well be other important reasons for making these investments (such as child welfare), and student inputs that reduce the marginal cost (or increase the marginal benefit) of attendance do seem to have a positive impact on school participation. But the evidence to date does not suggest any reason to be optimistic that 'improving' school quality in a 'business as usual' way will lead to a substantial improvement in learning outcomes.

Technology-Aided Instruction

Greater use of technology in classrooms is commonly thought of a promising way to rapidly improve education outcomes in developing countries (including India). Posited channels of impact include (1) cost-effective replication and scaling up of high-quality instruction using broadcast technology (such as radio and television-based instruction); (2) using technology to overcome limitations in teacher knowledge and training (for instance for teaching more advanced concepts in science and mathematics or for teaching a new language like English – for which there is growing demand but a limited supply of teachers with the requisite competence); (3) using technology to provide supplemental instruction at home; (4) using

technology to engage children better in the learning process through the use of interactive modules (such as educational games and puzzles); and (5) using technology to customize individual student learning plans. These interventions also range from being quite inexpensive on one hand to very expensive (individual laptops for students such as envisaged under the 'One Laptop per Child' or OLPC initiative). While the promise of enhanced use of technology in instruction is clear, and there are many advocates for doing so, the evidence on the effectiveness of technology in instruction remains limited and few rigorous studies have evaluated the benefits of such interventions. Skeptical scholars have even argued that the promotion of technology is fueled more by the prestige and symbol of modernity than any actual evidence of the effectiveness of the interventions . While many continue to champion educational technology, there may be adverse consequences of their implementation, the simplest of which would be an ineffective technology that does not increase achievement and takes time away from other more effective teaching techniques. Understanding the efficacy of technology is especially important as technology is often relatively expensive compared to other activities – if they do not lead to superior learning outcomes, then it is likely that there are more cost effective methods than technology to improve educational outcomes. Linden (2008) evaluates the impact of a computer-aided instruction program implemented by an NGO in Gujarat (Gyanshala) that was implemented both in an after-school supplemental instruction model as well as in a model where computer-aided instruction replaced a period of regular instruction. The paper finds that the supplemental program led to significant 18 positive effects on test scores (0.28 standard deviations), while the in-school model led to significantly lower test scores (-.0.57 standard deviations) suggesting that a blanket use of 'computers in school' may not only not be effective, but could also be harmful if it replaces otherwise productive instructional time. Further evidence on the importance of design details is provided by He, Linden, and MacLeod (2008) who analyze an intervention aimed at improving English skills in which part of the intervention is directed by teachers and the other component is a self-paced machine. While both components led to positive gains in test scores, the study found that stronger students fared better using the machine, while weaker students benefited more from the guidance of a teacher. Thus, technology may be an effective teaching aid, but it may require higher initial levels of learning to be used effectively. Banerjee et al (2007) find that a computer remedial program increases test scores twice as much as the remedial teacher. However, because of the high expense of the computer-based program, scaling up the teacher-based remedial program would be 5 to 7 times more cost effective than the computer assisted learning program. The experiment illustrates that while certain technologies may be effective, it still may be more cost effective to use non-technology based programs. The paper finds that while the program increased the ratio of computers to students in schools from 0.12 to 1.18 in treatment schools, there was no impact on either school enrollment or test scores in Math and Language. The paper does find some positive effects on general purpose measures of intelligence such as the Raven's Progressive Matrices but the overall results suggest need for caution in believing that the introduction of computers in classrooms will by itself lead to

improvements in learning levels.14 While set in a different context, a well identified study on the impact of providing 14-year old students with computers at home in Romania also found negative effects of the computer on test scores (Malamud and PopEleches 2011) – again serving to caution that a naïve attempt to provide students with more technology can have negative effects and that interventions need to pay careful attention to what activities are being crowded out by the additional computer time. These cautionary results are especially relevant in a context such as India where it is tempting to scale up interventions like "tablet computers for all" as a potential short-cut for addressing the challenges of education quality. To summarize, there is are many good reasons to be excited about the potential for technology-enabled instruction to improve learning outcomes significantly. However, the evidence on the impact of greater use of technology in the classroom is mixed and seems to depend crucially on the details of the model by which it is implemented. A lot more careful research is needed (on both process and impacts) before committing resources to scaling up these programs - especially those involving expensive investments in hardware.

