When Student Incentives Don't Work: Evidence from a Field Experiment in Malawi

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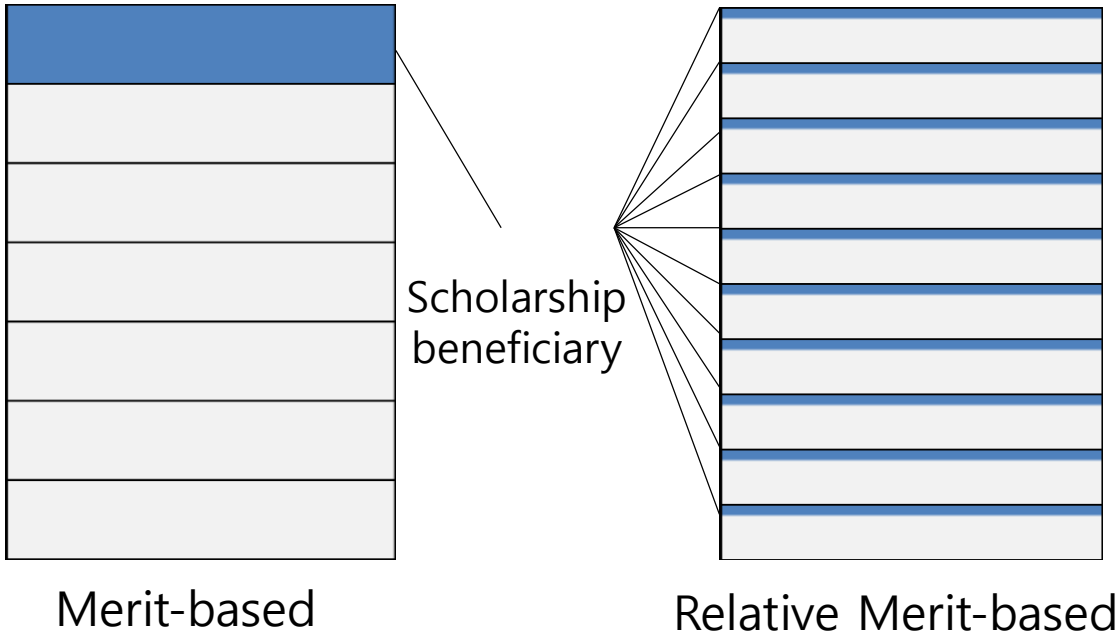
How to motivate students?

(Relative) Merit-based Scholarship

- Merit-based scholarship is given based on performance (in final exam)
- Impacts could be limited for low performing students.



Feedback

- Feedback on exam grades gives students information on their academic performance

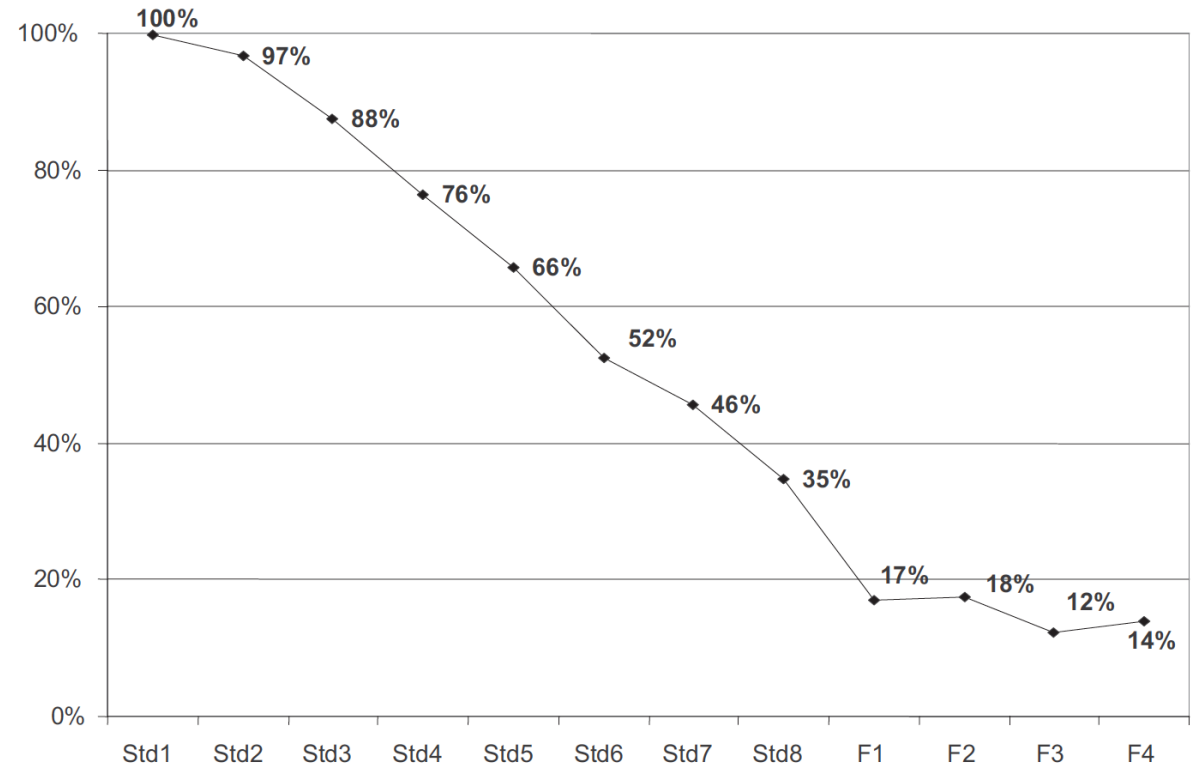
Background: Setting

- Malawi
  - GDP(Nominal) per capita : $250
  - Population: 16,695,253
- TA Chimutu, Malawi
  - Part of Lilongwe rural east (Lilongwe is the capital city)
  - 32 public primary schools

Background: Primary education in Malawi

- Survival rate in primary school
  - i. Despite its high enrollment, the survival rate is very low
  - ii. Main reason for dropout:
    - a. No money for fees
    - b. Not interested/lazy
    - c. Married/became pregnant
  - iii. Student-teacher ratio – 80:1

Figure 2.1: Cross-Sectional Schooling Profile with Revised Repetition Structure from IHS-2



Sources: Calculation with EMIS 2007 database; IHS-2 2004 repetition structure; and UN population data

Literature

- Financial incentives on schooling
  - Kremer, Miguel and Thornton (2009) : merit-based girls' scholarship program in rural Kenya (The top 15%)
    → Average test scores improved by 0.19 standard deviation.
    → Improvement of test score among low-scoring girls and boys (?!)
  - Blimpo (2012) : Team & individual education incentive in Benin
    → Average test scores ↑
    → Neither affected low performing students
  - Behrman, Sengupta, and Todd (2005) : Participation in the PROGRESA
    → School enrollment ↑, grade repetition ↓, dropout rates ↓
  - Baird, McIntosh, and Ozler (2011) : Conditional cash transfers in Malawi
    → School enrollment, attendance, and test scores ↑

Literature

- Feedback effects
  - Bandiera, Larcinese and Rasul (2015)

    → Providing feedback on absolute score has positive effect on test score of the students.

  - Tran and Zeckhauser (2012), Azmat and Iriberri (2010)

    → Providing feedback on relative rank improves academic performances of the students.

