Working paper

International Growth Centre

Education Policies and Practices

What Have We Learnt and the Road Ahead

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Objective of the Paper

- Study the status of education (both quality and quantity) in Bihar both in absolute terms and in relation to other states in India
- Quantify the correlates of educational outcomes using state level data
- Survey the literature on the effectiveness of education policies adopted in different parts of the world to improve both the "*quantity*" and "*quality*" of education.
- Survey the policies adopted by the government of Bihar towards improving educational outcomes in the state.
  - Place these policies appropriately in our broader survey framework to make this work a contextual survey.
- Identify best practices in education policies and make policy recommendations for Bihar

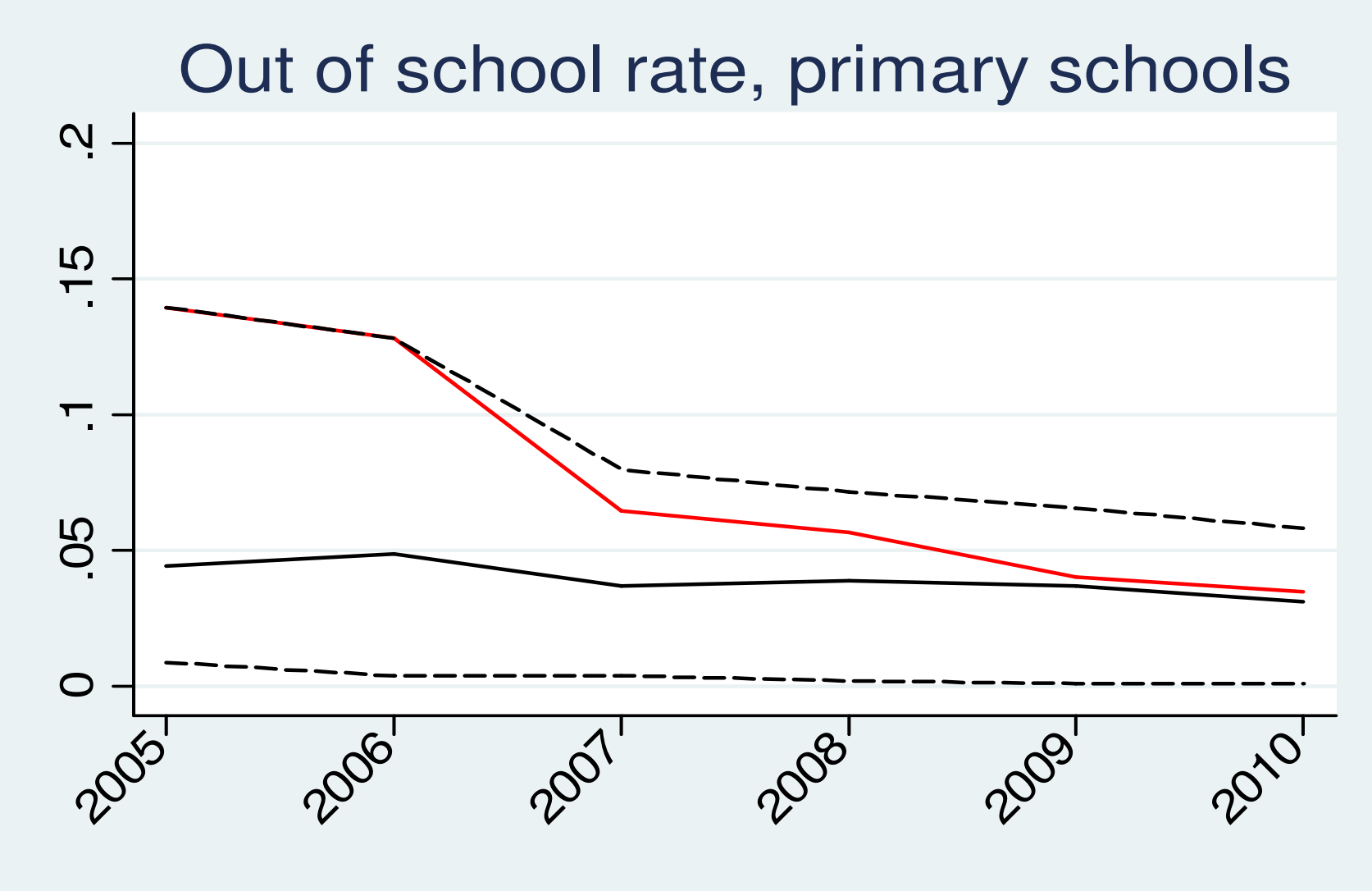
Status of Education in Bihar: Quantity measures

Out of School Rate (source: ASER)

Net Enrolment Ratio (DISE)

In all graphs-
Dashed lines – minimum and maximum of 20 states with non-missing data
Solid black line – median of 20 states with non-missing data
Solid red line – Bihar