Teachers Absence

Perhaps the most striking measure of weakness of school and teacher governance in India is the high rate of teacher absence from schools. Kremer et al(2005) present results from a nationally-representative all-India survey of schools where enumerators made unannounced visits to schools to measure teacher attendance and activity. They find that on any given day, around 25% of teachers were absent from work, and less than half of the teachers on the payroll were found to be engaging in teaching activity. The absence rate was the second highest in a similar survey across 8 low and middle income countries. Muralidharan et al (2013) present results from a nationally-representative panel survey that revisited the villages visited in the study above, and find that there has been a reduction in teacher absence rates from 26.3% to 23.7%.15 While this is a significant reduction in teacher absence rates, the magnitude of improvement in measures of governance such teacher absence is considerably lower (0.26 standard deviations relative to the 2003 distribution of teacher absence). The absence rate of 25% includes both the rural and the urban sample, whereas the absence rate in the rural sample in 2003 was 26.3% (for the villages in the panel data set) 20 than the magnitude of improvement in physical inputs such as school infrastructure (0.91 standard deviations relative to the 2003 distribution). In addition to these 2 nationally-representative studies, several other studies have also noted the high rates of teacher absence in India. Muralidharan and Sundararaman (2011b, and 2013) , and Muralidharan (2012) regularly document teacher absence with multiple unobserved visits to a representative sample of rural government-run primary schools in Andhra Pradesh and find teacher absence rates to steadily range between 24 - 28% over the 5 year period from 2005-06 to 2009-10.

Contractual Structure

A widespread but highly controversial aspect of primary education policy in India during the past couple of decades has been the use of locally-hired contract teachers on fixed-term renewable contracts, who are not professionally trained, and who are paid much lower salaries than those of regular teachers (often less than one fifth as much).16 Supporters consider the use of contract teachers to be an efficient way of expanding education access and quality to a large number of first-generation learners, and argue that contract teachers face superior incentives compared to tenured civil-service teachers. Opponents argue that using under-qualified and untrained teachers may staff classrooms but will not produce learning outcomes, and that the use of Contract teacher schemes have been widely employed in several states of India (under different names such as Shiksha Karmi in Madhya Pradesh and Rajasthan, Shiksha Mitra in Uttar Pradesh, Vidya Sahayak in Gujarat and Himachal Pradesh, and Vidya Volunteers in Andhra Pradesh). The salary differentials are even more pronounced if we account for the present discounted value of the pension and other retirement benefits offered to civil-service government teachers. 22 of contract teachers de-professionalizes teaching, reduces the prestige of the entire profession, and reduces motivation of all teachers. However, as seen below, there is no evidence to support the view that contract teachers are less effective than regular teacher. Sundararaman (2013) present experimental evidence from a program that provided an extra contract teacher to 100 randomly-chosen government-run rural primary schools in the Indian state of Andhra Pradesh. At the end of two years, students in schools with an extra contract teacher performed significantly better than those in comparison schools by 0.16 and 0.15 standard deviations, in math and language tests respectively. They also find that contract teachers were significantly less likely to be absent from school than civil-service teachers (16% vs. 27%). Finally, they implement four different non-experimental estimation procedures (using both within and between-school variation as well as variation over time in pupil-teacher ratios in the same school) and find that they can never reject the hypothesis that contract teachers are at least as effective in improving student learning as regular civil-service teachers. In fact, their point estimates typically suggest that the contract teachers are more effective than regular teachers who are more qualified, better trained, and paid five times higher salaries. Atherton find that the contract teachers produced better learning outcomes. Finally, data from Madhya Pradesh and Uttar Pradesh and find that contract teachers exert higher levels of effort than regular teachers with employment security (on measures of teacher attendance and engagement). It is also relevant to this discussion to highlight that all the four studies discussed in the previous section that found large positive effects on student learning outcomes of remedial instruction programs, used volunteer/informal/contract teachers with minimal formal training who were paid stipends that were at most one fifth of the salary of regular teachers. These results suggest that the superior work incentives of contract teachers may more than make up for . Kumar et al (2005) for an example of these criticisms. They also suggest that the binding constraint in translating increased education spending into improved learning outcomes may not be teacher training and qualifications (as is

commonly believed) but teacher effort, which is (relatively) weaker for civil service teachers with lifetime employment security because there is no reward for effort and performance under the status quo (and conversely, few consequences for poor performance).