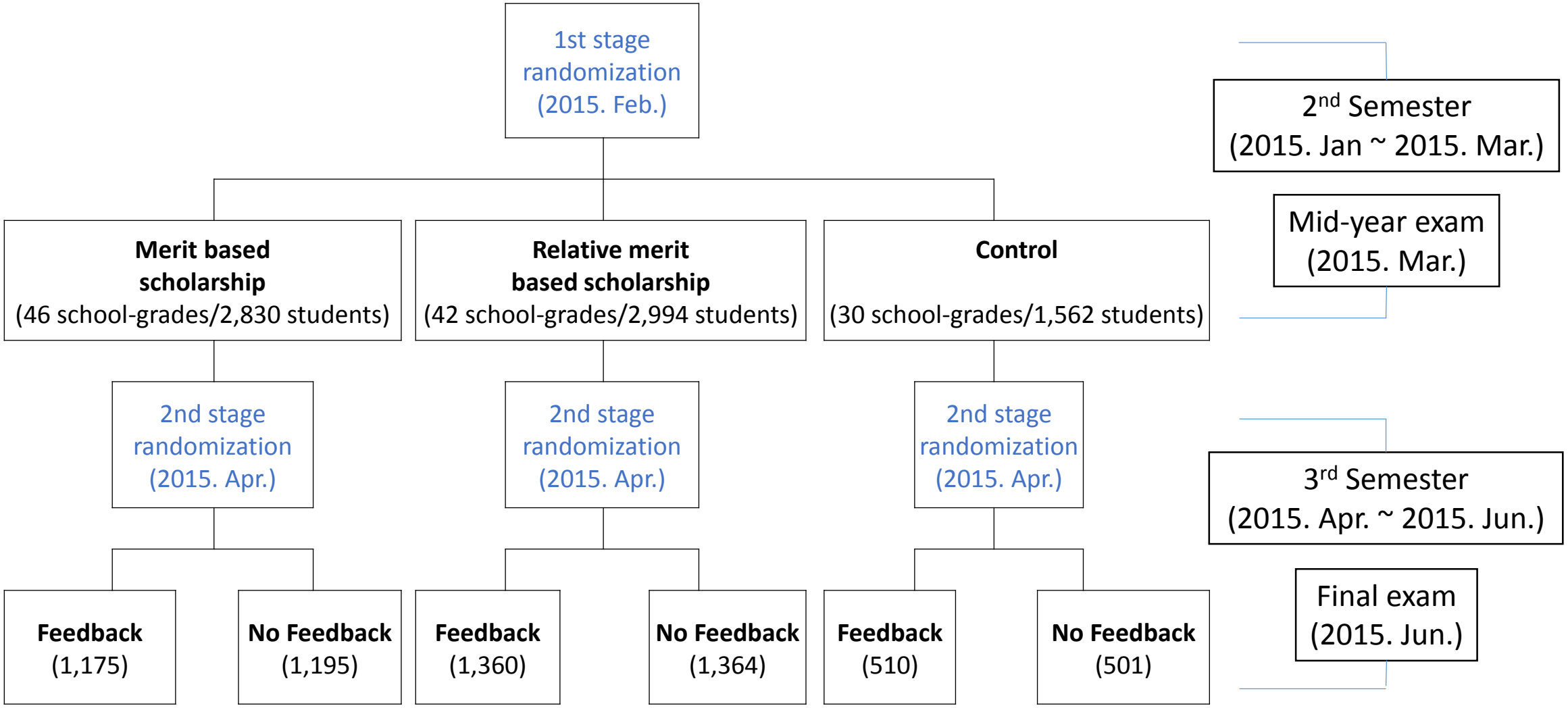
  - Ashraf, Bandiera and Lee. (2014)

    → Providing feedback on relative rank decreases performances of the trainees, while the employer recognition and the social visibility increases.

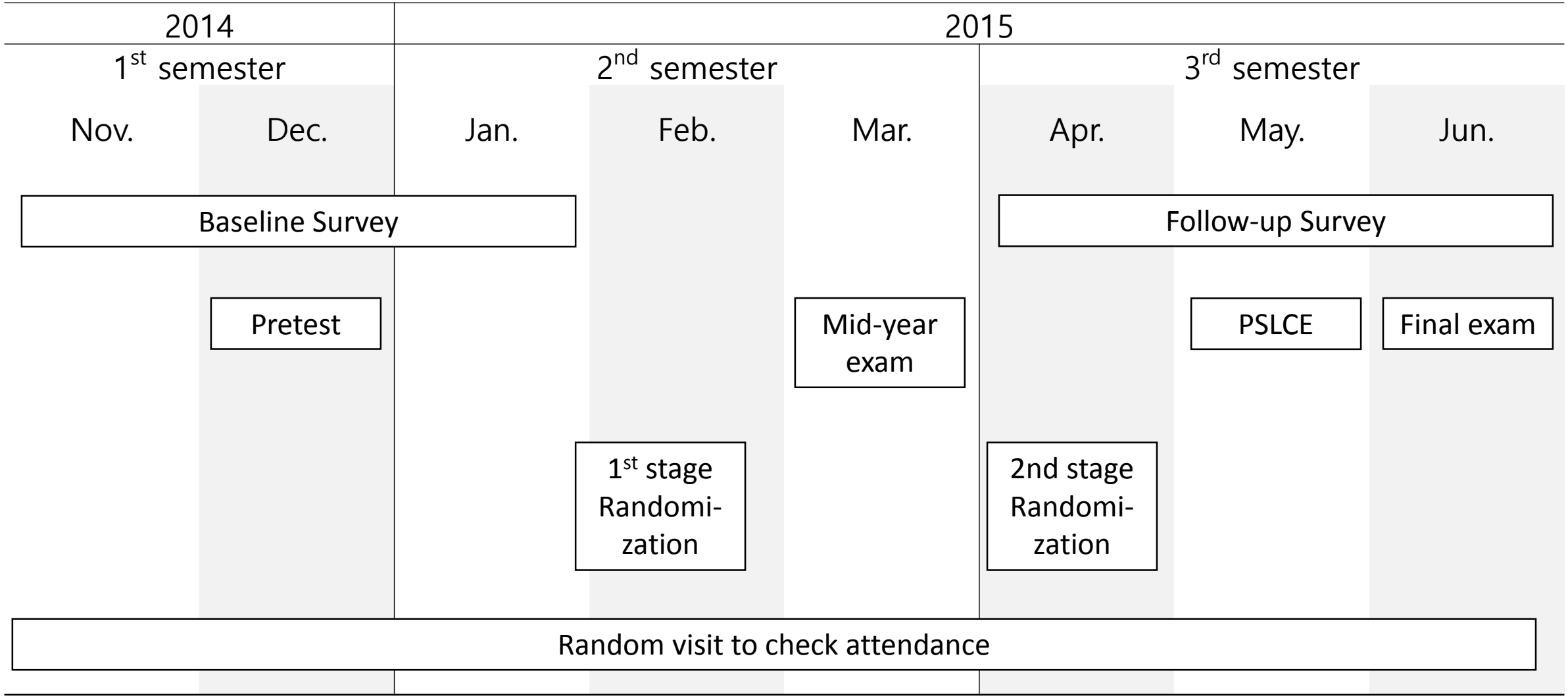
Experimental Design

- 7,386 5th-8th graders in 31 primary schools (118 grade-school)
- Financial incentives: *grade-school* level randomization
  - Merit based scholarship
    - Scholarship will be given if students' achieve top 15% among 10,000 students of the district in the final exam.
  - Relative merit based scholarship
    - Each group consists of 100 students with similar baseline test score.
    - Scholarship will be given if students' achieve top 15% among their subgroup in the final exam.
  - Benefits
    - 4,500 MWK (= $ 6.5) (4 options – cash, shoes, school bags, and uniform)
- Rank information feedback : *individual* level randomization
  - No feedback: test score only
  - Feedback: test score and the rank
  - Standard 8 was excluded due to academic schedule

Experimental Design



Experimental Design : Project Chronology



Baseline survey and Pretest

- Baseline survey (2014. 11~2015. 1) & Baseline exam (2014. 12)

  i. Approached 9,419 registered students of Standard 5 to 8 in 31 primary schools in TA Chimutu

  ii. Baseline survey: 7,638 (81.1%) students participated

  iii. Baseline exam: 8,491 (90.1%) students participated
    - Pretest was administered on TA-level (District level)
    - Six subjects: Chichewa, English, Math, Primary Science, Social studies, Art and life skills

  iv. Study sample: 7,386 (78.4%) who successfully completed the baseline survey and exam