Status of Education in Bihar



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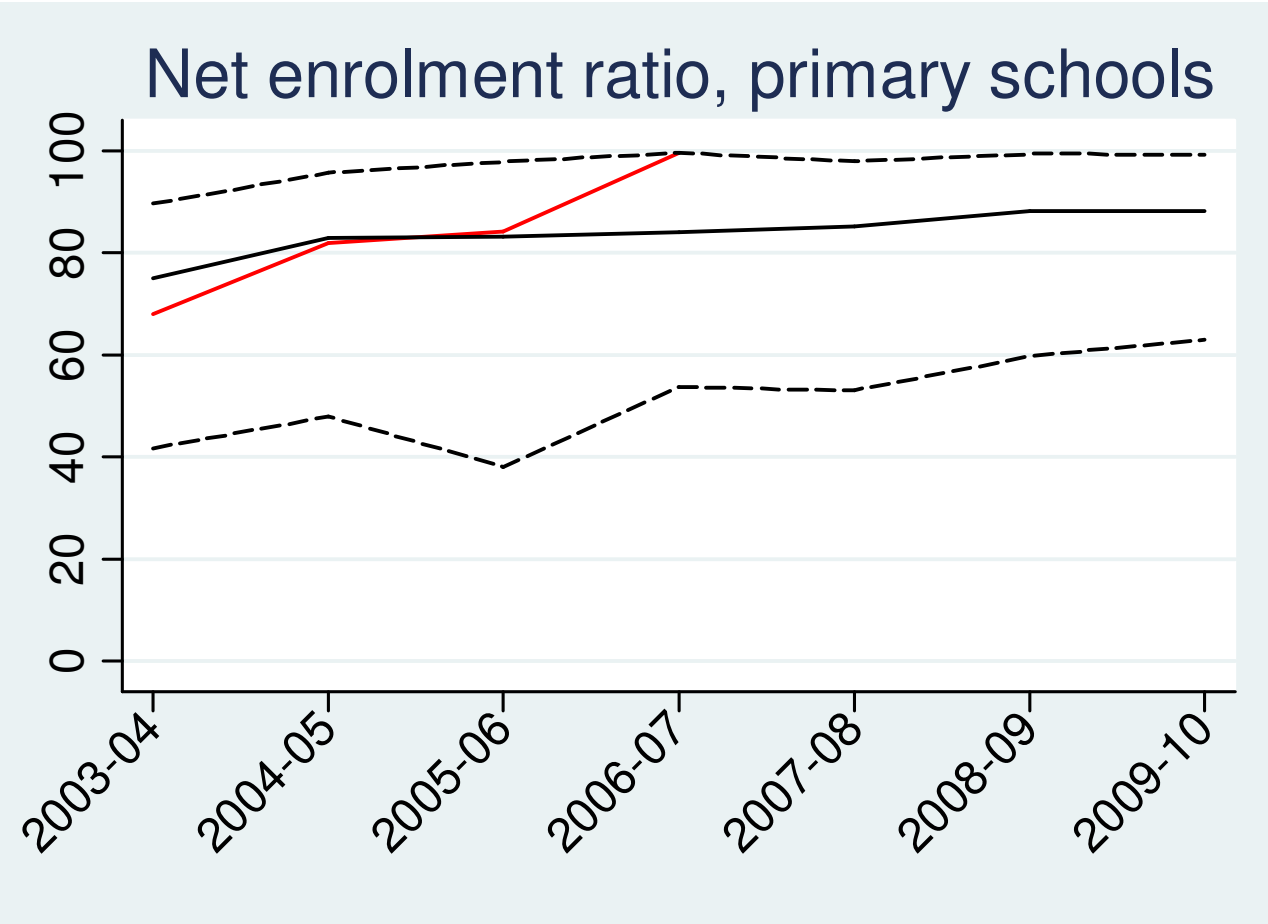
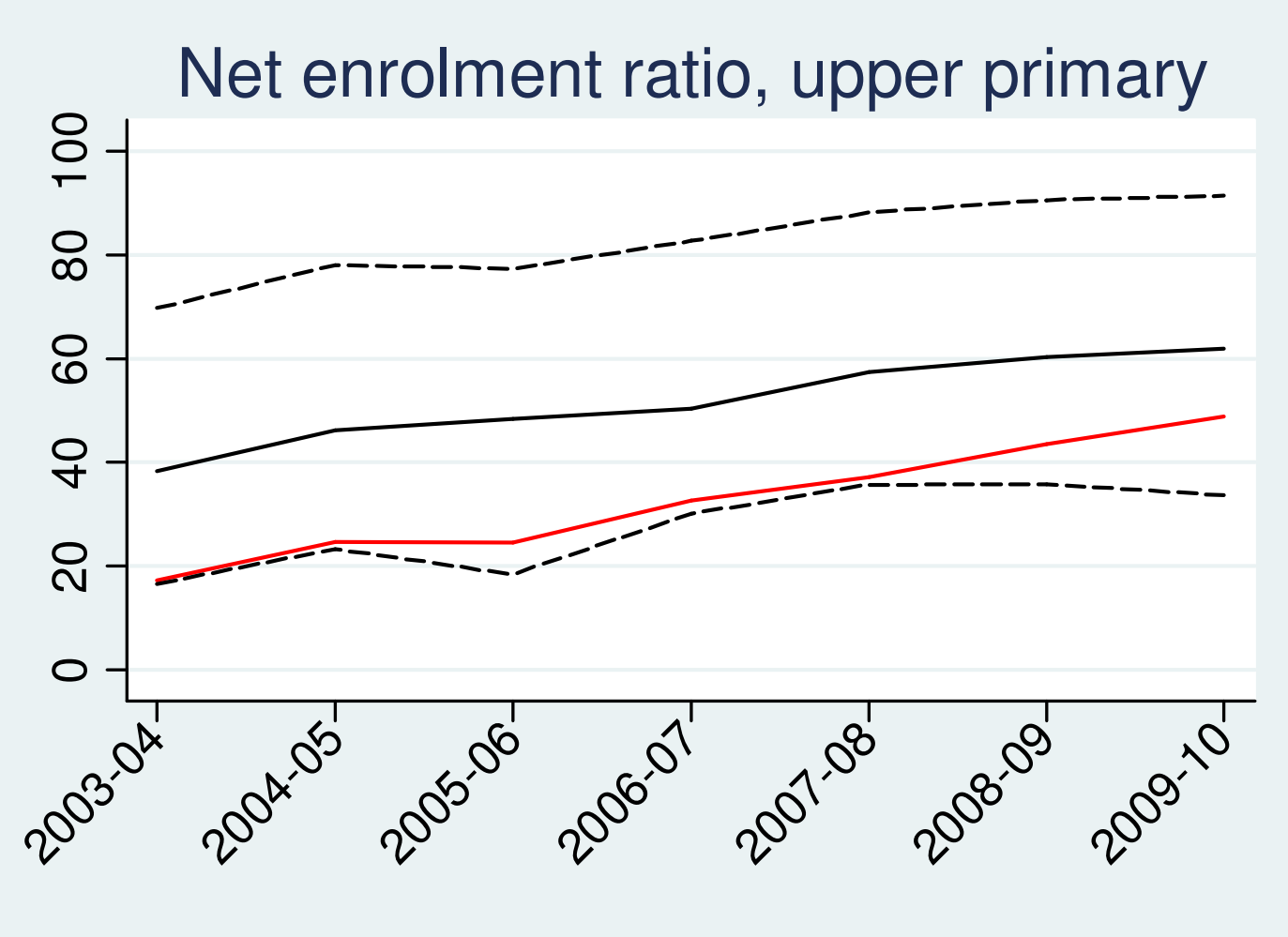


Note: NER missing for Bihar starting 2007-08.

Status of Education in Bihar



Summary of Evidence on Quantity

- Out of school rate higher than the median, but declining over time and converging to the median
  - Gap with the best performing states significant
- Enrolment ratio at primary level above the median starting in 2006-07
  - Near universal primary enrolment
- Enrolment ratio at upper primary level still very low (right at the bottom in India)

