

CONTRACT TEACHERS: EXPERIMENTAL EVIDENCE FROM INDIA

Karthik Muralidharan and Venkatesh Sundararaman
September 2008

Central European University
Program Evaluation Spring 2010

Arailym Kadyrova
Katalin Springel

25th May, 2010

The program



- Extra Contract Teacher program (ECT)
 - ▣ Part of AP RESt project, study of 4 policy options
- Location
 - ▣ Andhra Pradesh state of India
- Timeline
 - ▣ Between 2005 and 2007
- Objectives
 - ▣ Improving quality of primary education
- Data collection
 - ▣ Test scores on math and language (Telugu), teacher attendance, teaching activity, assignment of extra contract teacher

The program design



- Evaluation of “as is” expansion of contract teacher policy
- Mechanism for program impact
- Intent-to-treat effect
- Randomization
- Generalized difference-in-differences regressions
 - ▣ Simple
 - ▣ Subject based

Evaluation questions



- Effects on students
 - ▣ Impact on student learning outcome
 - ▣ Extent of impact depending on grade

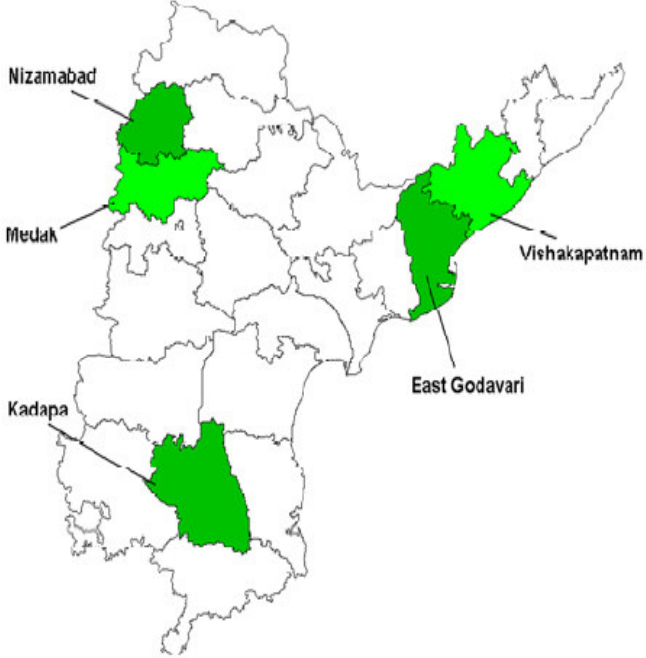
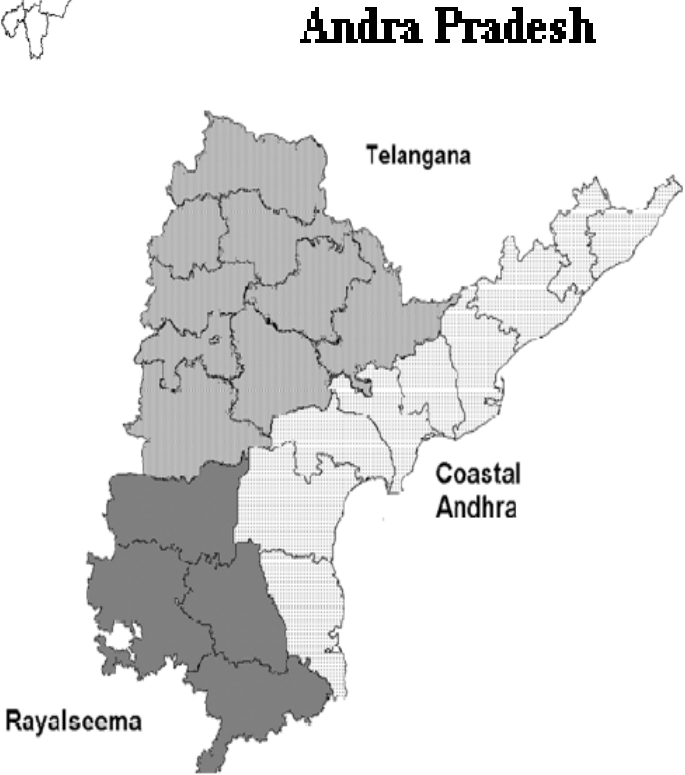
- Effects on teachers
 - ▣ Behaviour of contract teachers versus regular teachers
 - ▣ Influence of extra contract teacher on regular teachers

Randomized experiment



- Random assignment of schools (external validity)
- Random assignment of treatment (internal validity)
 - ▣ 100-100 schools in the treatment and in the control group