Scholarship Randomization

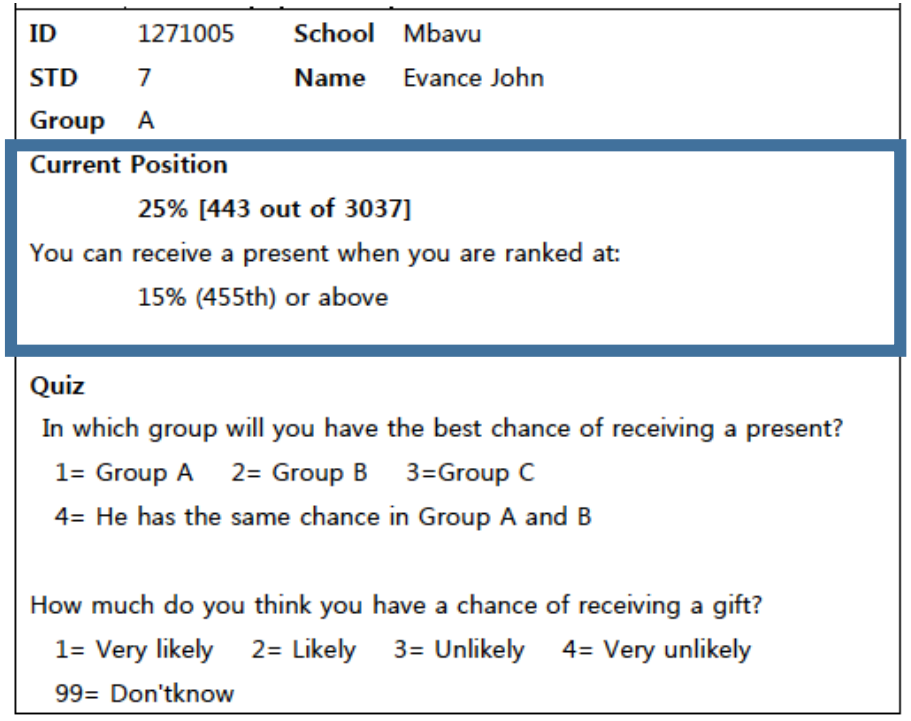
- Scholarship randomization (2015. 2)

  i. Randomization
     - Randomization was conducted at the grade-school level
     - Teachers from the target schools attended in the ceremony to observe the process

  ii. Announcement
     - Randomization results and the pretest score were recorded on the transcript to be distributed to each student
     - Quiz for understanding

Scholarship Randomization

- Scholarship randomization and announcement (2015. 2)



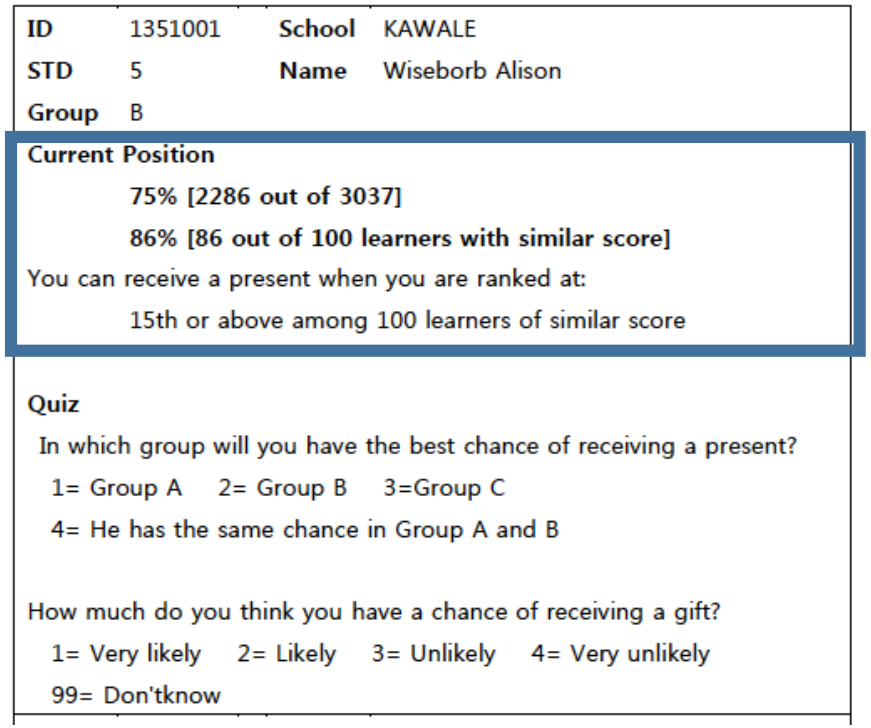
ID 1271005 **School** Mbavu
STD 7 **Name** Evance John
Group A

Current Position
25% [443 out of 3037]
You can receive a present when you are ranked at:
15% (455th) or above

Quiz
In which group will you have the best chance of receiving a present?
1= Group A 2= Group B 3=Group C
4= He has the same chance in Group A and B

How much do you think you have a chance of receiving a gift?
1= Very likely 2= Likely 3= Unlikely 4= Very unlikely
99= Don'tknow

Merit-based scholarship students



ID 1351001 **School** KAWALE
STD 5 **Name** Wiseborb Alison
Group B

Current Position
75% [2286 out of 3037]
86% [86 out of 100 learners with similar score]
You can receive a present when you are ranked at:
15th or above among 100 learners of similar score

Quiz
In which group will you have the best chance of receiving a present?
1= Group A 2= Group B 3=Group C
4= He has the same chance in Group A and B

How much do you think you have a chance of receiving a gift?
1= Very likely 2= Likely 3= Unlikely 4= Very unlikely
99= Don'tknow

Relative merit-based scholarship students

Feedback Randomization

- 6,470 (87.6%) participated in the mid-year exam (2015. 3)
- Feedback information on midterm rank was randomly given (2015. 4)

Feedback

ID	1451001	School	Chiwamba
STD	5	Name	Yohane Absanyi
Group	A		

Baseline poisition

3% **Overall** (Rank 115 out of 3037)

↓

Current Position

22% **Overall** (Rank 696 out of 3037)

You can receive a present when you are ranked at:

15% or above
(Rank 455)

No Feedback

ID	1451002	School	Chiwamba
STD	5	Name	Lukasi Aiman
Group	A		

Baseline poisition

22% **Overall** (Rank 696 out of 3037)

You can receive a present when you are ranked at:

15% or above
(Rank 455)

Follow-up Survey and Final Exam

- Follow-up survey & Final exam (2015.6 - 2015.7)
  - 6,616 (89.6%) participated in the final exam.
  - 6,106 (82.7%) participated in the follow-up survey.
    - We collected information on the level of understanding of the scholarship scheme and computation skill test in the survey.