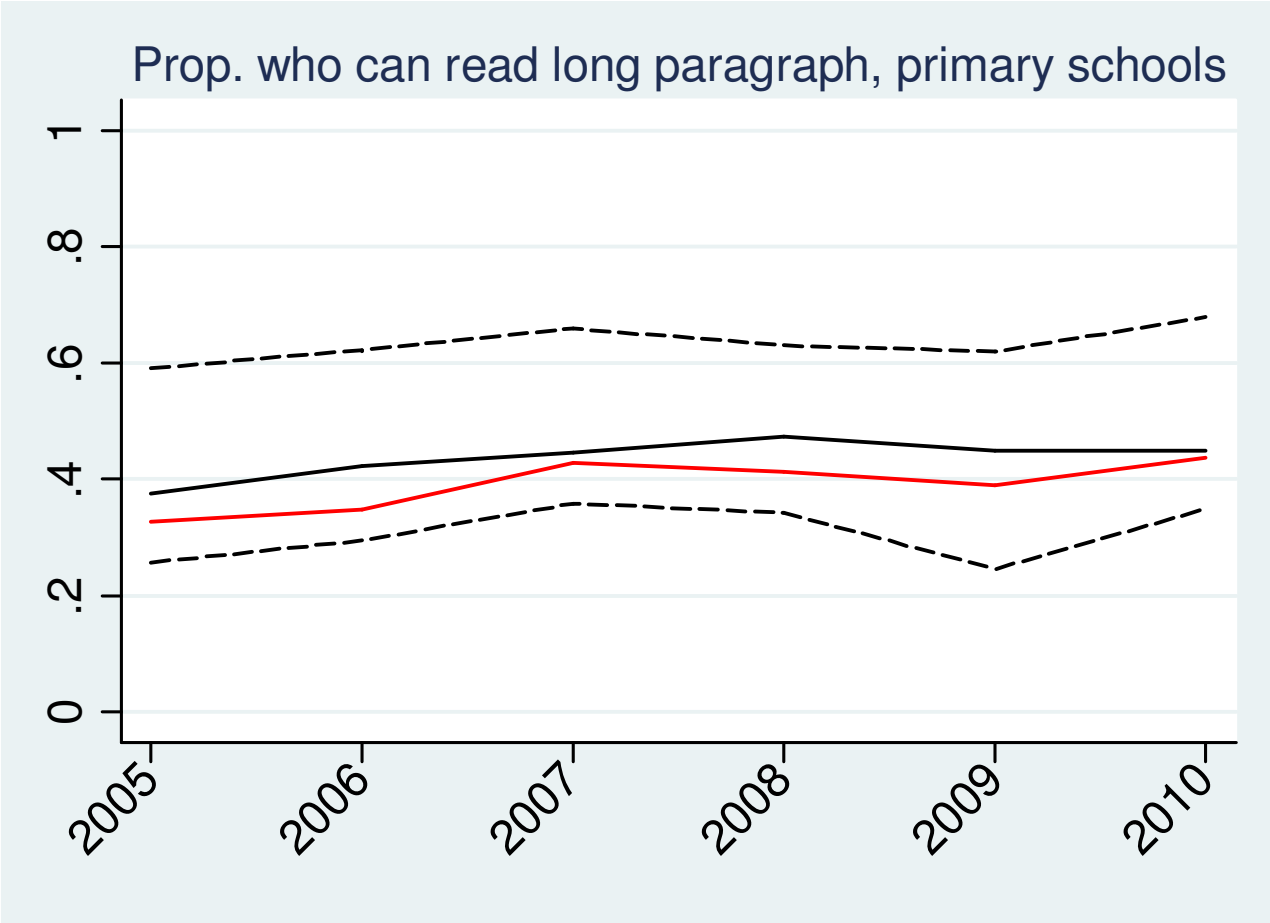
Status of Education in Bihar: Quality measures

Can read long paragraph,

Can solve division problem

(Source: ASER)

Status of Education in Bihar



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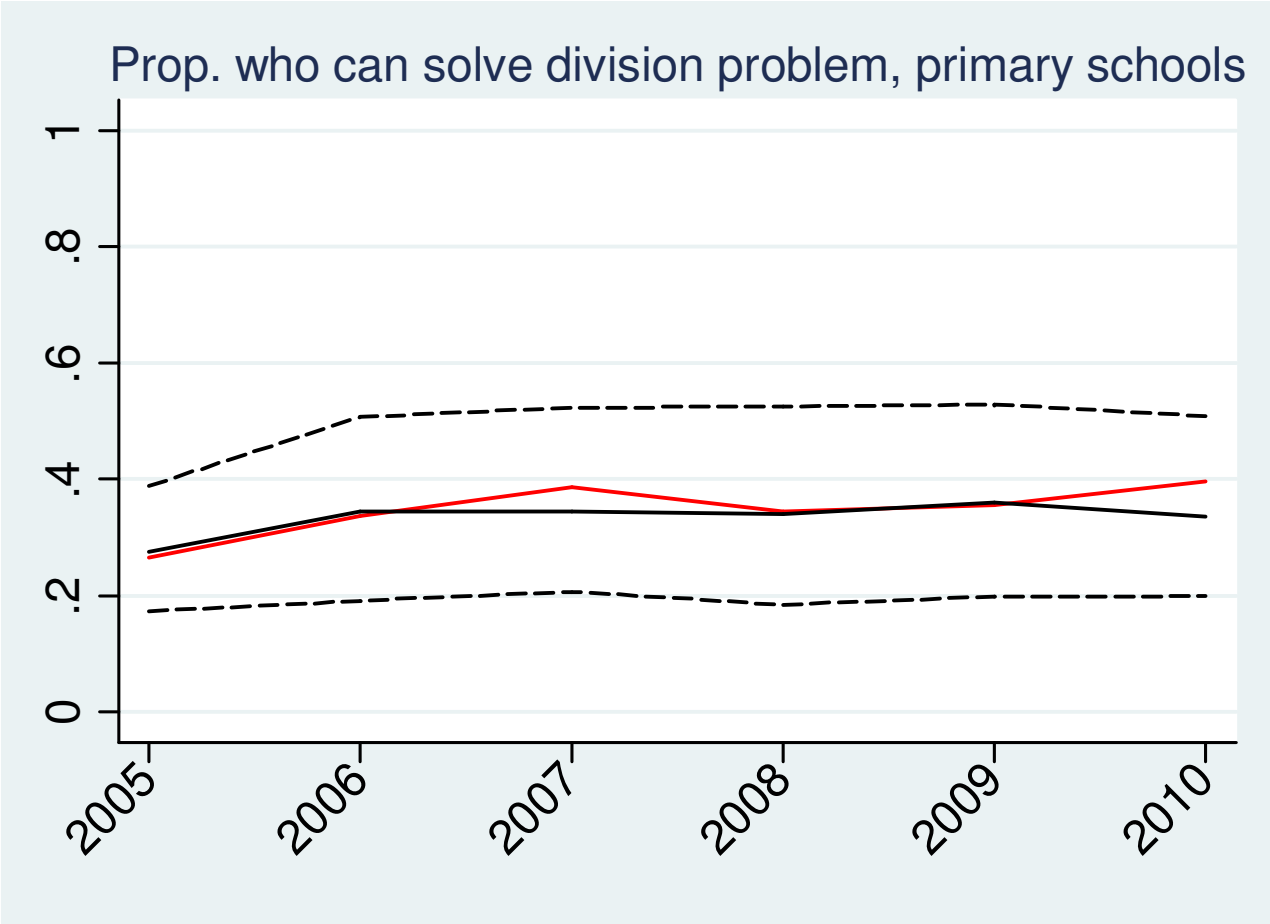


