

# 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-**

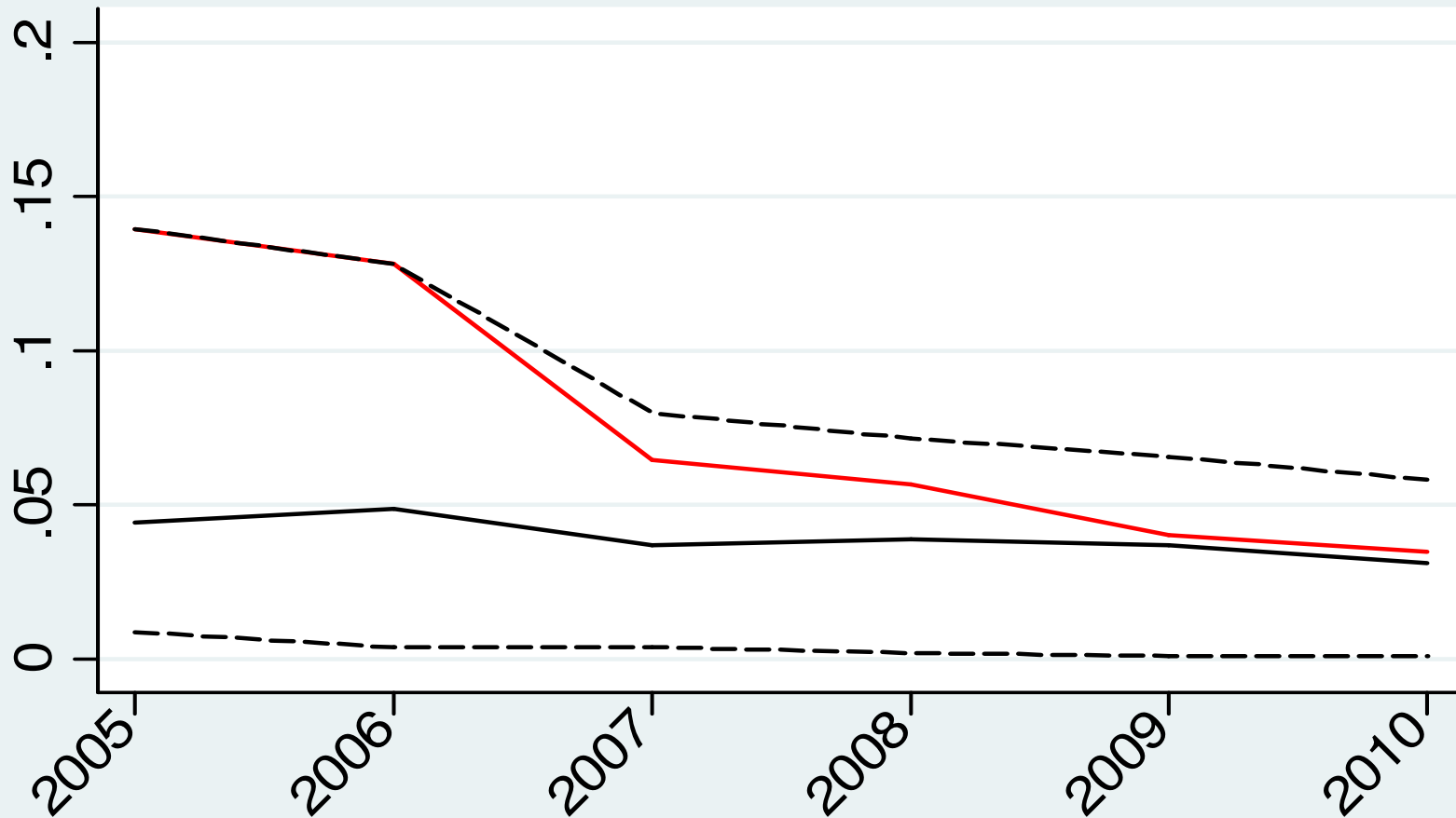
Dashed lines – minimum and maximum of 20 states with non-missing data