Data

- Baseline and follow-up surveys
  - Demographics, education attainment, study effort and level of motivation, etc.
  - Cognitive ability: raven test, O-net ability score, and computation
  - Non-cognitive traits; self-esteem, grit scale, conscientiousness
- Exams
  - Baseline
  - Mid-year exam
  - Final exam
    - 5^{th} ~7^{th} grade: Integrated exam on TA level, Jul 2015
    - 8^{th} grade: Primary School Leaving Certificate Exam(PSLCE), May 2015
- Attendance data from random visit to schools (Nov 2014 ~ Jun 2015)

Randomization balance (1st stage)

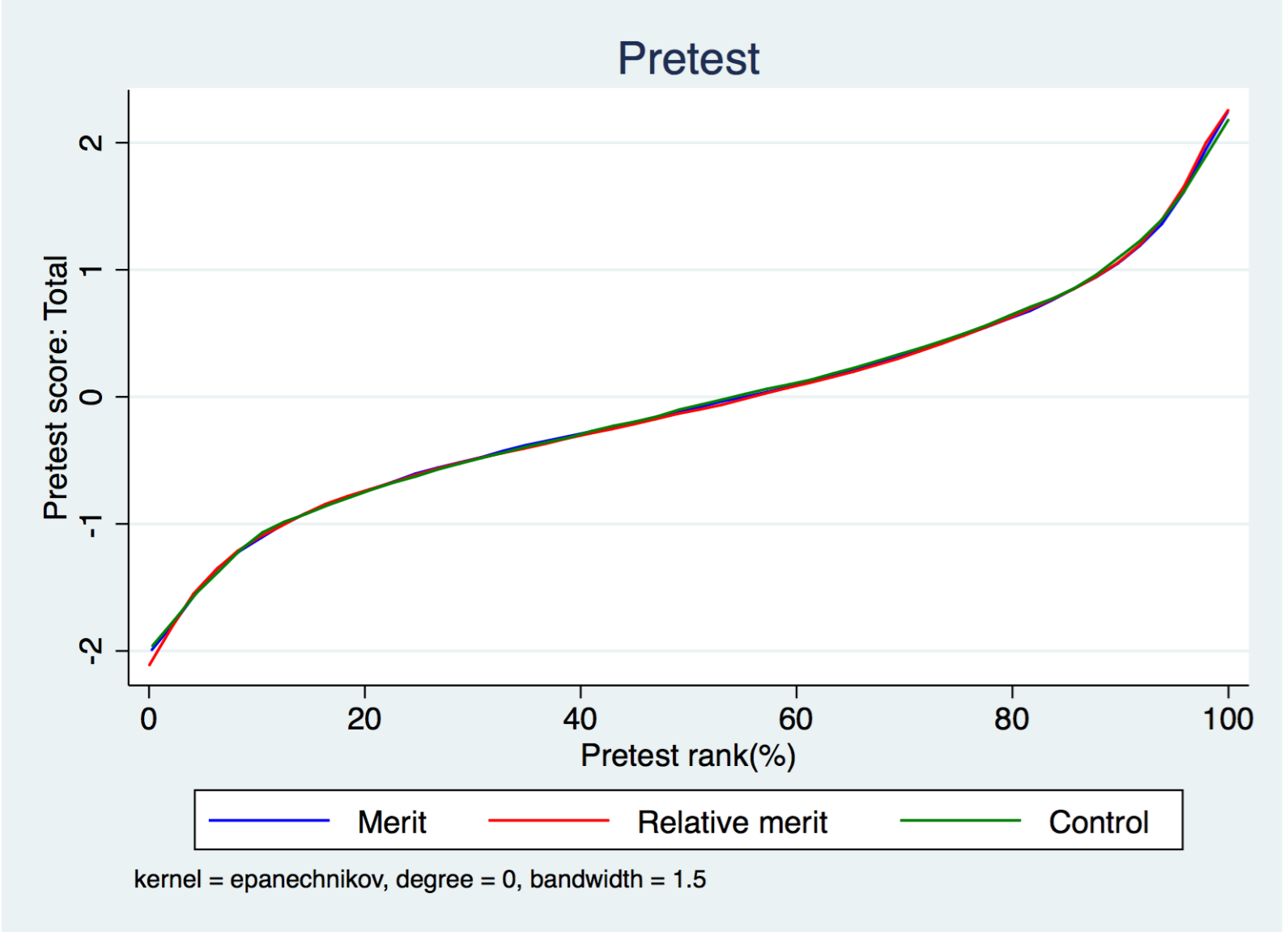
	Whole Sample	Control	Merit vs Control	Relative vs Control	Feedback	Observations
	(1)	(2)	(3)	(4)	(5)	(6)
Age	14.15	14.42	-0.366	-0.299	0.155	7386
	(4.602)	(3.602)	(0.311)	(0.280)	(0.079)	
N of sibling	7.951	7.796	0.233	0.162	0.043	7386
	(1.553)	(1.659)	(0.360)	(0.327)	(0.029)	
Baseline exam rank(%)	51.89	51.35	-0.214	1.543	0.347	7386
	(28.21)	(27.29)	(3.121)	(3.912)	(0.533)	
Baseline exam score: Total	0.00584	-0.00953	-0.012	0.049	0.005	7386
	(0.850)	(0.797)	(0.092)	(0.125)	(0.015)	
Raven test score	0.742	0.750	-0.031	0.010	0.003	7370
	(0.245)	(0.249)	(0.021)	(0.017)	(0.006)	
Attendance before announcement	0.850	0.863	-0.011	-0.021	0.004	7386
	(0.192)	(0.196)	(0.018)	(0.018)	(0.004)	
Study hours after class (week)	16.08	16.79	-1.005	-0.805	0.085	7309
	(16.13)	(16.37)	(0.865)	(0.875)	(0.346)	
Homework completion	0.282	0.290	-0.009	-0.009	0.006	7367
	(0.450)	(0.454)	(0.027)	(0.028)	(0.010)	

(Continued on the next page)

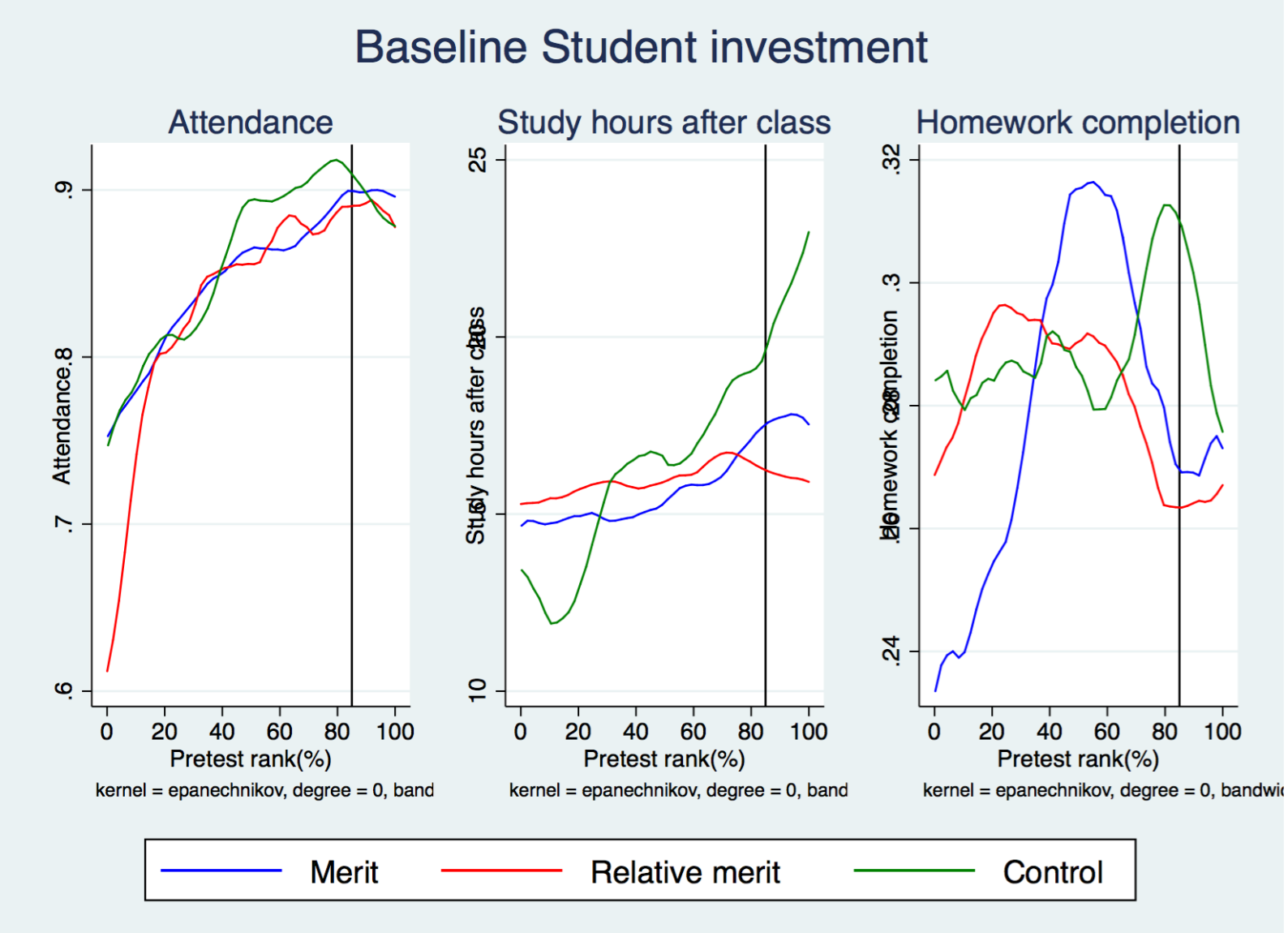
Randomization balance (1st stage)