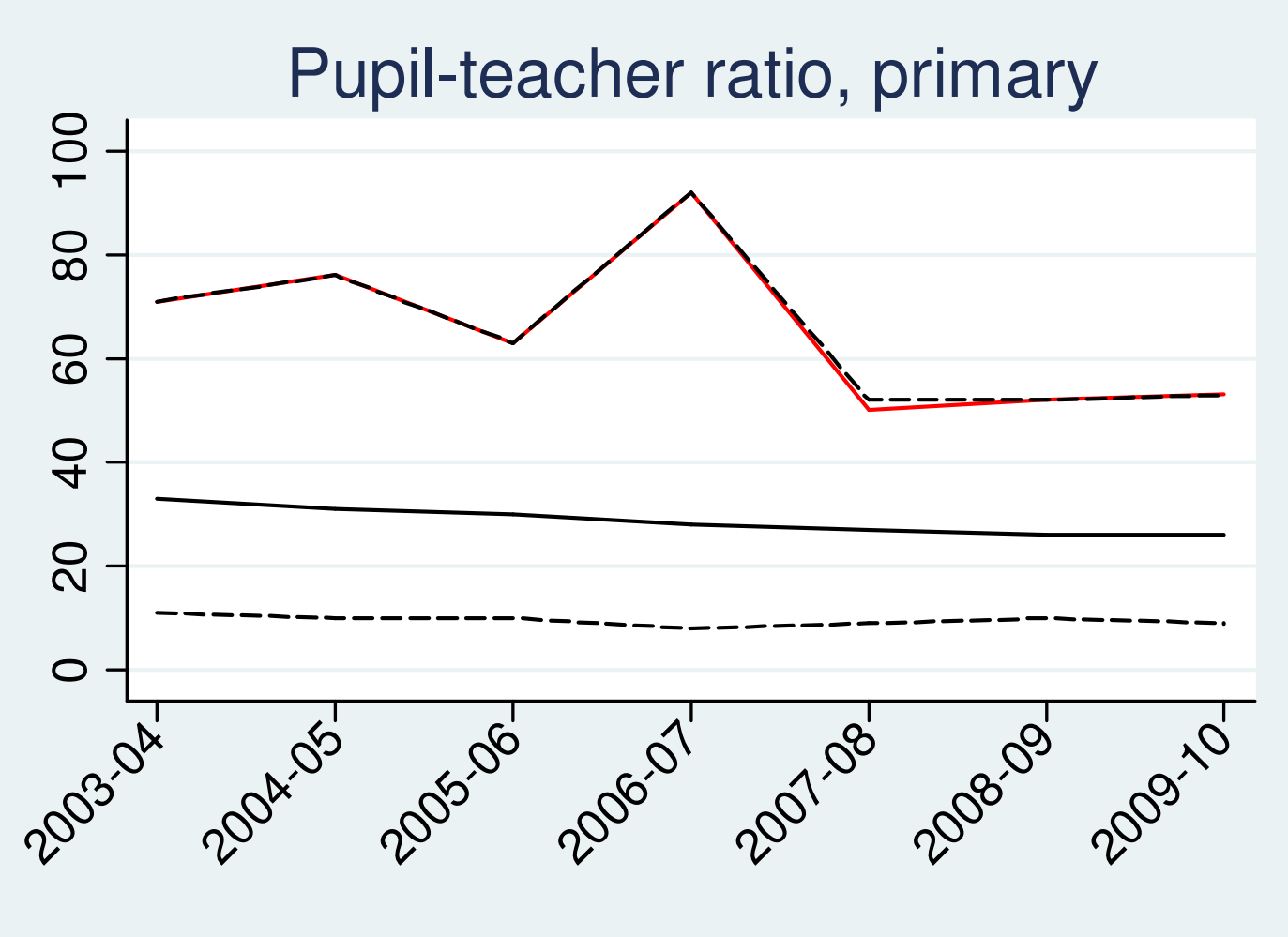
Summary of evidence on quality

- In “reading” Bihar slightly below the median
- In math skills, Bihar very close to the median
- In both reading and math skills, the gap with the best performers is substantial
  - Some evidence of narrowing of gap in recent years
  - In absolute terms, not very satisfactory
    - 30% of students in class VI cannot not read a paragraph taken from a class II textbook
    - 50% of class V students cannot solve a simple division problem

Proximate Determinants of Low Schooling Attainment: Schooling Inputs

pupil-teacher ratio,
student-classroom ratio,
no. of teachers per school,
Proportion of classrooms in good condition
% schools with common toilet,
% schools with girls' toilet,
% schools with drinking water facility
Source: DISE

Schooling Inputs: Primary Schools



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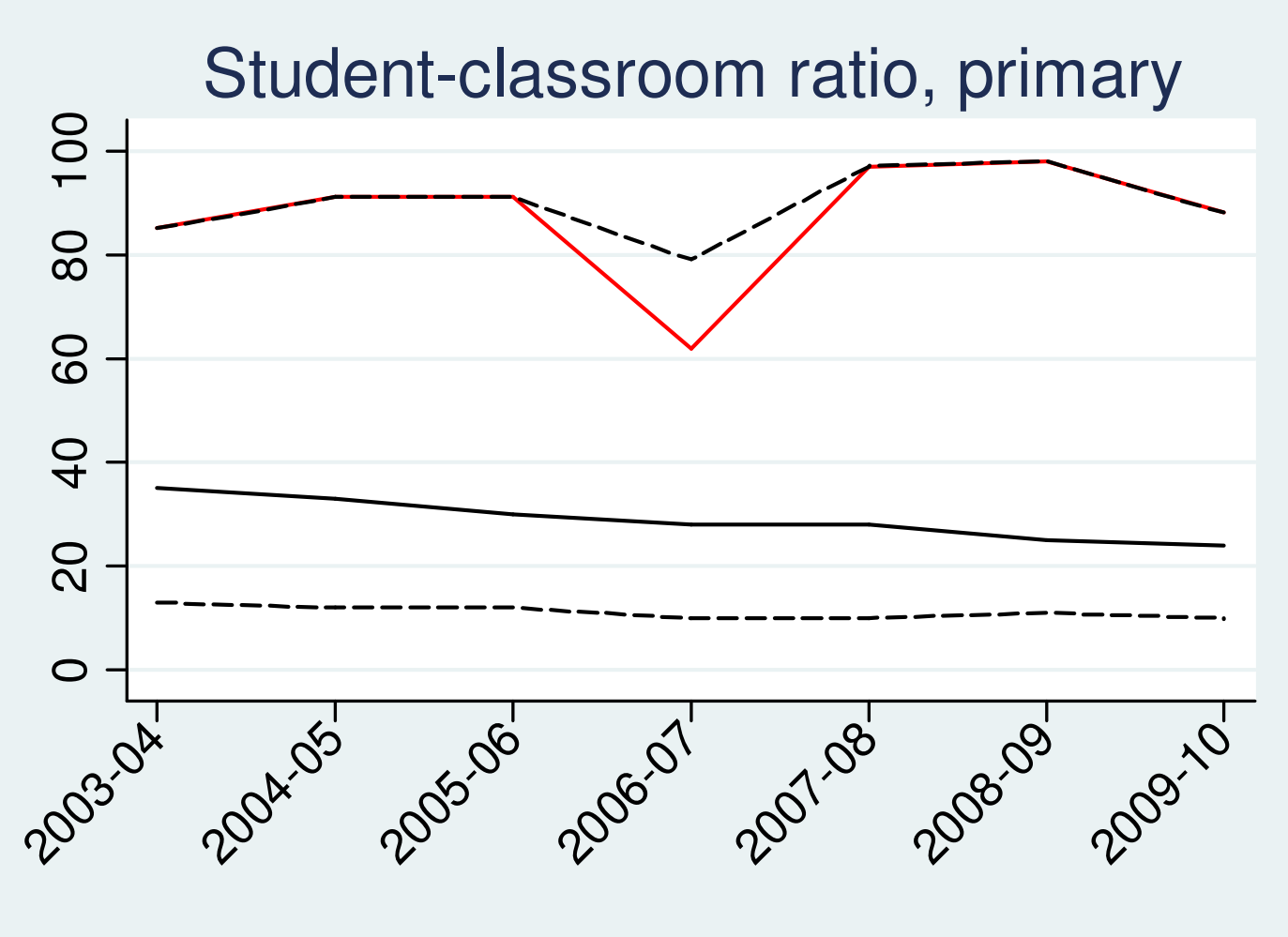