Performance-Linked Pay

The discussions in this section suggest that improving governance is not just a matter of making better policies but also requires enhancements in the capacity of the government to effectively implement policies. Since the effort exerted by public sector employees is a key determinant of state effectiveness, a natural set of policy options to enhance governance in education would be to consider linking compensation of teachers as well as education administrators to measures of performance. Muralidharan and Sundararaman (2011b) present experimental evidence on the impact of a program in Andhra Pradesh that provided bonus payments to teachers based on the average improvement of their students' test scores in independently administered learning assessments (with a mean bonus of 3% of annual pay). At the end of two years of the program, students in incentive schools performed significantly better than those in control schools by 0.27 and 0.17 standard deviations in math and language tests respectively. Students in incentive schools also performed better on subjects for which there were no incentives, suggesting positive spillovers between improved performance on math and language and the untested subjects (science and social studies). Since the performance pay programs were implemented as a part of larger set of experimental evaluations costing the same amount, the authors are able to compare the relative effectiveness of input and incentive based approaches to improving learning outcomes. They find that the incentive schools performed significantly better than other randomly-chosen schools that received additional schooling inputs of a similar value. Also, as discussed earlier, Duflo, Hanna, and Ryan (2012) find that paying teachers on the basis of the number of days they attend work (as opposed to a flat salary that does not depend on performance) led to a halving of teacher absence rates (from 42% to 21%) and significant increases in student test scores (by 0.17 standard deviations). Finally, Muralidharan (2012) presents evidence from the longest-running experimental evaluation of a teacher performance pay program (spanning 5 years), and finds that students who completed their full five years of primary school under the individual teacher incentive program performed significantly better than those in control schools by 0.54 and 0.35 standard deviations in math and language tests respectively. The group teacher incentive program also had positive (and mostly significant) effects on student test scores, but the effect sizes were always smaller than that of the individual incentive program, and were not significant at the end of primary school for the cohort exposed to the program for five years. The paper estimates that the individual teacher performance pay program would be around 15 to 20 times more cost effective (including administrative costs) at improving learning outcomes than the default policy of reducing pupil-teacher ratios by hiring more teachers. Taken together, these results suggest that even modest changes to compensation structure to provide reward and recognition to teachers on the basis of objective measures of performance (such as attendance or increases in student test scores) can generate

substantial improvements in learning outcomes at a fraction of the cost of a 'business as usual' expansion in education spending.

Policy Recommendations

Policy formulation needs to consider technical, administrative, ethical, as well as political factors and even the best technical studies can only provide inputs into one dimension of policy making. For instance, many programs which may not be 'cost-effective', such as education for children with special needs, may nevertheless be consistent with normative principles of a just and humane society. Nevertheless, given budgetary pressures and the existence of several sectors that can claim an ethical basis for increased spending in a fiscally constrained environment (including health and food security), it becomes both morally and practically imperative to account for cost-effectiveness in questions of public policy. Improving the cost-effectiveness of social sector spending will allow a fiscally constrained state to do more in the social sector and improve both efficiency of spending as well as achieve greater equity in outcomes. The collection of evidence presented in the previous section suggests that there are several 'low-hanging' fruit for education policy that can improve learning outcomes at low cost. Since the majority of disadvantaged children (especially in rural India) still attend government run schools. Another source of a demand-side market failure can be the high discount rate of parents who may choose to not send their children to school because the benefits are too far in the future while the costs (both monetary and opportunity costs) are immediate. While the Right to Education Act seeks to limit this concern by making schooling compulsory till age 14, there may still be a role for demand-side interventions such as conditional cash transfers at later ages. However, we do not discuss this topic here because (a) the focus of this piece is on primary education, and (b) there is not much good evidence on the impact of conditional transfer programs in India, running of the government-school system. Implementation issues are - Make Learning Outcomes an Explicit Goal of Primary Education Policy The evidence on the key role of learning outcomes for both components of the "inclusive growth" agenda of the Government of India combined with the evidence on low levels and trajectories of learning should make it almost obvious that a key goal of primary education policy in India should be to measure and improve learning outcomes. Nevertheless, this seemingly obvious point is necessary to highlight because the current education policy framework pays almost no attention to it. Nowhere is this more visible than in the "Results Framework Document (RFD)" of the Ministry of Human Resource Development (MHRD). The RFD serves as the document that outlines the goals of MHRD for the year, and places weights on different priorities including access, equity, quality, and departmental processes. While these are all important goals to aspire towards, it is striking that there is no mention of learning outcomes in the most recent RFD for 2012-13. While 'quality' of education is given prominence, the document defines quality exclusively in terms of improving the 'inputs' into education – with most of the focus being on teacher training. This formulation is consistent with standard input-based conceptions of quality of education, but has almost no support in the data. In particular, there is no study that finds a