	Whole Sample	Control	Merit vs Control	Relative vs Control	Feedback	Observations
	(1)	(2)	(3)	(4)	(5)	(6)
Motivation to study hard	0.915	0.921	-0.021	0.005	-0.003	7375
	(0.279)	(0.270)	(0.022)	(0.016)	(0.007)	
Self esteem	2.648	2.666	-0.027	-0.019	0.005	7369
	(0.336)	(0.338)	(0.023)	(0.024)	(0.007)	
Grit Scale	3.177	3.208	-0.050	-0.028	0.017	7369
	(0.432)	(0.450)	(0.026)	(0.028)	(0.010)	
Conscientiousness	3.591	3.583	-0.028	0.045	-0.004	7371
	(0.586)	(0.600)	(0.068)	(0.066)	(0.014)	
Teacher Effort Index	4.040	3.950	0.092	0.134	0.006	7365
	(0.566)	(0.596)	(0.085)	(0.077)	(0.012)	
Parental effort	4.529	4.561	-0.051	-0.032	0.017	7377
	(0.806)	(0.769)	(0.055)	(0.048)	(0.016)	
Observations	7386	1562				

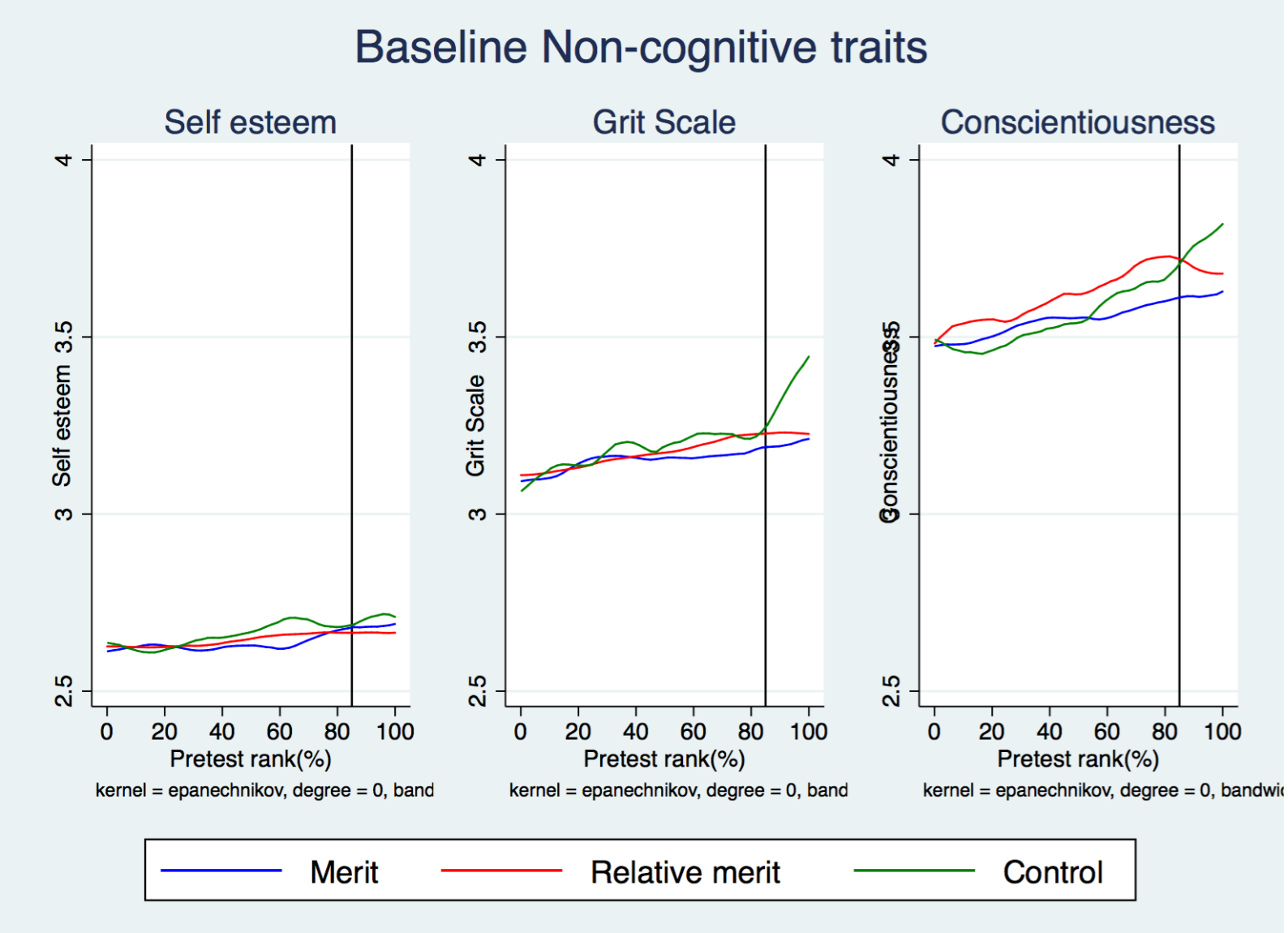
Distribution of Baseline characteristics



Distribution of Baseline characteristics (cont.)



Distribution of Baseline characteristics (cont.)



Sample attrition

	Mid-year exam participation	Follow-up survey participation	Final exam participation
	(1)	(2)	(3)
Merit	.00763	-.0266	.0182
	(.0264)	(.0184)	(.0144)
Relative merit	-.000316	-.0292	.0235
	(.0291)	(.0209)	(.0147)
Feedback	-.0125	.00322	-.00158
	(.00795)	(.00847)	(.00634)
Demographic Control	Yes	Yes	Yes
Observations	6044	6044	6044
R-sqaured	.0131	.0256	.0203
Mean of dep. var.	.867	.836	.889

Empirical strategy

- Scholarship effects

$$Y_{ijk} = \beta_0 + \beta_1 Merit_{jk} + \beta_2 Relative_{jk} + \gamma_1 X_{ijk} + \epsilon_{ijk} \quad (1)$$

$$Y_{ijk} = \beta_0 + \beta_1 Merit_{jk} + \beta_2 Relative_{jk} + \beta_3 Top15_{ijk} + \beta_4 Relative_{jk} * Top15_{ijk} + \beta_5 Relative_{jk} * Top15_{ijk} + \gamma_1 X_{ijk} + \epsilon_{ijk} \quad (2)$$