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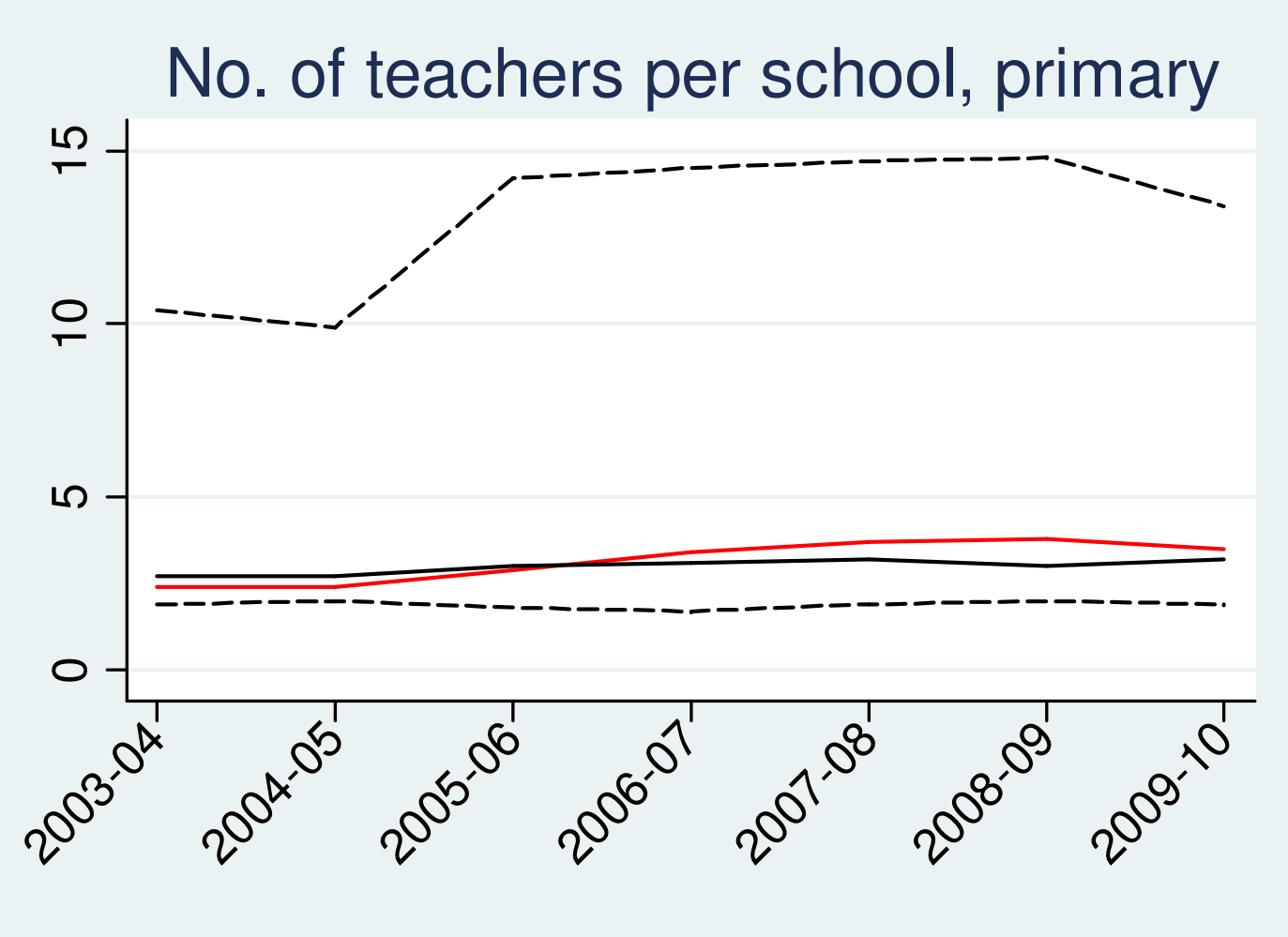

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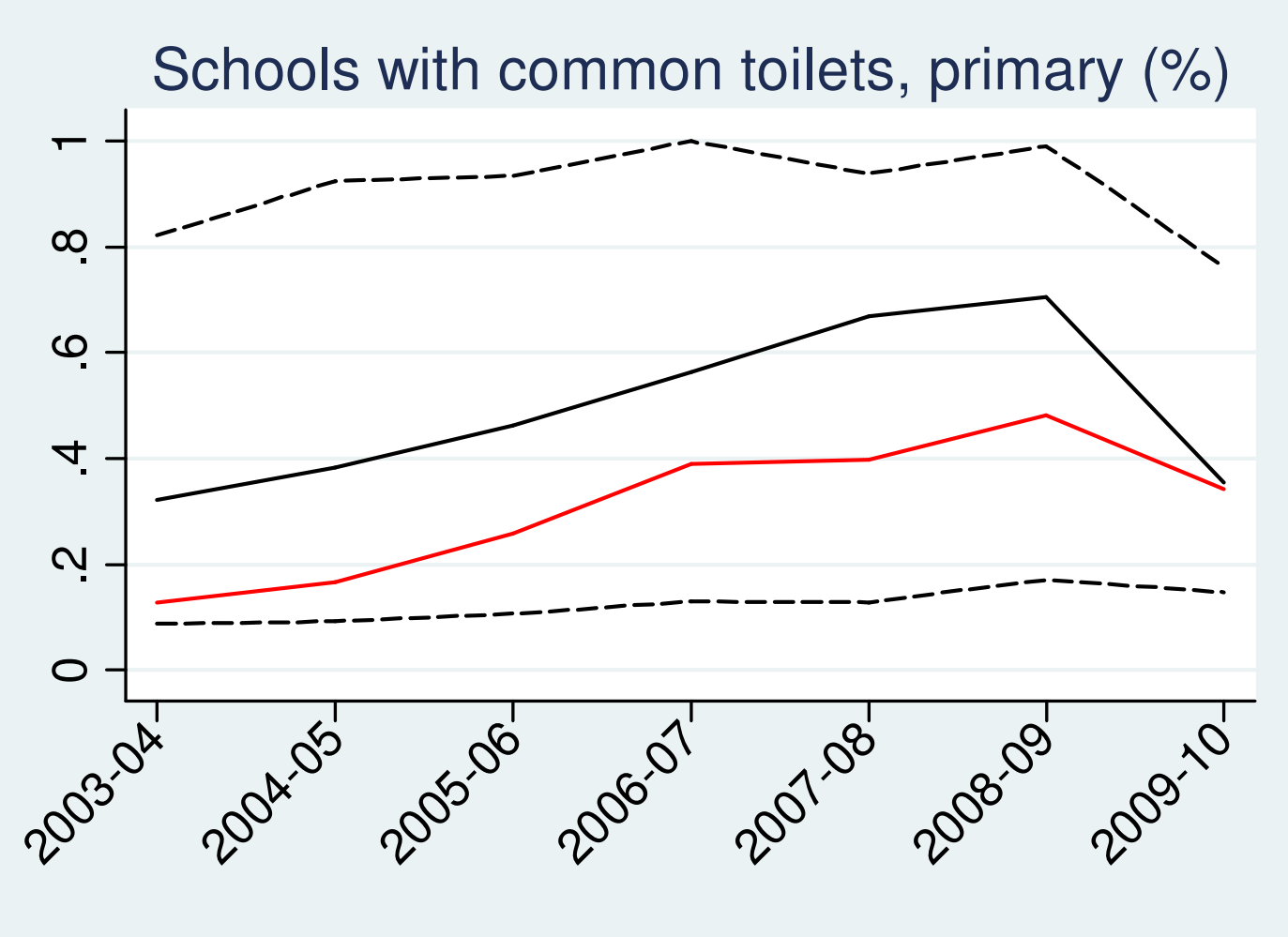