Solid black line – median of 20 states with non-missing data

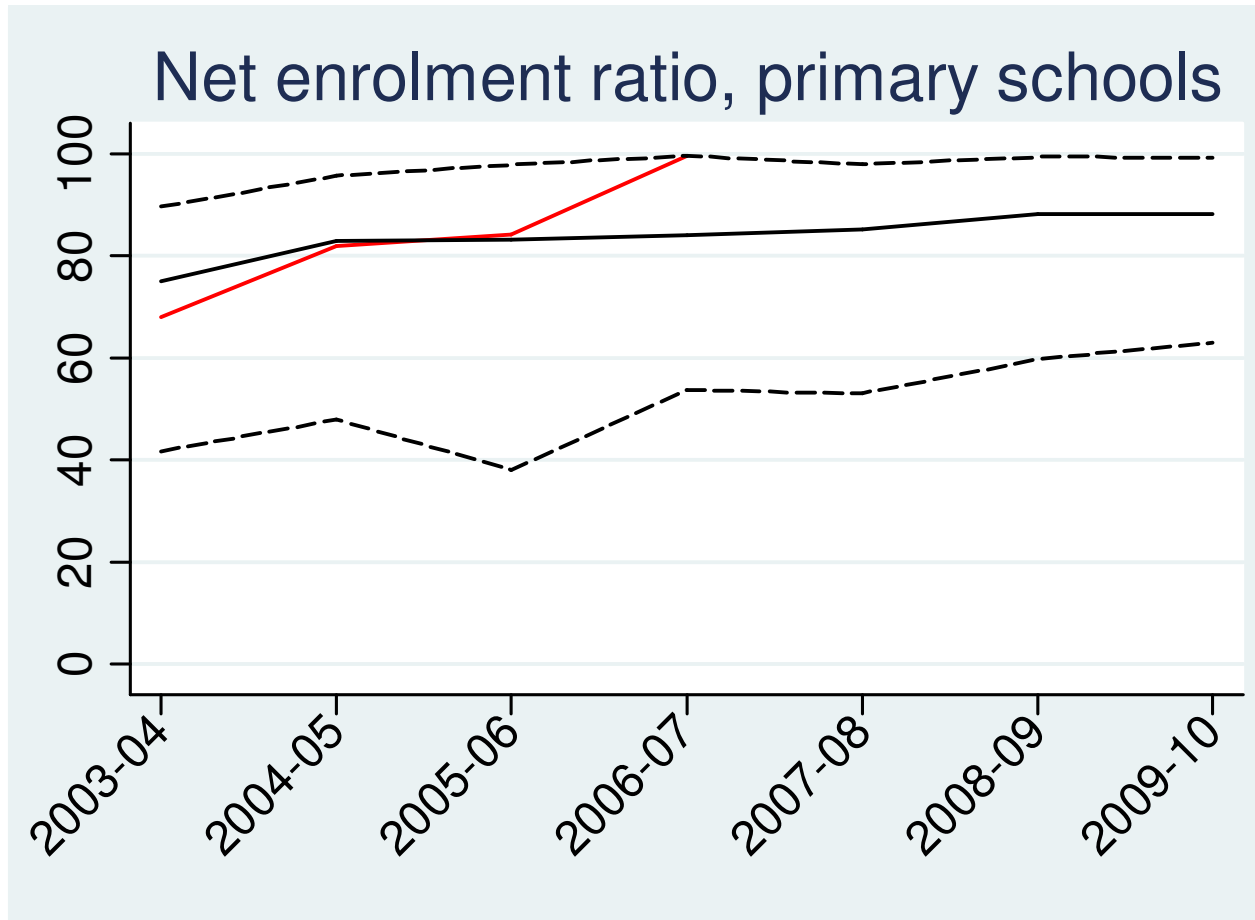
Solid red line – Bihar

# Status of Education in Bihar

## Out of school rate, primary schools

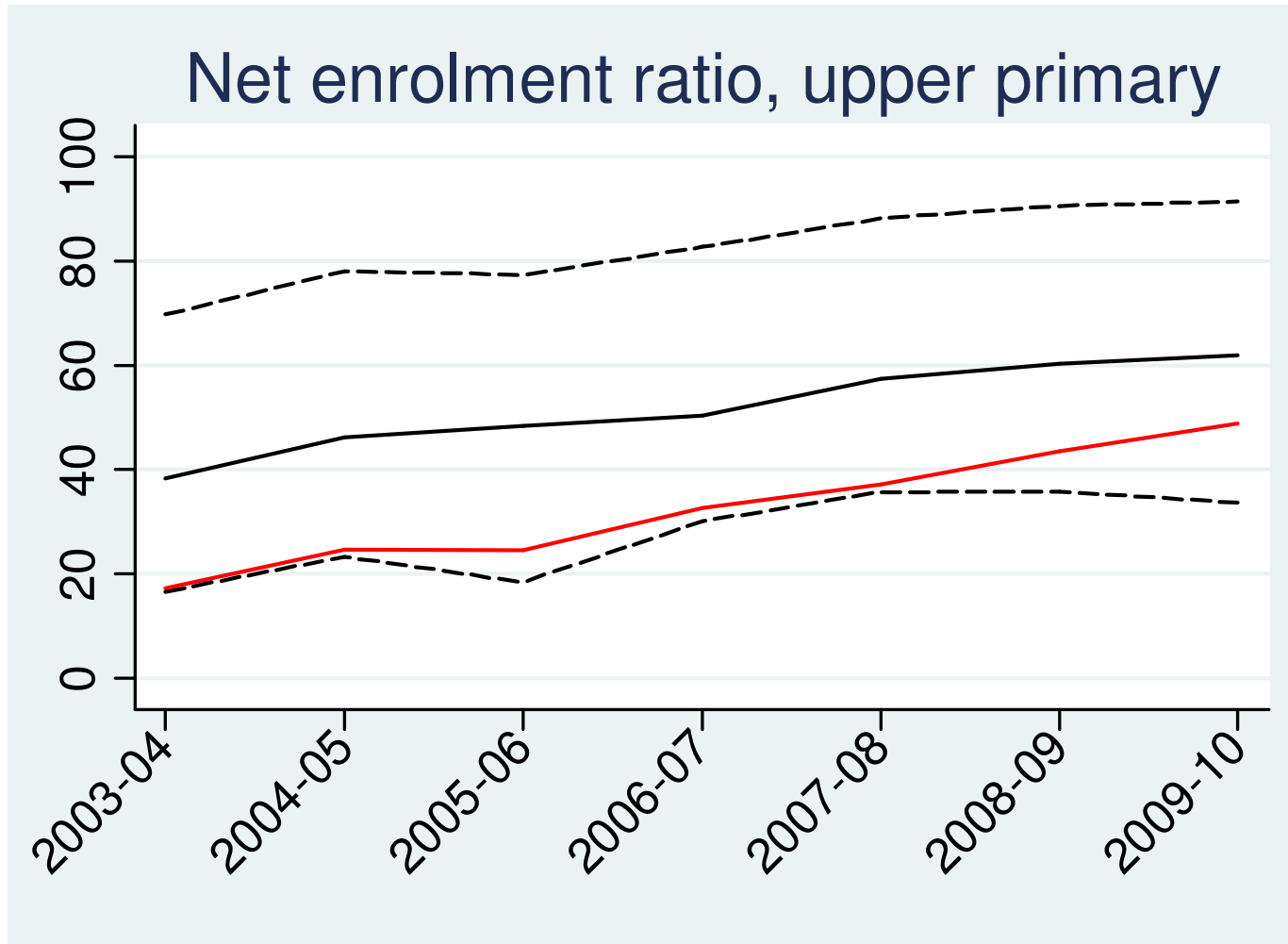


# Status of Education in Bihar



Note: NER missing for Bihar starting 2007-08.