- Y_{ijk} : Outcome variables (test score, final rank, attendance, and non-cognitive traits) for student i in grade-school j of school k
- *Merit* : a merit-based scholarship indicator
- *Relative* : a relative merit scholarship indicator
- *Top15* equals one if baseline test score is within top 15%
- X : a control vector
- ϵ_{ijk} : an error term.
- Errors are clustered by grade-school level

Empirical strategy

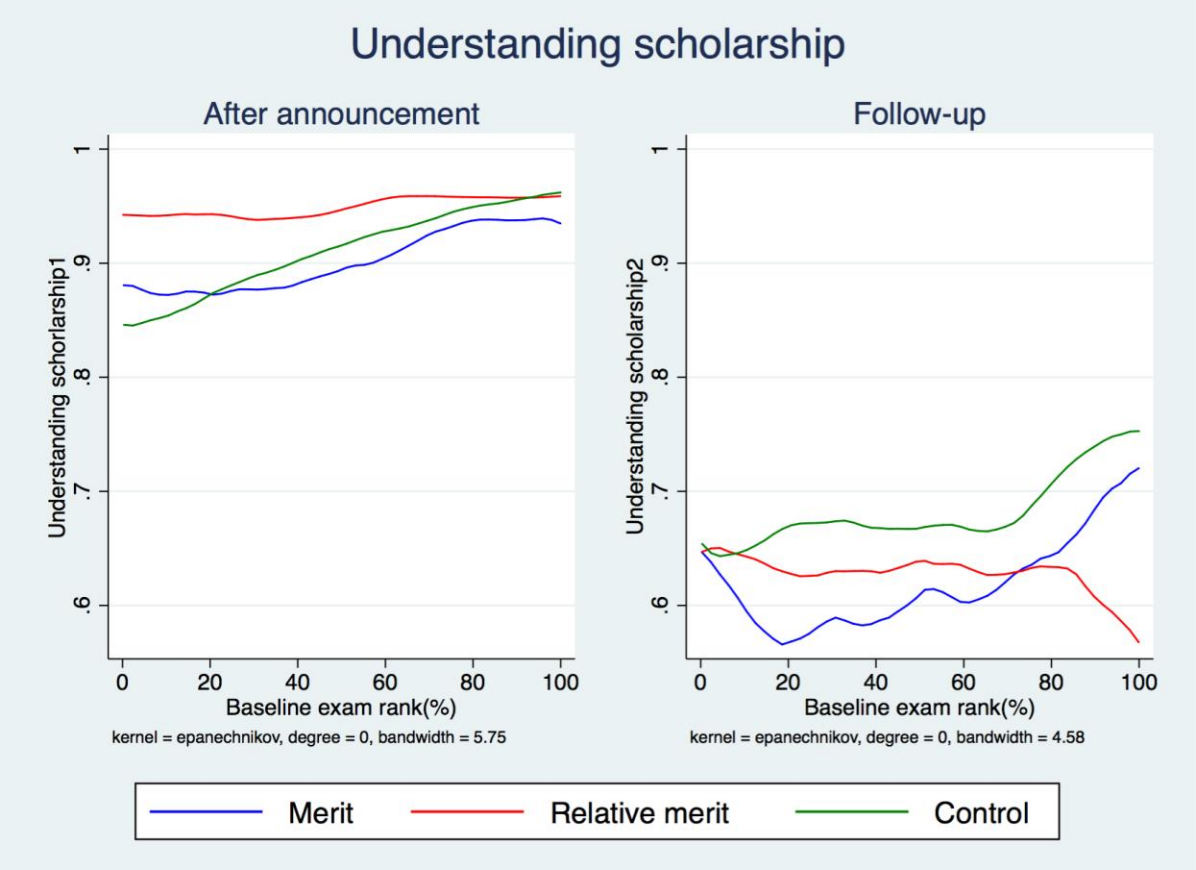
- Feedback effect

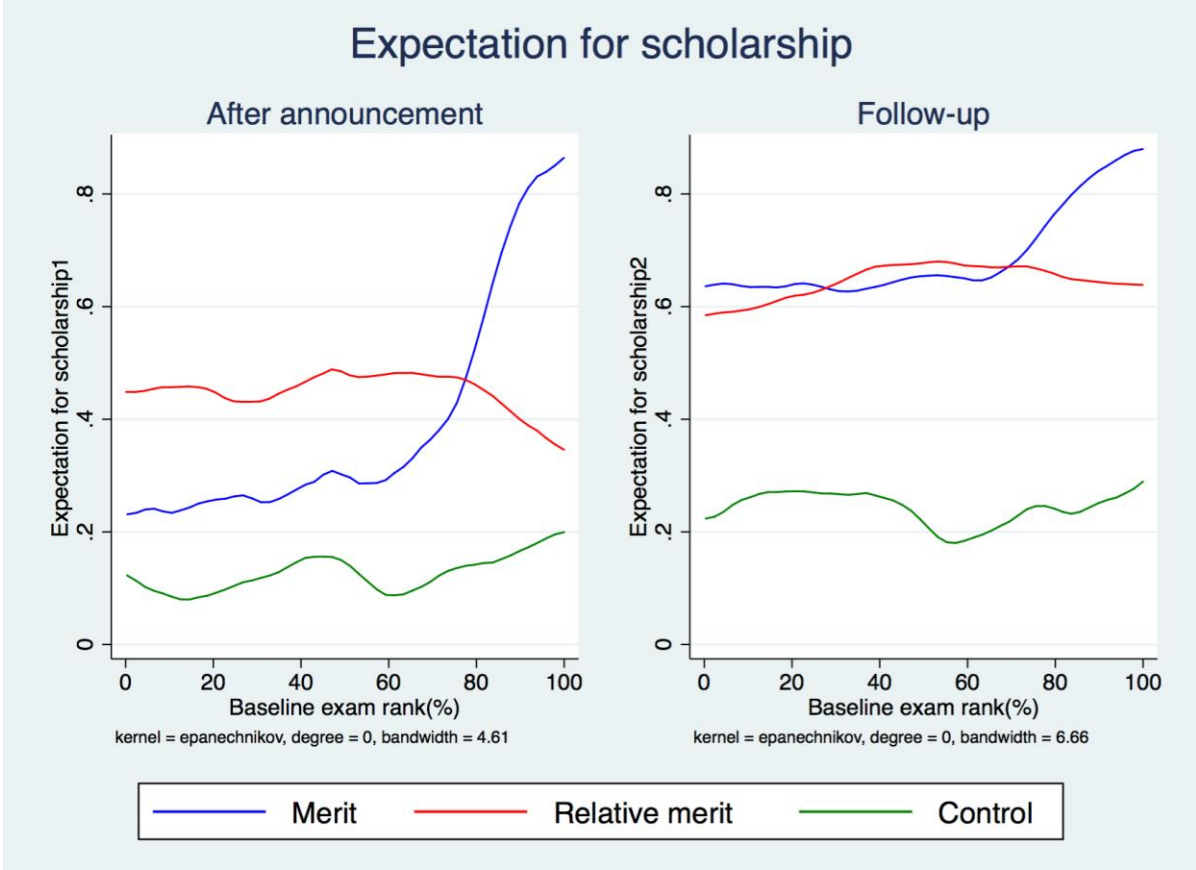
$$Y_{ijk} = \beta_0 + \beta_1 Merit_{jk} + \beta_2 Relative_{jk} + \beta_3 Feedback_{ijk} + \beta_4 Relative_{jk} * Feedback_{ijk} + \beta_5 Relative_{jk} * Feedback_{ijk} + \gamma_1 X_{ijk} + \epsilon_{ijk} \quad (3)$$