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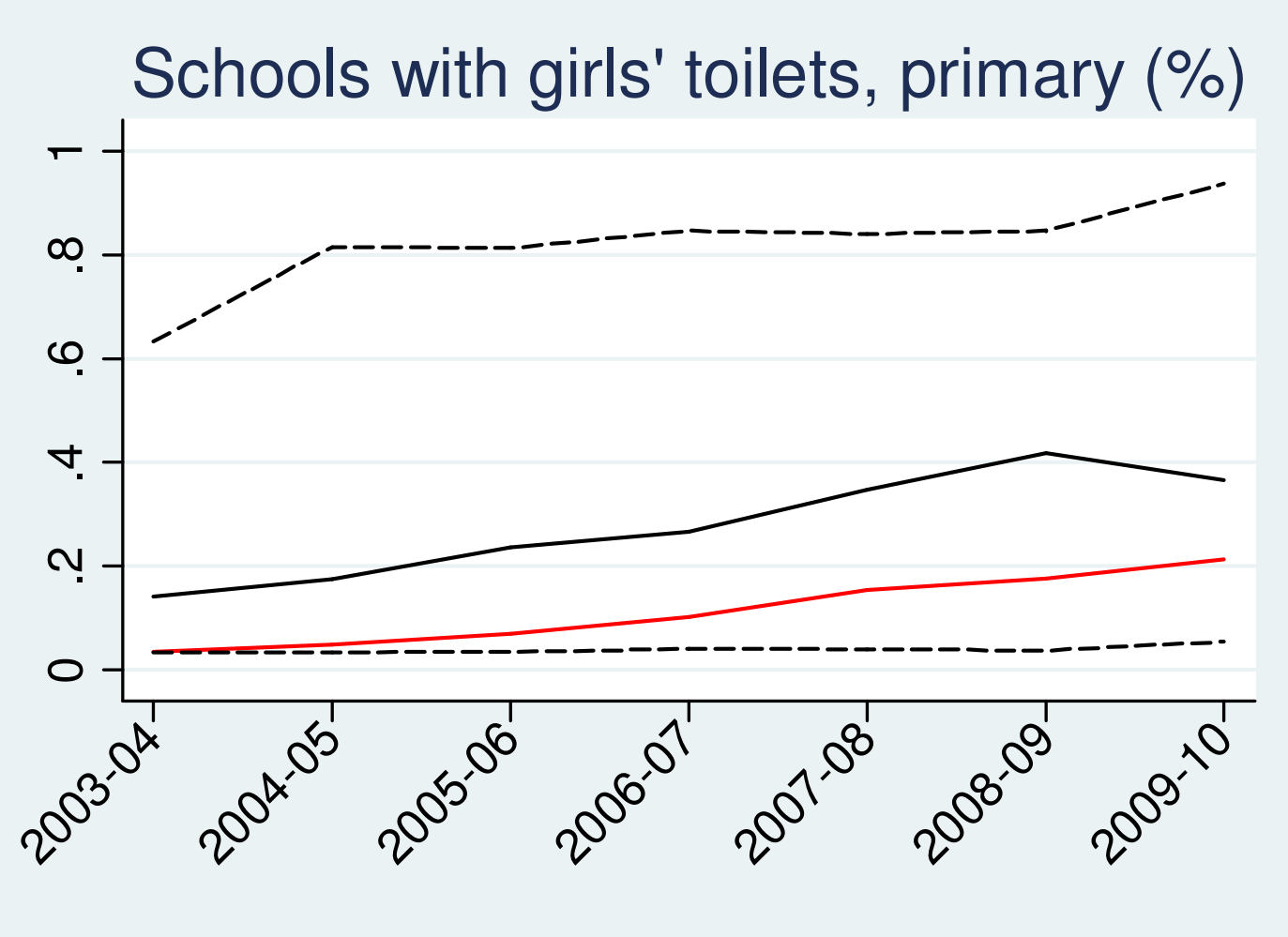

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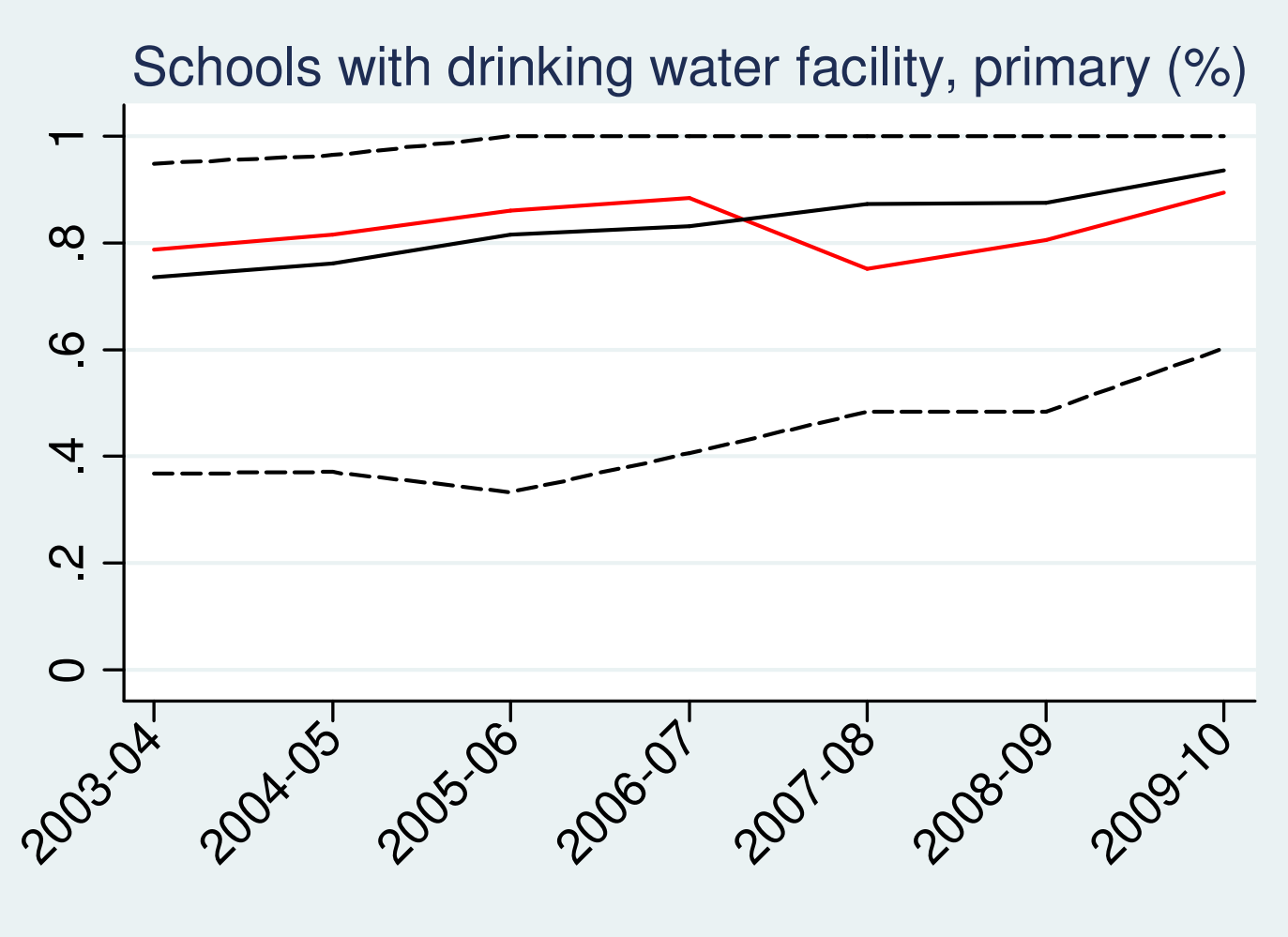