# Status of Education in Bihar



# Summary of Evidence on Quantity

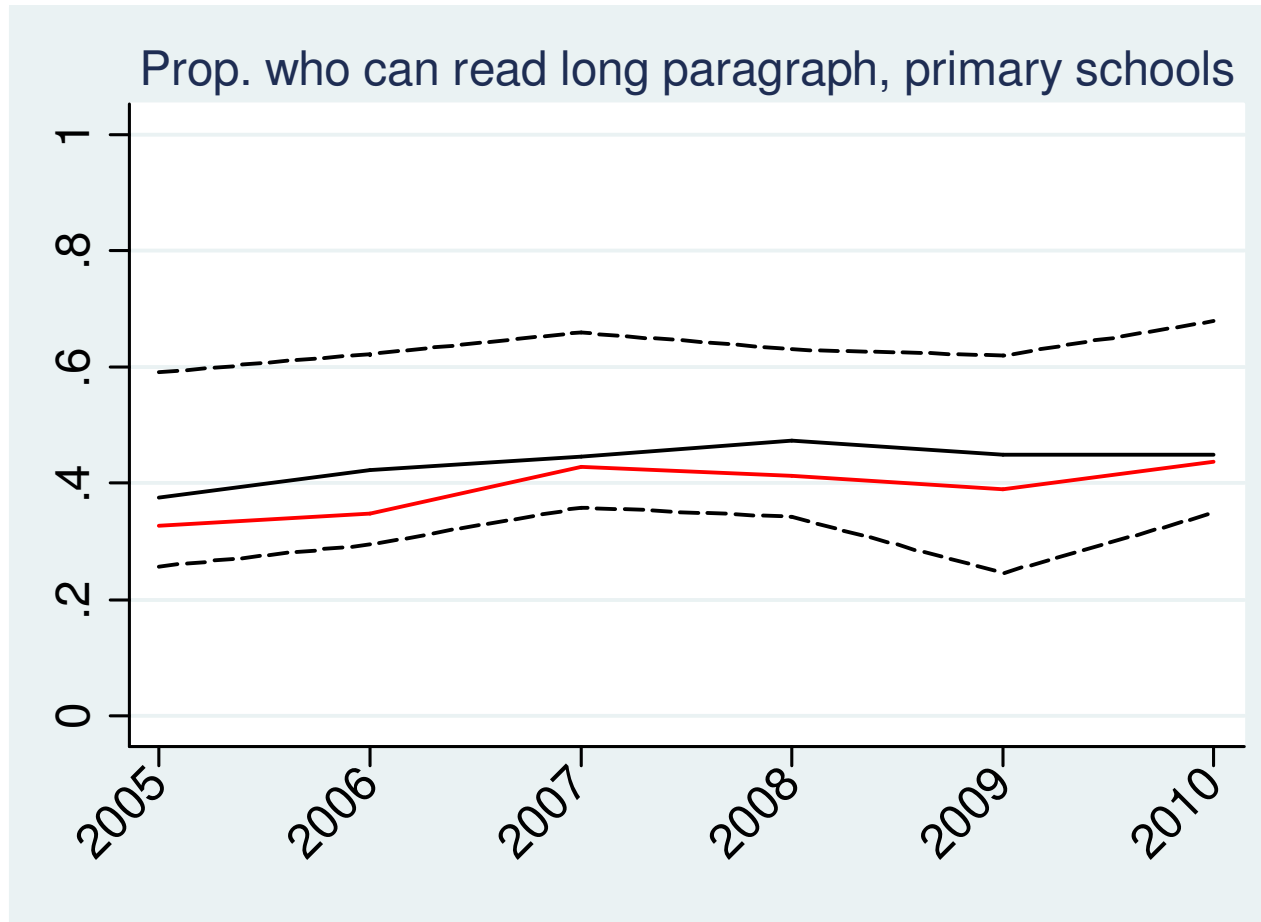
- Out of school rate higher than the median, but declining over time and converging to the median
  - Gap with the best performing states significant
- Enrolment ratio at primary level above the median starting in 2006-07
  - Near universal primary enrolment
- Enrolment ratio at upper primary level still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

# Status of Education in Bihar: Quality measures

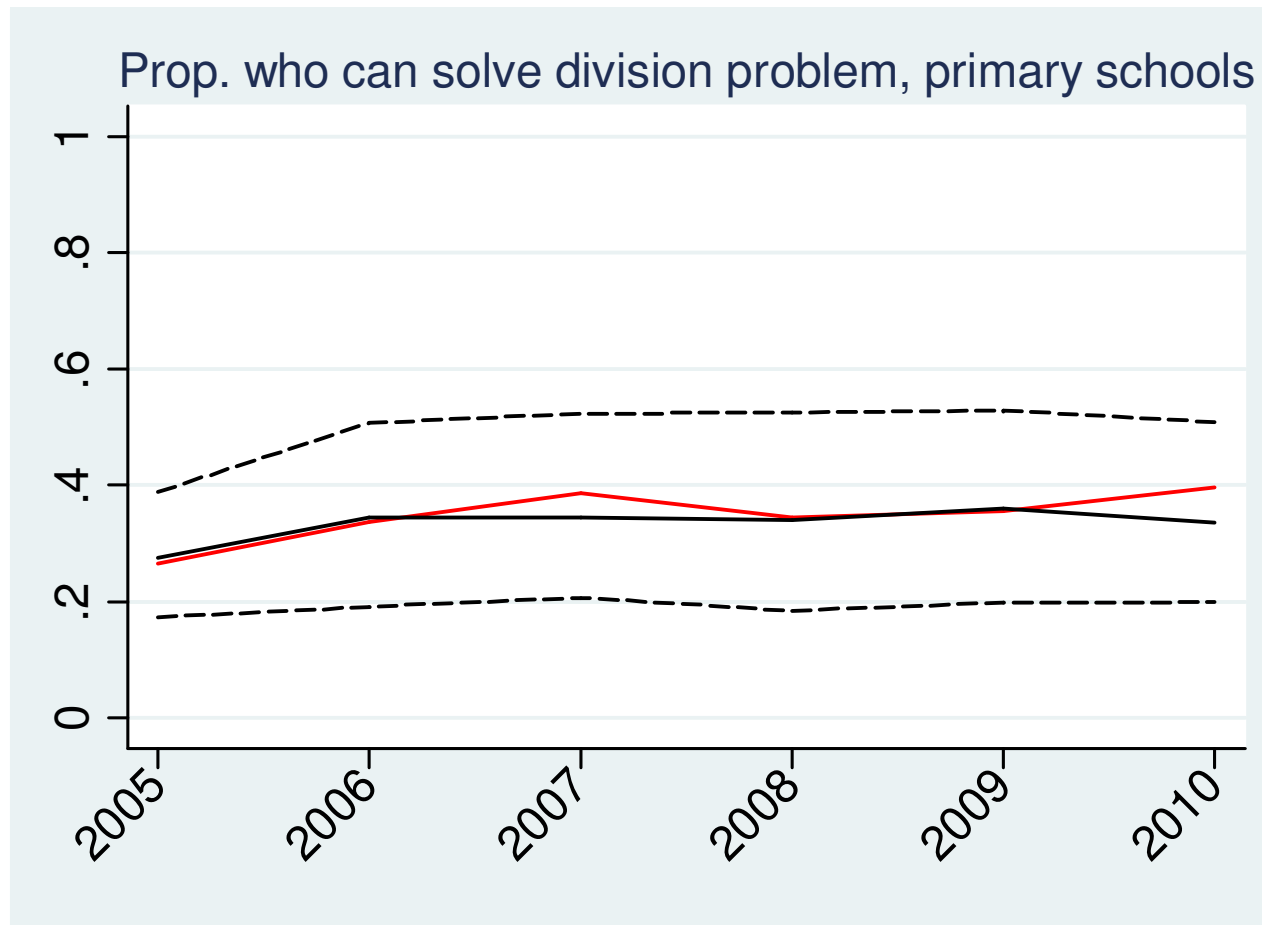
Can read long paragraph,  
Can solve division problem