Geographic distribution of sample



Evidence on randomization

	Comparison schools	ECT Schools	P-value
<u>School-level variables</u>			
Total Enrollment (Baseline: Grades 1-5)	113.2	104.6	0.41
Total Test-takers (Baseline: Grades 2-5)	64.9	62.0	0.59
Number of teachers	3.07	2.83	0.24
Pupil-Teacher Ratio	39.5	39.8	0.94
Infrastructure Index (0-6)	3.19	3.13	0.84
Proximity to Facilities Index (8-24)	14.65	14.97	0.55
<u>Baseline Test Performance</u>			
Math (Raw %)	18.4	17.3	0.33
Telugu (Raw %)	35	34.1	0.63

Econometric specification

$$T_{ijkm}(Y_n) = \alpha + \gamma \cdot T_{ijkm}(Y_0) + \delta \cdot ECT + \beta \cdot Z_m + \varepsilon_k + \varepsilon_{jk} + \varepsilon_{ijk}$$

where i, j, k, m denote student, grade, school and mandal respectively

T_{ijkm} – normalized test score on specific test

Y_0 – baseline tests, Y_n – test at the end of n years

Z_m – mandal-level dummies

Attrition bias

Further specifications

Results (1) – Impact of ECT program on Test Scores

Impact of Extra Contract Teacher on Student Test Scores (Combined Results)

	Year 1 on Year 0		Year 2 on Year 1		Year 2 on Year 0	
	(1)	(2)	(1)	(2)	(1)	(2)
Normalized Lagged Test Score	0.51*** (0.016)	0.51*** (0.015)	0.55*** (0.013)	0.57*** (0.015)	0.46*** (0.016)	0.46*** (0.016)
ECT School	0.09** (0.035)	0.09** (0.034)	0.09** (0.034)	0.06 (0.04)	0.12*** (0.045)	0.11** (0.045)
School & Household Controls	No	Yes	No	Yes	No	Yes
Observations	44506	41658	57185	35875	32894	30347
R-squared	0.32	0.35	0.29	0.32	0.23	0.25

Dependent variable: Normalized End of Year Test Score

(1) Without household&school controls (2) With household&school controls

Results (2) – Heterogeneous treatment effects by grade

Impact of Extra Contrat Teacher by Grade

	Combined			Math			Telugu		
	Y1 on Y0	Y2 on Y1	Y2 on Y0	Y1 on Y0	Y2 on Y1	Y2 on Y0	Y1 on Y0	Y2 on Y1	Y2 on Y0
ECT* Grade 1	0.205 (0.078)	0.269 (0.069)		0.239 (0.082)	0.221 (0.067)		0.173 (0.079)	0.137 (0.081)	
ECT* Grade 2	0.175 (0.058)	-0.046 (0.06)	0.122 (0.071)	0.188 (0.063)	-0.05 (0.07)	0.111 (0.08)	0.163 (0.062)	-0.041 (0.06)	0.13 (0.069)
ECT* Grade 3	0.037 (0.05)	0.109 (0.056)	0.197 (0.073)	0.072 (0.06)	0.164 (0.069)	0.245 (0.084)	0.003 (0.05)	0.055 (0.05)	0.15 (0.07)
ECT* Grade 4	0.107 (0.046)	0.076 (0.044)	0.067 (0.06)	0.155 (0.056)	0.101 (0.058)	0.103 (0.07)	0.058 (0.05)	0.052 (0.04)	0.03 (0.062)
ECT* Grade 5	-0.021 (0.05)	0.057 (0.05)	0.114 (0.052)	-0.056 (0.06)	0.073 (0.06)	0.161 (0.067)	0.015 (0.06)	0.044 (0.05)	0.06 (0.05)
Observations	44506	57185	32894	22124	28553	16374	22382	28632	16520
R-squared	0.33	0.3	0.24	0.32	0.26	0.22	0.36	0.34	0.27

Dependent variable: Normalized Endline Test Score

Results (3)



- Heterogeneous treatment effects by other school/student characteristics
- Behaviour of Contract Teachers versus Regular Teachers

Conclusions of the Study

- Adding a contract teacher significantly improved average learning outcomes in treatment schools, and especially benefited the children in grade 1 and those in more remote areas.
- Contract teachers show superior performance on measures such as attendance and teaching activity.



Expanding the use of contract teachers could be a highly cost effective way of improving education outcomes

The Evaluation of the Evaluation Study



Do we believe the results? YES

→ Randomization (external & internal validity)

Remaining questions

- Relative effectiveness of contract and regular teachers, optimal ratio of the two types



Thank you for your attention!

Questions?