positive correlation between a teacher possessing a formal teacher training credential and measures of gains in learning of students taught by the teacher. This is not to suggest that teacher training and other inputs cannot be contributors to improving learning outcomes – but to highlight that these inputs in their current form do not seem to matter for improved learning outcomes. However, since there is no reason to think that the current policy framework envisages anything other than expanding training and other inputs in their current form, the evidence points to expecting that the future will not be very different from the past experiences.

The closest component of the RFD that relates to learning outcomes is "Assessment of Learners Under Saakshar Bharat" - but this is an adult education scheme. Of course, there is no guarantee that measuring learning outcomes will by itself lead to an improvement (for instance, 6 years of ASER reports showing consistently low levels of learning have not led to any noticeable changes in policy). But it is almost certain that not measuring outcomes will encourage the system to continue on its current course with poor transformation of inputs into outcomes. Several studies have documented that organizations (especially bureaucracies) are more likely to deliver on outcomes that get measured. India's own experience in education over the past decade supports this point, since there has been a significant improvement in input-based measures of quality (which were the stated policy goals). Thus, the starting point in the education policy agenda needs to be an inclusion of improving learning outcomes as an explicit goal of primary education policy with immediate effect.

Consider curricular reform to adjust for the vast variation in learning levels and/or provide additional instructional resources in early schooling years to disadvantaged children with a view to bridging learning gaps at an early age Muralidharan and Zieleniak (2013) show that the learning trajectories of students over time are substantially flatter than the rate of growth envisaged by the curriculum. It is therefore not surprising that a very large fraction of school-aged children complete primary education without having achieved even basic levels of learning. They also show that there is not only a large amount of variation in student learning levels at the end of grade 1, but that this variance grows over time. Indeed, as they note, the historical purpose of education systems in many developing countries may not have been to provide 'human capital' to all students as much as to screen gifted students for positions of responsibility in the state and the clergy. Since the teachers continue to follow the textbook as the default mode of instruction, and define their goals in terms of completing the curriculum over the course of year, it is not surprising that they are effectively 'teaching to the top' of the distribution and that a large number of children are in the class but not learning because the lesson is too advanced for them. While there is no direct test of this hypothesis in the Indian context, it is consistent with the findings of a large body of experimental evaluations of education interventions in India in the past decade. In particular, the finding that targeted remedial instruction programs have been highly effective in improving test scores in spite of being implemented by untrained and poorly paid volunteers, while large investments in teacher qualifications and training, PTR reductions,

and other investments in school infrastructure have not been found to be effective suggest that the 'business as usual' pedagogy is not conducive to improving learning outcomes effectively.

Banerjee et al (2012) experiment with different models of incorporating learning materials targeted to the initial levels of children into the regular schooling system in Bihar and Uttaranchal. They find that the only model that was successful was one where the instruction was provided in a summer camp, and conclude that the behavior of teachers in the classroom appears to be so deeply ingrained towards completing the 'regular' curriculum that it is difficult for them to deviate from that and modify their behavior towards incorporating the new materials in the classroom. Thus considerable additional work needs to be done to pilot and evaluate effective models of modifying pedagogy to reflect the need to cater to students who are falling behind. There is however already enough evidence to warrant the scaling up with public funds of programs that provide supplemental remedial instruction to children who need it through either after-school programs or through summer camps. The exact implementation models should be left to individual states to determine with the lessons from existing models and evaluations made available to them.

Contract teachers need not be like permanent adjunct faculty, but can be part of a performance-linked tenure track. Continuous training and professional development could be a natural component of this career progression, and integrating contract and regular teachers into a career path should help to address most of the concerns above, including the political economy ones.