(Source: ASER)

# Status of Education in Bihar



# Status of Education in Bihar



# Summary of evidence on quality

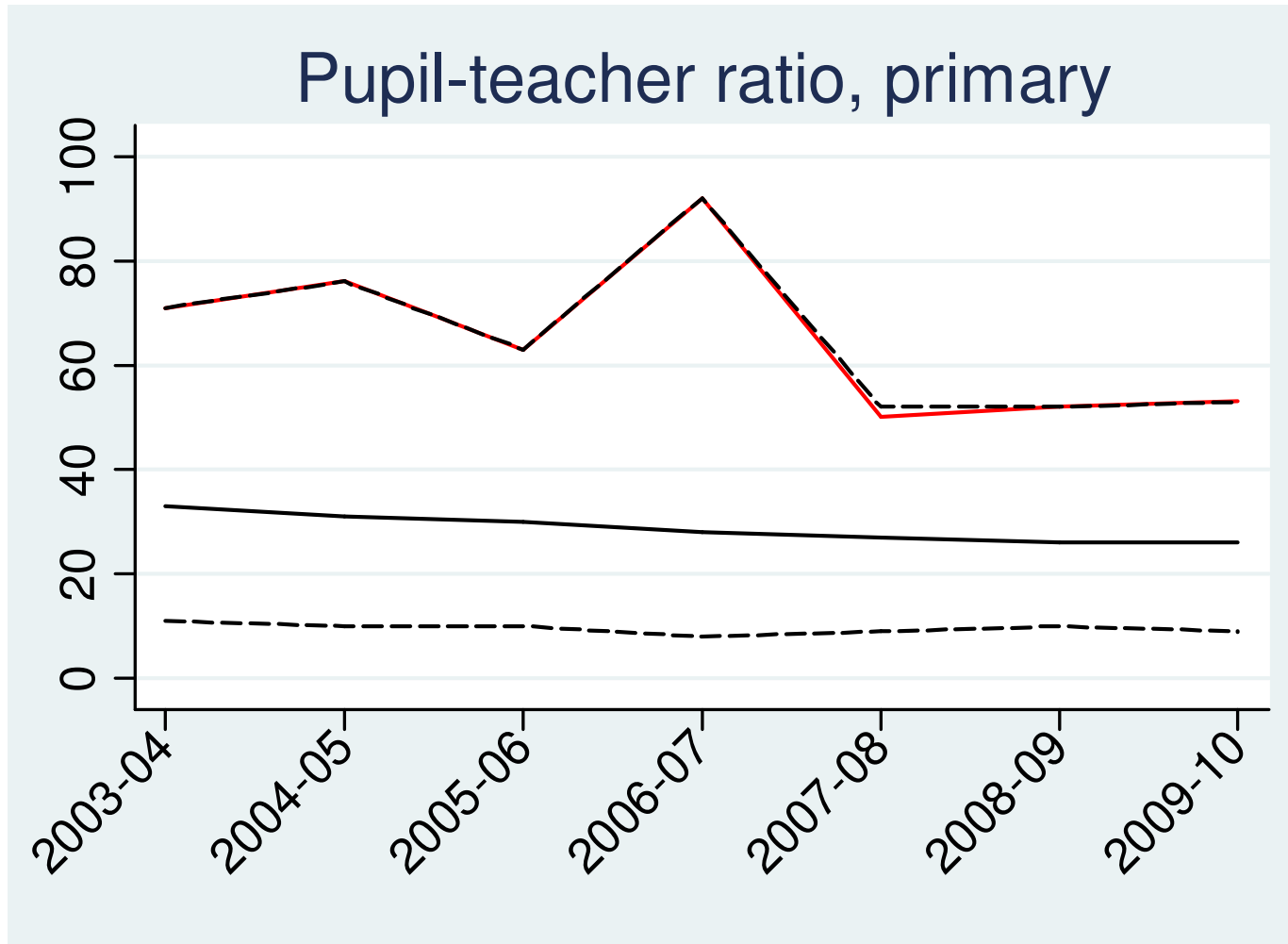
- In “reading” Bihar slightly below the median
- In math skills, Bihar very close to the median
- In both reading and math skills, the gap with the best performers is substantial
  - Some evidence of narrowing of gap in recent years
  - In absolute terms, not very satisfactory
    - 30% of students in 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

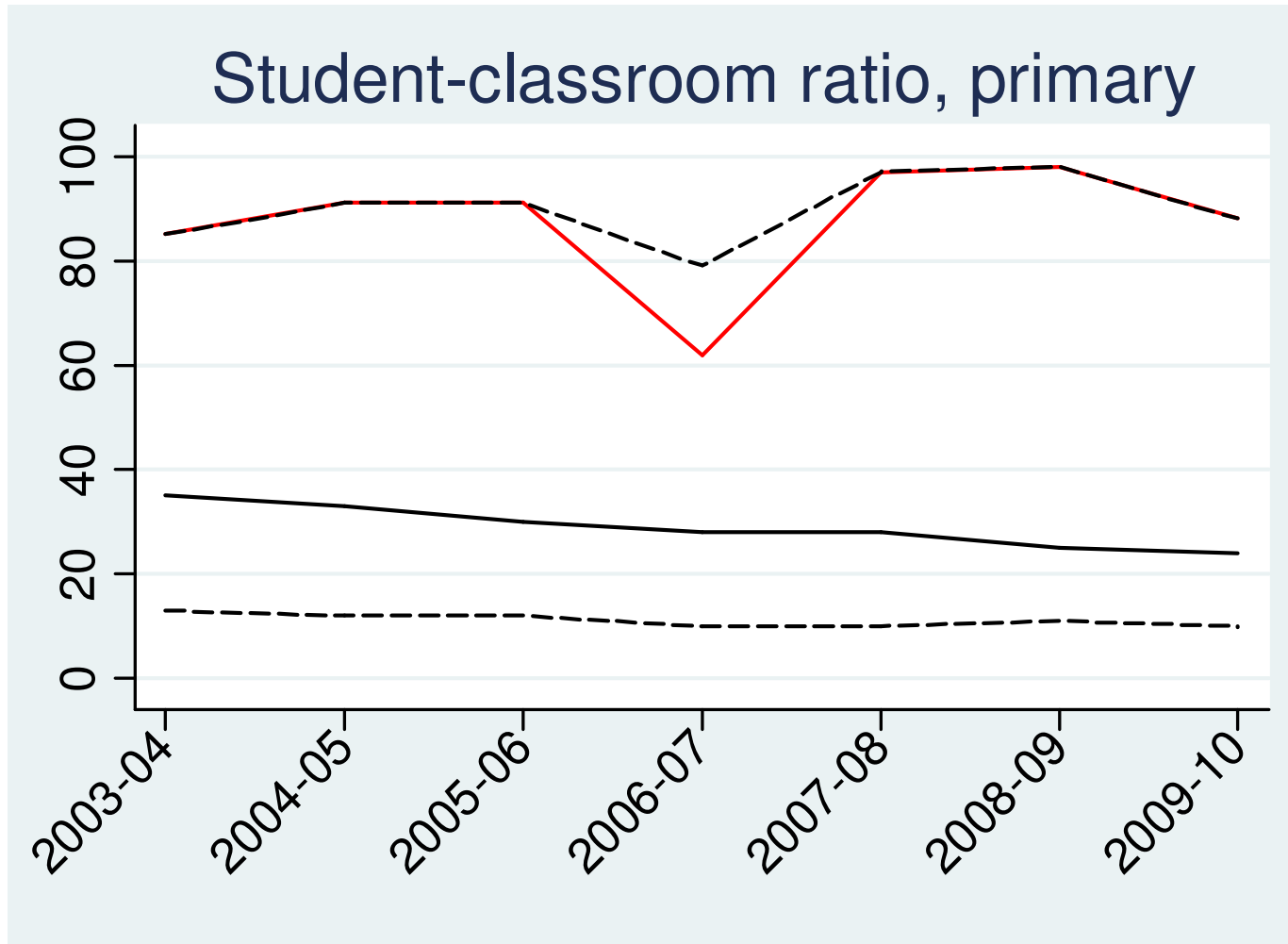
pupil-teacher ratio,  
student-classroom ratio,  
no. of teachers per school,  
Proportion of classrooms in good condition  
% schools with common toilet,  
% schools with girls' toilet,  
% schools with drinking water facility