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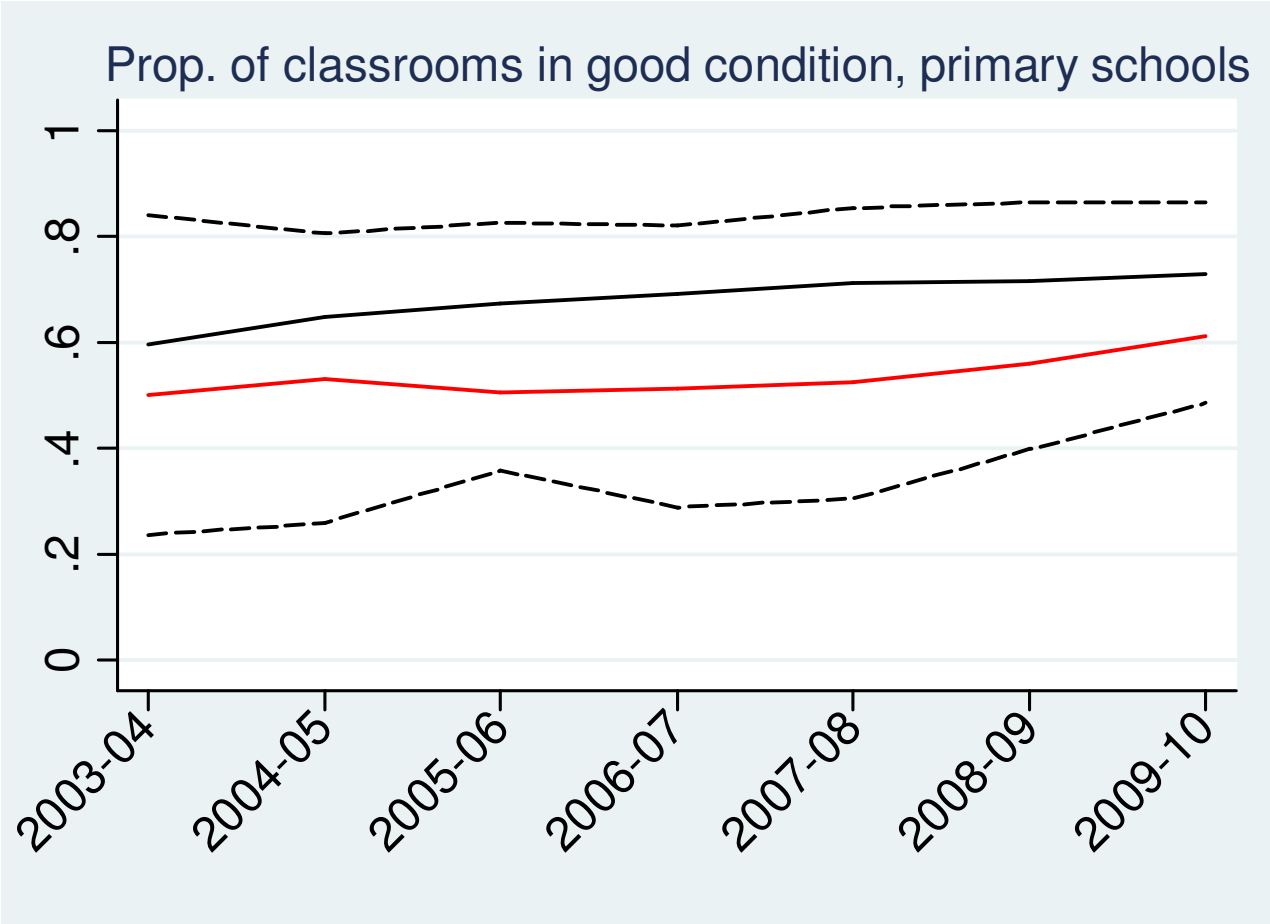

Summary of evidence on schooling inputs

- Primary schools
  - Highest pupil-teacher ratio as well as student-classroom ratio among Indian states
  - Number of teachers per school low, but has become higher than the median
  - % of schools with toilets or separate girls toilet well below the median
  - Surprisingly, % of schools with drinking water facility has gone down from above median to below it
- Somewhat similar story for upper primary schools

Correlation (inputs and outcomes)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
% Can read long paragraph (A)	1.00								
% Can solve division problem (B)	0.82	1.00							
Out of school rate (C)	-0.53	-0.32	1.00						
Pupil-teacher ratio (D)	-0.35	-0.09	0.55	1.00					
Student-classroom ratio (E)	-0.37	-0.13	0.53	0.81	1.00				
% Schools with toilet (F)	0.28	0.20	-0.39	-0.08	-0.28	1.00			
% Schools with girls' toilet (G)	0.32	0.22	-0.35	-0.03	-0.28	0.71	1.00		
Schools with drinking water facility (H)	0.40	0.36	-0.37	0.08	-0.20	0.43	0.67	1.00	
% Classrooms in good condition (I)	0.13	0.04	-0.37	-0.09	-0.29	0.38	0.57	0.40	1.00

Summary of correlation table

- Pupil-teacher ratio and student-classroom ratio negatively associated with learning attainment
- Quality of schooling infrastructure positively associated with learning
- Pupil-teacher ratio and student-classroom ratio positively associated with out of school rate
- Quality of schooling infrastructure negatively associated with out of school rates