  - $Feedback_{ijk}$ equals one if students were assigned to feedback group

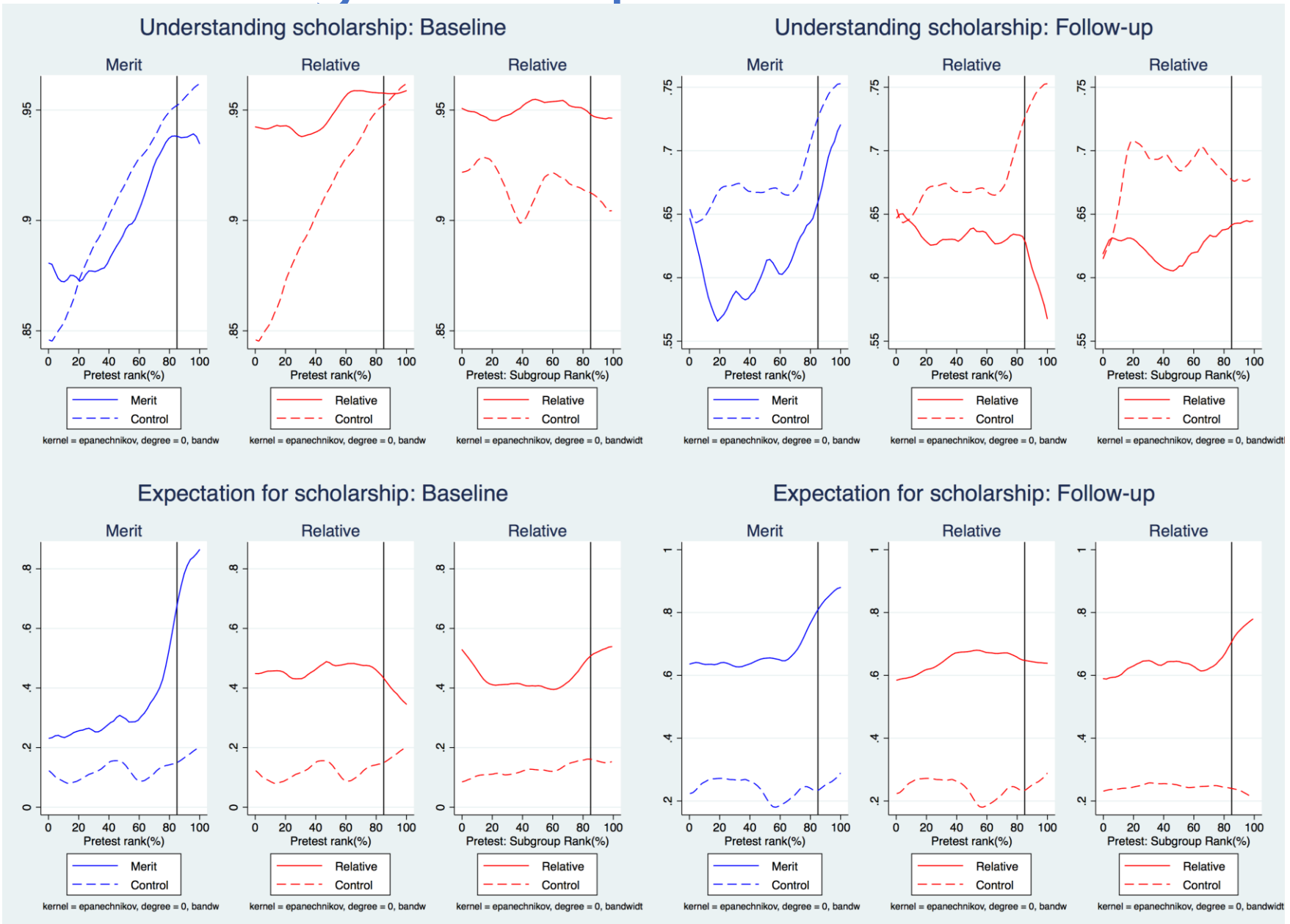
Scholarship effects

Understanding and expectation of the scholarship





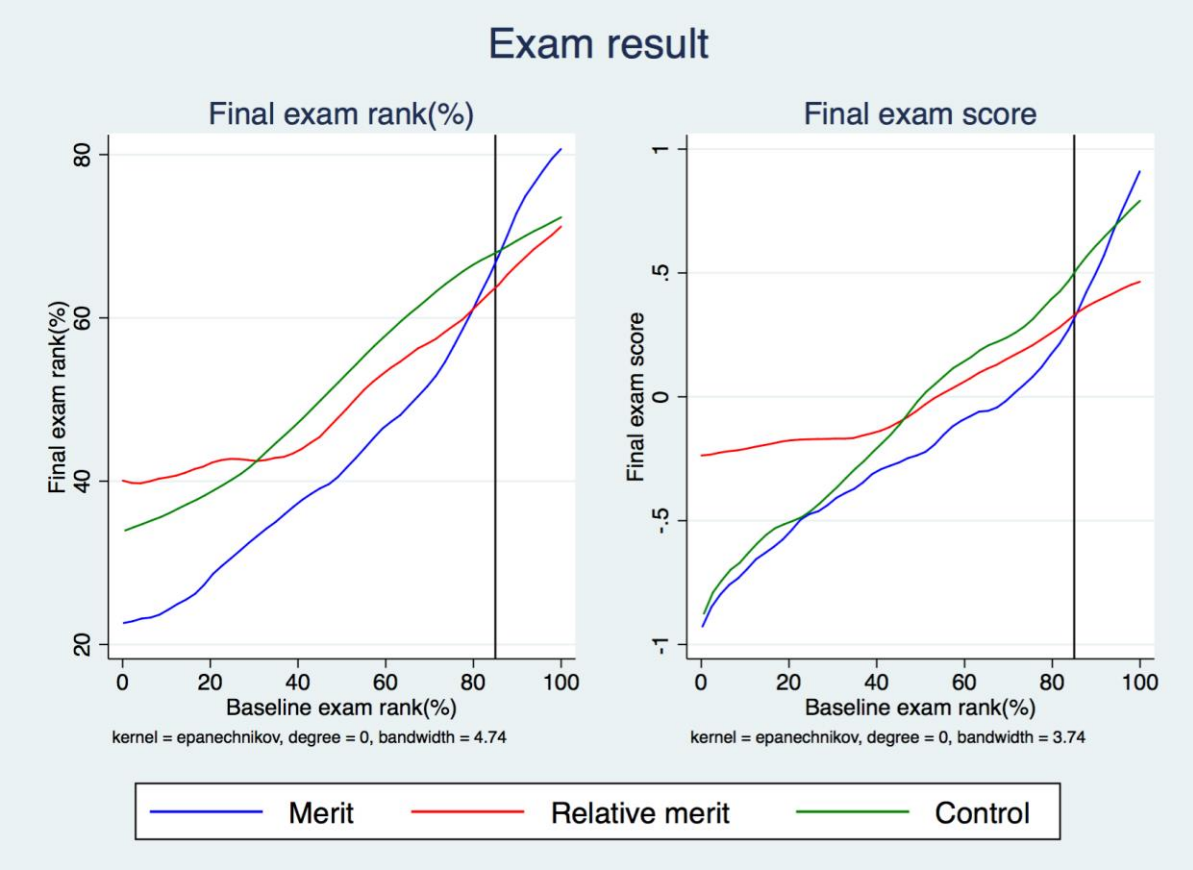
Understanding and expectation of the scholarship