Source: DISE

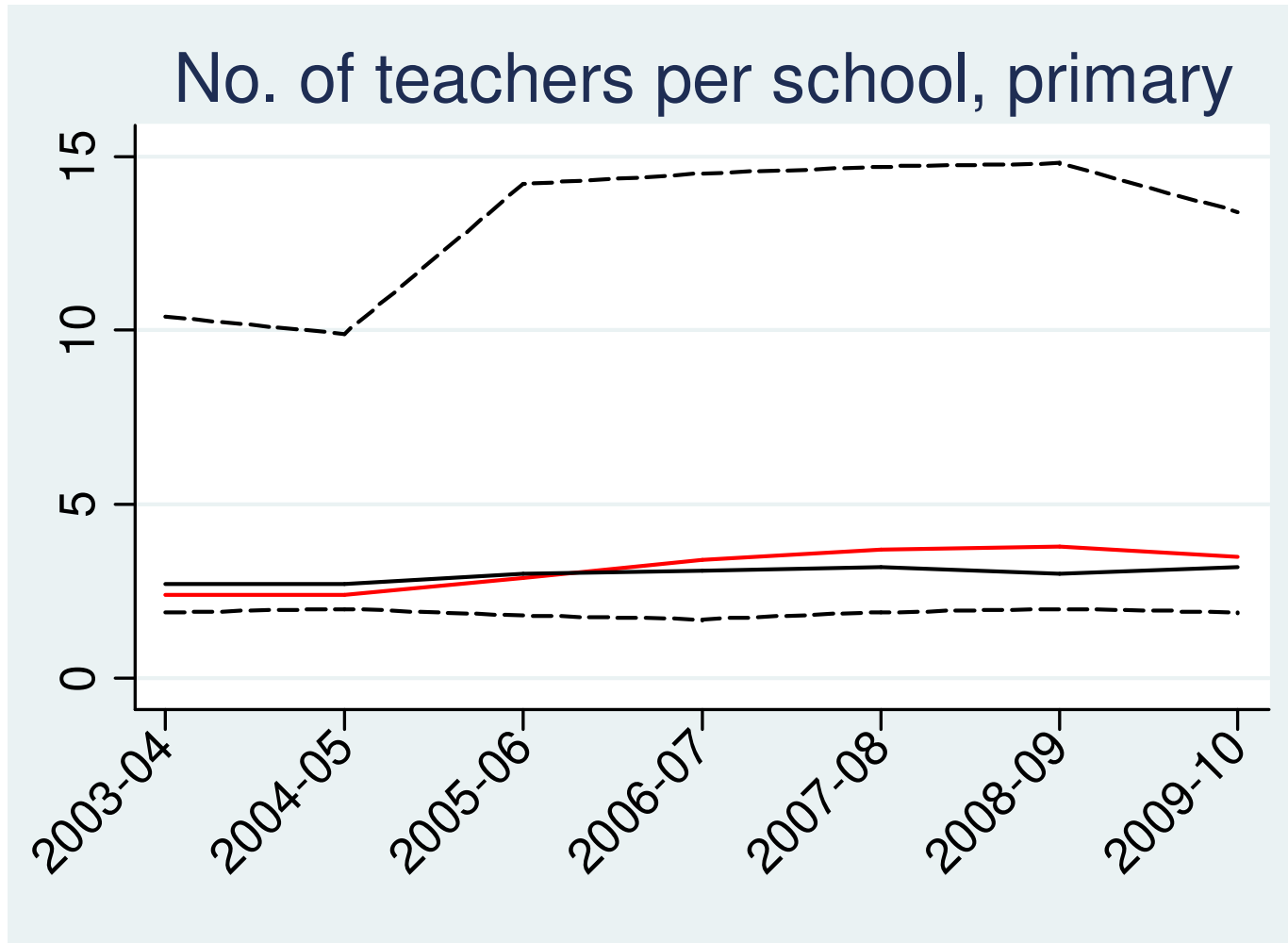
# Schooling Inputs: Primary Schools



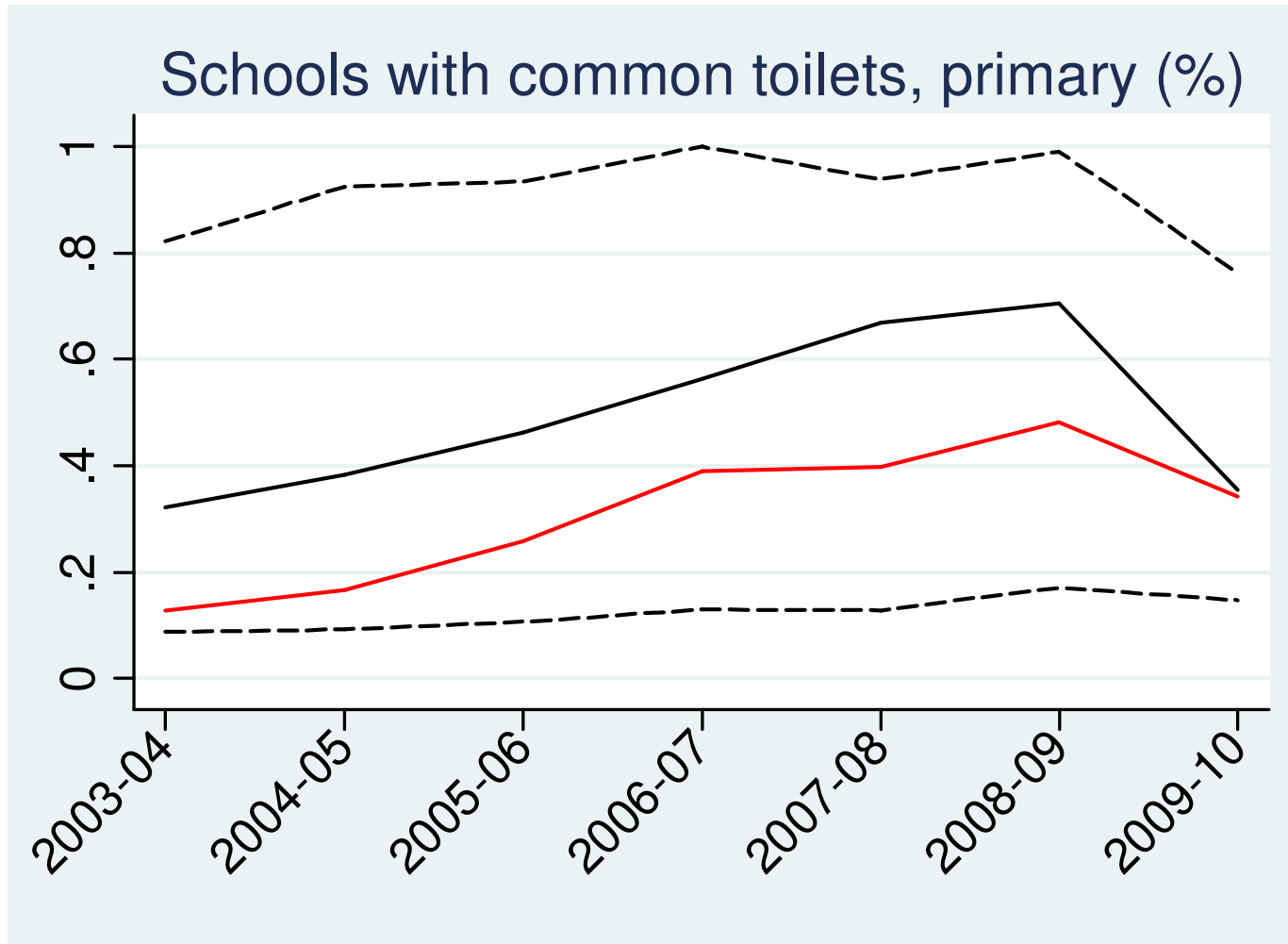
# Schooling Inputs: Primary Schools



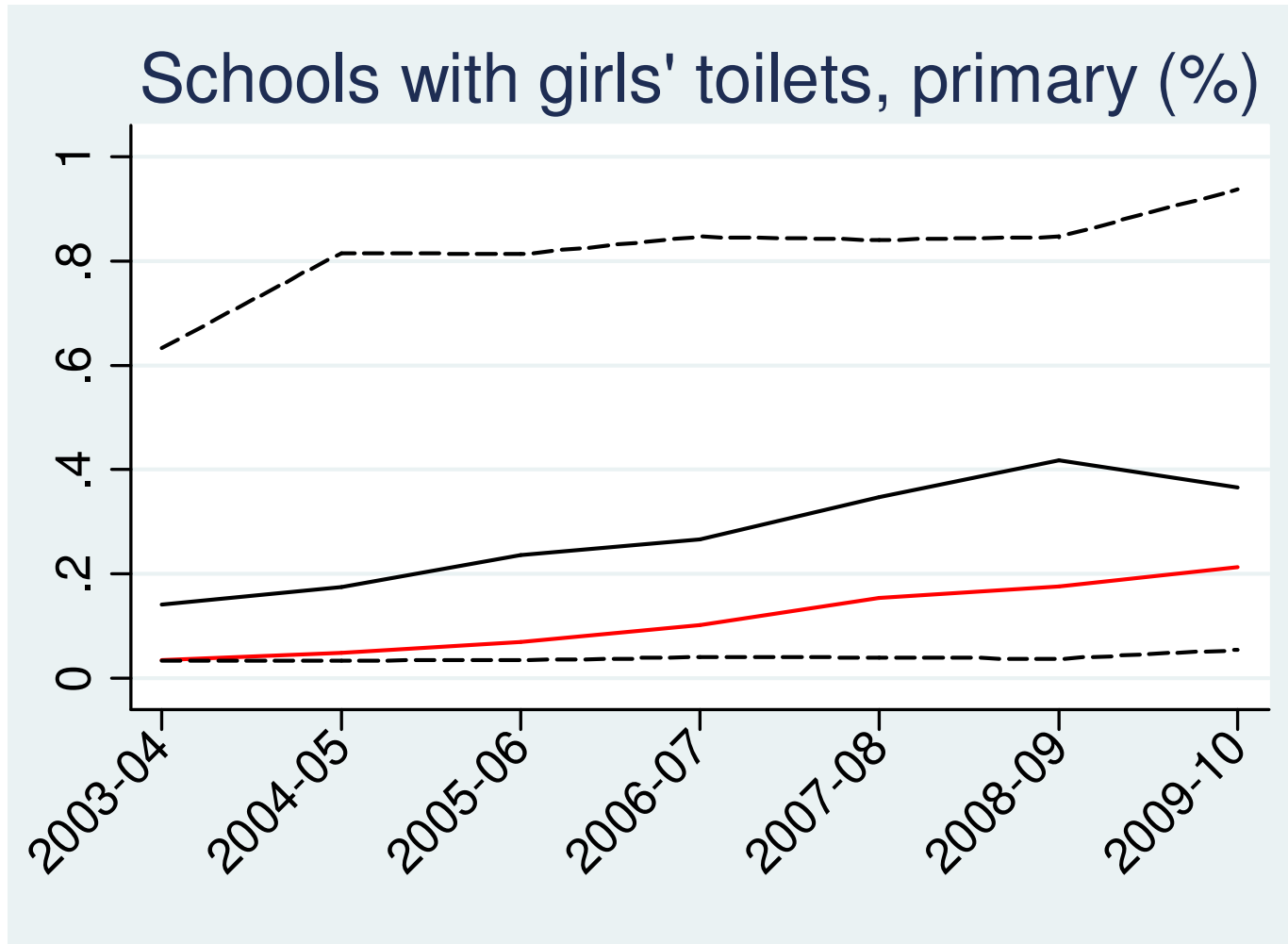
# Schooling Inputs: Primary Schools



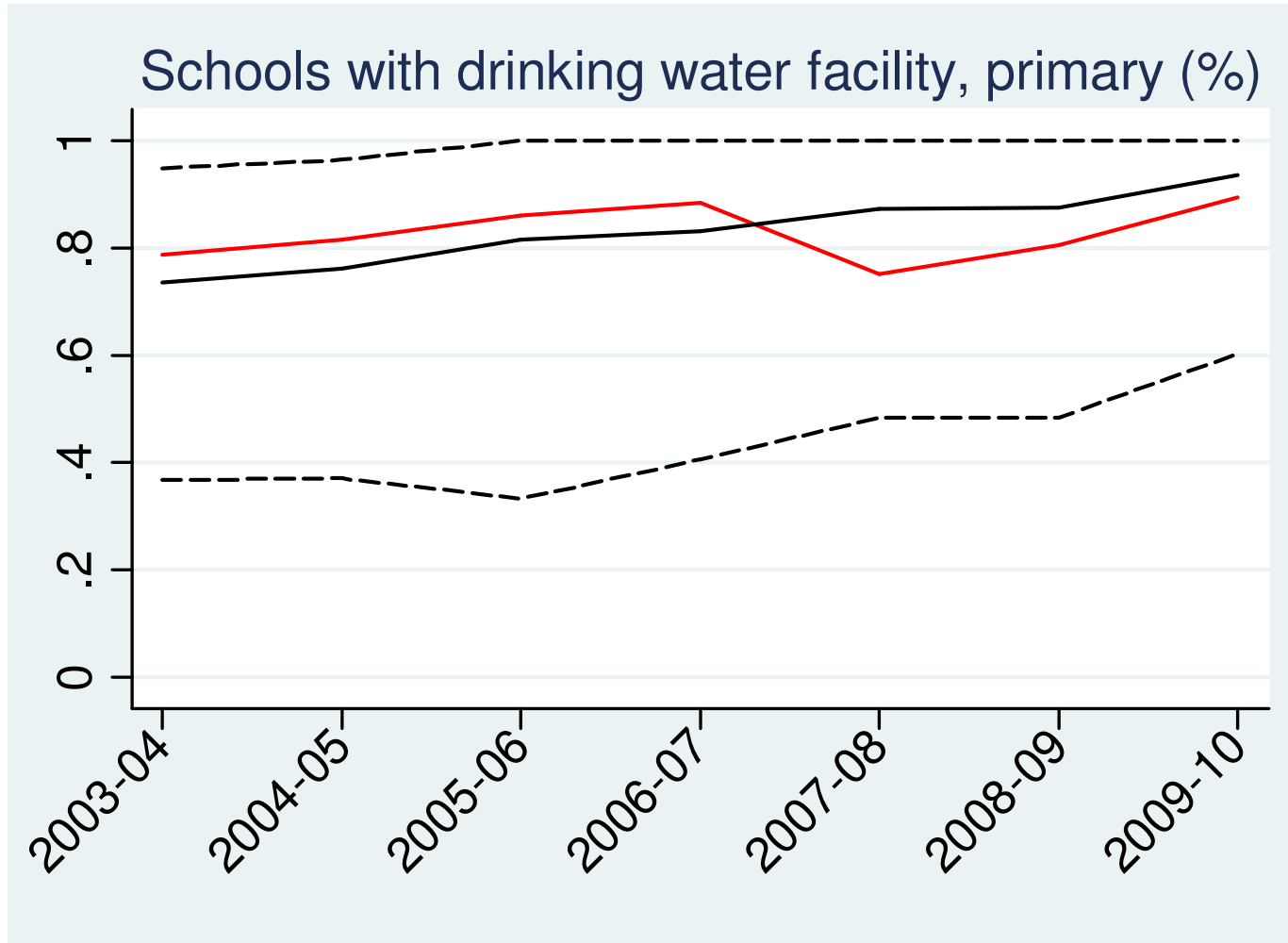
# Schooling Inputs: Primary Schools



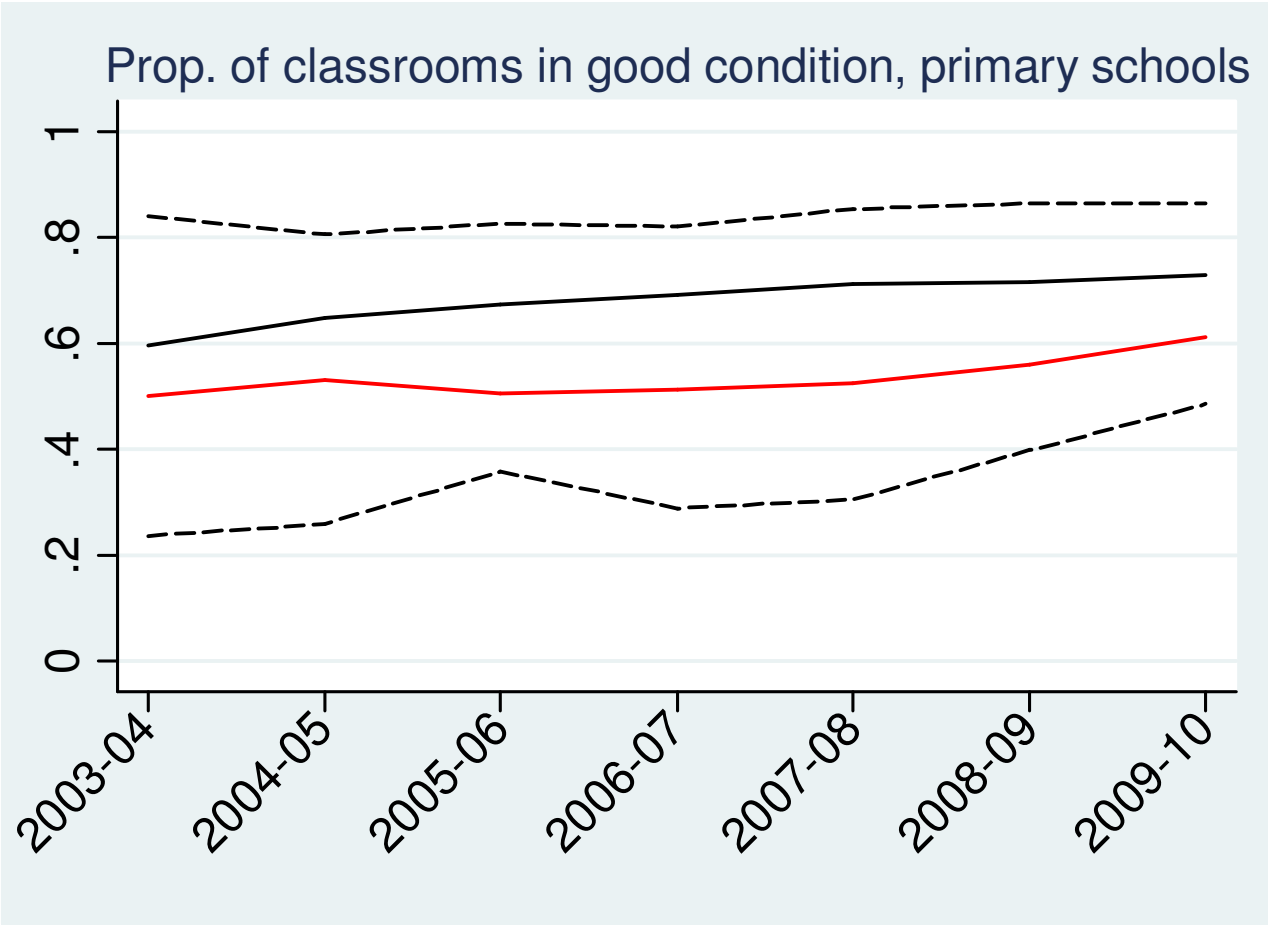
# Schooling Inputs: Primary Schools



# Schooling Inputs: Primary Schools



# Schooling Inputs: Primary Schools



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

# 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

<i>Independent variables:</i>	All		Boys		Girls	
Pupil-teacher ratio	-0.0035 ** (0.001)	0.0010 (0.001)	-0.0022 * (0.001)	-0.0004 (0.001)	-0.0038 ** (0.001)	-0.0003 (0.001)
Student-classroom ratio	0.0005 (0.001)	0.0003 (0.001)	0.0003 (0.001)	-0.0002 (0.001)	0.0001 (0.001)	-0.0001 (0.001)