Regression Analysis

Correlates of Reading

	Dependent variable: Proportion who can read long paragraph					
Independent variables:	All		Boys		Girls	
Pupil-teacher ratio	-0.0035 **	0.0010	-0.0022 *	-0.0004	-0.0038 **	-0.0003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Student-classroom ratio	0.0005	0.0003	0.0003	-0.0002	0.0001	-0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
% Schools with toilet	0.0407	-0.0006	0.0040	0.0390	0.0564	0.0414
	(0.047)	(0.046)	(0.045)	(0.036)	(0.047)	(0.035)
% Schools with girls' toilet	0.0185	0.0310	0.0121	-0.0626	-0.0092	-0.0540
	(0.058)	(0.065)	(0.055)	(0.054)	(0.056)	(0.053)
% Schools with drinking water facility	0.3551 ***	0.0145	0.3290 ***	0.1336	0.4057 ***	0.1731
	(0.090)	(0.106)	(0.089)	(0.095)	(0.092)	(0.094)
% Classrooms in good condition	-0.0816	-0.1464	-0.0003	-0.0015	-0.0007	-0.0008
	(0.066)	(0.105)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.2706 **	0.4505 ***	0.2805 ***	0.4664 ***	0.2806 **	0.3885 **
	(0.081)	(0.130)	(0.082)	(0.118)	(0.085)	(0.117)
Year and state fixed effects	No	Yes	No	Yes	No	Yes
Adj. R-squared	0.287	0.783	0.217	0.854	0.386	0.896
No. of observations	119	119	99	99	99	99

Correlates of Reading

- Lower pupil-teacher ratio associated with higher reading attainment
- Availability of drinking water facility associated with higher reading attainment
- The above relationships hold when looking at reading attainment of boys and girls separately
- Statistical significance goes away in fixed effect regression
  - Results driven by cross-state variation rather than within-state

Correlates of Math

	Dependent variable: Proportion who can solve division problem					
Independent variables:	All		Boys		Girls	
Pupil-teacher ratio	-0.0018	0.0022	-0.0005	0.0009	-0.0019	0.0014
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Student-classroom ratio	0.0008	0.0010	0.0003	0.0003	0.0002	0.0006
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
% Schools with toilet	0.0472	0.0332	0.0107	0.0497	0.0387	0.0508
	(0.052)	(0.047)	(0.053)	(0.044)	(0.053)	(0.044)
% Schools with girls' toilet	-0.0162	0.0625	-0.0237	0.0029	-0.0409	0.0298
	(0.064)	(0.066)	(0.063)	(0.067)	(0.063)	(0.066)
% Schools with drinking water facility	0.3642 ***	-0.0923	0.3500 **	-0.0668	0.4260 ***	-0.0587
	(0.100)	(0.108)	(0.103)	(0.118)	(0.104)	(0.116)
% Classrooms in good condition	-0.0932	-0.0743	-0.0007	-0.0010	-0.0009	-0.0004
	(0.073)	(0.106)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.1041	0.2760 *	0.1441	0.4479 **	0.1238	0.3589 *
	(0.090)	(0.132)	(0.096)	(0.147)	(0.096)	(0.144)
Year and state fixed effects	No	Yes	No	Yes	No	Yes
Adj. R-squared	0.126	0.777	0.091	0.807	0.190	0.835
No. of observations	119	119	99	99	99	99

Correlates of Math

- Availability of drinking water facility positively associated with math attainment
- Again, the relationship holds separately for both boys and girls
- Relationship driven by cross-state variation rather than within state variation

Correlates of out of school rate

	Dependent variable: Out of school rate					
Independent variables:	All		Boys		Girls	
Pupil-teacher ratio	0.0016 ***	0.0001	0.0015 ***	-0.0011 **	0.0020 ***	-0.0009
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Student-classroom ratio	-0.0004	-0.0004	-0.0005 *	-0.0012 ***	-0.0007 *	-0.0011 **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
% Schools with toilet	-0.0343 **	-0.0127	-0.0183	-0.0114	-0.0545 **	-0.0198
	(0.011)	(0.014)	(0.013)	(0.013)	(0.018)	(0.016)
% Schools with girls' toilet	0.0219	-0.0288	0.0046	-0.0504 *	0.0328	-0.0586 *
	(0.014)	(0.020)	(0.016)	(0.019)	(0.021)	(0.024)
% Schools with drinking water facility	-0.0955 ***	0.0387	-0.1013 ***	0.0369	-0.1310 ***	0.0456
	(0.021)	(0.032)	(0.026)	(0.034)	(0.035)	(0.043)
% Classrooms in good condition	-0.0408 *	-0.0458	-0.0007 ***	-0.0012 ***	-0.0002	-0.0011 *
	(0.016)	(0.032)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.1186 ***	0.0854 *	0.1582 ***	0.2207 ***	0.1602 ***	0.2186 ***
	(0.019)	(0.039)	(0.024)	(0.042)	(0.032)	(0.053)
Year and state fixed effects	No	Yes	No	Yes	No	Yes
Adj. R-squared	0.520	0.763	0.457	0.849	0.328	0.837
No. of observations	119	119	99	99	99	99

Correlates of out of school rate

- Availability of (common) toilet, drinking water facility and well-maintained classrooms are associated with lower out of school rate (higher school attendance).
- The cross-sectional relationships hold for both boys and girls separately
- Regressions with state fixed effects show that
  - States which have improved classrooms have lowered out of school rates
  - States which have increased the % of schools with separate girls' toilet have improved girls' enrolment

Correlates of out of school rate

- Pupil-teacher ratio
  - Cross-sectional relationship shows that States with lower pupil-teacher ratio also have lower out of school rate (higher school enrolment)
  - Fixed effect estimate shows that States where pupil-teacher ratio has increased, out of school rate has decreased (enrolment has increased)
    - Reverse causality: states with greater enrolment drive haven't had a commensurate increase in the hiring of teachers

Overall summary

- Bihar has made substantial progress on the “quantity” front at primary level
- Enrolment at upper primary level still very low
- In reading and math, Bihar’s performance satisfactory in relative terms, but weak in absolute terms
  - For example, 30% of students in class VI could not read a paragraph taken from a class II textbook
  - 50% of class V students cannot solve a simple division problem
- Record on the schooling input front weak in both relative and absolute terms
  - Schooling input provision hasn’t kept pace with enrolment
  - Policy should focus on improving schooling input

Work in progress: survey part

I. Increase enrollment in schools

- Supply-side interventions
  - Classroom availability and accessibility
  - Complementary facilities
  - Primary and secondary facilities balance
- Demand-side interventions
  - Reduce cost §
    - Subsidized or free uniforms, bicycles (augment supply-side), school supplies § Scholarships § Vouchers for private schools, especially if public schools can't accommodate all eligible students
  - Increase perceived benefit §
    - Information provision on returns to schooling and job opportunities

Work in progress: survey part

II. Sustain enrollment and grade progression

- Health-related interventions
  - Immunization
  - Deworming
  - School lunch or breakfast (with fortified food)
- Conditional cash transfers
- Compulsory schooling (also addresses parents' preferential treatment on certain children)

Work in progress: survey part

III. Improve schooling quality and learning outcomes

- Teacher inputs
  - Recruitment and promotion
  - Addressing absenteeism
  - Hiring contract teachers

Work in progress: survey part

III. Improve schooling quality and learning outcomes

- Other inputs and pedagogical changes
  - Changes in curriculum § Concentrate on basic skills and core competencies § Design of textbooks and other materials
  - Using information technology for instruction
  - Classroom tracking (to address variable teacher effort and to allow less prepared students to catch up)
  - Remedial education § summer camps, community volunteers, college students

Work in progress: survey part

III. Improve schooling quality and learning outcomes

- Incentive structure
  - Incentive pay for teachers § Implementation architecture § Standardized tests
  - Merit scholarships and other rewards for students
  - Community participatory programs for parents

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