Of course, these are not experimental estimates of the effect of increasing inspections, but the very robust findings of negative correlations between increased inspections and lower absence, suggests that even at the margins of the current system, increasing the frequency of supervisory visits to schools is likely to be a more cost effective way of increasing effective teacher-student contact time than hiring more teachers (as seen earlier).

Implementation

While the research to date suggests the four policy recommendations made here, it does not provide adequate guidance as to a possible implementation roadmap. There is now more and better evidence to support these recommendations, but the issues have not changed much in the past 5 years and have been clearly visible to experts in this area. The ASER reports have been saying essentially the same thing for seven years now – that learning levels are low in spite of high enrollments – but not much has changed in India's national education priorities (as starkly illustrated by an RFD that has no mention of learning outcomes).

The best approach for implementing reform agenda would be for the Central Government under the 12th Plan to prioritize learning outcomes and provide states with pools of flexible funding that will allow them to experiment with ways of improving learning outcomes in a cost-effective way. The Planning Commission

can help in knowledge-sharing by convening state education departments and providing them with summaries of relevant research; guidelines on what the research points to as effective ways of improving learning outcomes; and in working with states and other partners to design, implement, and evaluate district (or block) level pilots in re-orienting pedagogy and governance towards a better functioning education system. The next ten years will see the largest ever number of citizens in the Indian school system at any point in the country's history (or future), and it is critical that this generation that represents the demographic dividend be equipped with the literacy, numeracy, and skills needed to participate fully in a rapidly modernizing world. In a fiscally-constrained environment, it is also imperative to use evidence to implement cost-effective policies that maximize the social returns on any given level of public investment. The growing body of high-quality research on primary education in the past decade provides an opportunity to put this principle into practice.

References:

1.Accountability Initiative. 2012. PAISA Report. New Delhi: Center for Policy Research. Afridi, Farzana.

2.2010a. "Child Welfare Programs and Child Nutrition: Evidence from a Mandated School Meal Program in India." Journal of Development Economics no. 92:152-165. ———. 2010b.

3. The relative effectiveness and costs of contract and regular teachers in India. Institute of Education, University of London. Banerjee, Abhijit, Rukmini Banerji, Esther Duflo, Rachel Glennerster, and Stuti Khemani. 2010.

4.The Long-Term Impact of Teachers: Teacher Value-Added and Student Outcomes in Adulthood. Harvard. Chin, Aimee. 2005.

5.Technology and Child Development: Evidence from the One Laptop Per Child Program. IZA Discussion Paper 6401. Das, Jishnu, Stefan Dercon, James Habyarimana, Pramila Krishnan, Karthik Muralidharan, and Venkatesh Sundararaman. 2013.

6. "India shining and Bharat drowning: Comparing two Indian states to the worldwide distribution in mathematics achievement." Journal of Development Economics no. 92:175-187. .Desai, Sonalde, Amaresh Dubey, Reeve Vanneman, and Rukmini Banerji. 2009.

7."Private Schooling in India: A New Educational Landscape." In India Policy Forum, edited by Suman Bery, Barry Bosworth and Arvind Panagariya. New Delhi: Sage. Duflo, Esther. 2001.

8."Teacher Absence in India: A Snapshot." Journal of the European Economic Association no. 3 (2-3):658-67. Kumar, Krishna, Manisha Priyam, and Sadhna Saxena. 2005.

9.Muralidharan, Karthik. 2011. "India's States Can be Laboratories for Policy Innovation." Business Standard, December 12, 2012.

10.Long Term Effects of Teacher Performance Pay: Experimental Evidence from India. UC San Diego. Muralidharan, Karthik, Jishnu Das, Alaka Holla, Michael Kremer, and Aakash Mohpal. 2013.

11.Pratham. 2012. Annual Status of Education Report. Pritchett, Lant. 2012.

12.The first PISA results for India: The end of the beginning. edited by Ajay Shah. Pritchett, Lant, and Amanda Beatty. 2012.

13.Making Primary Education Work for India's Rural Poor: A Proposal for Effective Decentralization. In Social Development Papers: South Asia Series. New Delhi: World Bank. PROBE Team. 1999.

14.Public Report on Basic Education in India. New Delhi: Oxford University Press. Raina, Vinod. 2013.

15."Teachers, Schools, and Academic Achievement." Econometrica no. 73 (2):417-58. Rockoff, Jonah E. 2004.

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