% Schools with toilet	0.0407 (0.047)	-0.0006 (0.046)	0.0040 (0.045)	0.0390 (0.036)	0.0564 (0.047)	0.0414 (0.035)
% Schools with girls' toilet	0.0185 (0.058)	0.0310 (0.065)	0.0121 (0.055)	-0.0626 (0.054)	-0.0092 (0.056)	-0.0540 (0.053)
% Schools with drinking water facility	0.3551 *** (0.090)	0.0145 (0.106)	0.3290 *** (0.089)	0.1336 (0.095)	0.4057 *** (0.092)	0.1731 (0.094)
% Classrooms in good condition	-0.0816 (0.066)	-0.1464 (0.105)	-0.0003 (0.001)	-0.0015 (0.001)	-0.0007 (0.001)	-0.0008 (0.001)
Constant	0.2706 ** (0.081)	0.4505 *** (0.130)	0.2805 *** (0.082)	0.4664 *** (0.118)	0.2806 ** (0.085)	0.3885 ** (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					
<i>Independent variables:</i>		All		Boys		Girls	
Pupil-teacher ratio		-0.0018 (0.001)	0.0022 (0.001)	-0.0005 (0.001)	0.0009 (0.001)	-0.0019 (0.001)	0.0014 (0.001)
Student-classroom ratio		0.0008 (0.001)	0.0010 (0.001)	0.0003 (0.001)	0.0003 (0.001)	0.0002 (0.001)	0.0006 (0.001)
% Schools with toilet		0.0472 (0.052)	0.0332 (0.047)	0.0107 (0.053)	0.0497 (0.044)	0.0387 (0.053)	0.0508 (0.044)
% Schools with girls' toilet		-0.0162 (0.064)	0.0625 (0.066)	-0.0237 (0.063)	0.0029 (0.067)	-0.0409 (0.063)	0.0298 (0.066)
% Schools with drinking water facility		0.3642 *** (0.100)	-0.0923 (0.108)	0.3500 ** (0.103)	-0.0668 (0.118)	0.4260 *** (0.104)	-0.0587 (0.116)
% Classrooms in good condition		-0.0932 (0.073)	-0.0743 (0.106)	-0.0007 (0.001)	-0.0010 (0.001)	-0.0009 (0.001)	-0.0004 (0.001)
Constant		0.1041 (0.090)	0.2760 * (0.132)	0.1441 (0.096)	0.4479 ** (0.147)	0.1238 (0.096)	0.3589 * (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

<i>Independent variables:</i>	Dependent variable: Out of school rate					
	All		Boys		Girls	
Pupil-teacher ratio	0.0016 *** (0.000)	0.0001 (0.000)	0.0015 *** (0.000)	-0.0011 ** (0.000)	0.0020 *** (0.000)	-0.0009 (0.001)
Student-classroom ratio	-0.0004 (0.000)	-0.0004 (0.000)	-0.0005 * (0.000)	-0.0012 *** (0.000)	-0.0007 * (0.000)	-0.0011 ** (0.000)
% Schools with toilet	-0.0343 ** (0.011)	-0.0127 (0.014)	-0.0183 (0.013)	-0.0114 (0.013)	-0.0545 ** (0.018)	-0.0198 (0.016)
% Schools with girls' toilet	0.0219 (0.014)	-0.0288 (0.020)	0.0046 (0.016)	-0.0504 * (0.019)	0.0328 (0.021)	-0.0586 * (0.024)
% Schools with drinking water facility	-0.0955 *** (0.021)	0.0387 (0.032)	-0.1013 *** (0.026)	0.0369 (0.034)	-0.1310 *** (0.035)	0.0456 (0.043)
% Classrooms in good condition	-0.0408 * (0.016)	-0.0458 (0.032)	-0.0007 *** (0.000)	-0.0012 *** (0.000)	-0.0002 (0.000)	-0.0011 * (0.000)
Constant	0.1186 *** (0.019)	0.0854 * (0.039)	0.1582 *** (0.024)	0.2207 *** (0.042)	0.1602 *** (0.032)	0.2186 *** (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