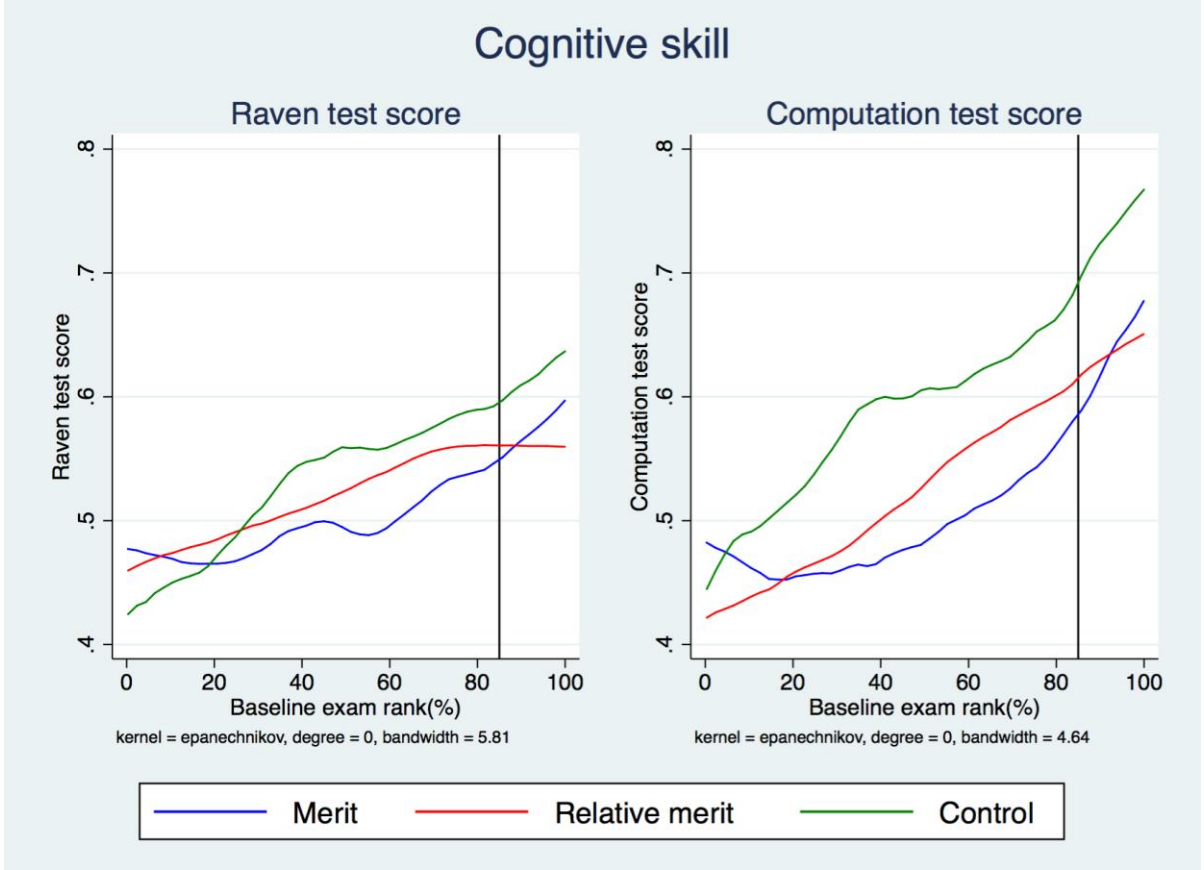


Understanding and expectation of the scholarship

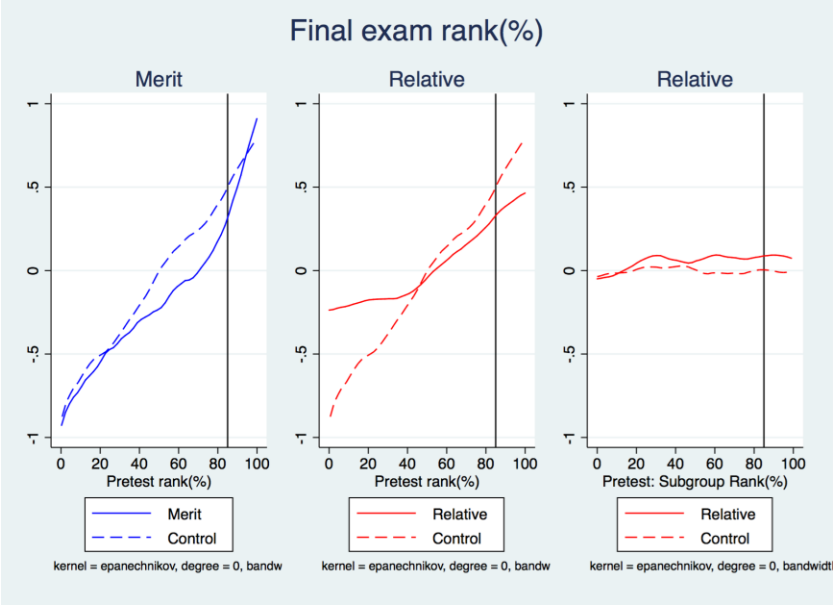
	Understanding scholarship				Expectation for scholarship			
	After Announcement		Follow-up		After Announcement		Follow-up	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Merit	-.0125	-.0117	-.0593*	-.062*	.26***	.194***	.442***	.411***
	(.0246)	(.0269)	(.0327)	(.0337)	(.0657)	(.0665)	(.0417)	(.0441)
Relative merit	.0336	.0397	-.0518	-.0314	.318***	.347***	.399***	.406***
	(.0219)	(.0241)	(.0349)	(.0343)	(.0723)	(.0701)	(.0425)	(.0445)
Baseline top 15%		.0551**		.0867***		.0646		.0157
		(.0212)		(.0267)		(.0526)		(.0374)
Merit x Top 15%		-.00828		.0166		.458***		.198***
		(.026)		(.0423)		(.0883)		(.0445)
Relative x Top 15%		-.0438*		-.123**		-.16		-.0387
		(.0234)		(.049)		(.101)		(.0513)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5792	5792	6047	6047	5775	5775	5946	5946
R-sqaured	.0318	.0419	.0176	.0266	.0693	.127	.134	.143
Mean of dep. var.	.924		.635		.355		.581	

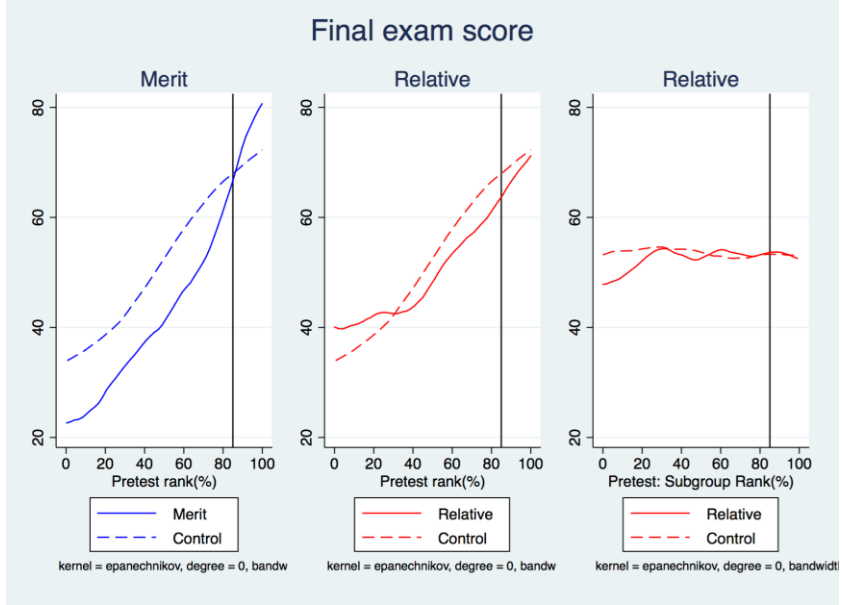
Test results





Test result


Final exam rank(%)
Merit
Relative
Relative
Pretest rank(%)
Pretest rank(%)
Pretest: Subgroup Rank(%)
Merit
Control
Relative
Control
Relative
Control
kernel = epanechnikov, degree = 0, bandw
kernel = epanechnikov, degree = 0, bandw
kernel = epanechnikov, degree = 0, bandwidt


Final exam score
Merit
Relative
Relative
Pretest rank(%)
Pretest rank(%)
Pretest: Subgroup Rank(%)
Merit
Control
Relative
Control
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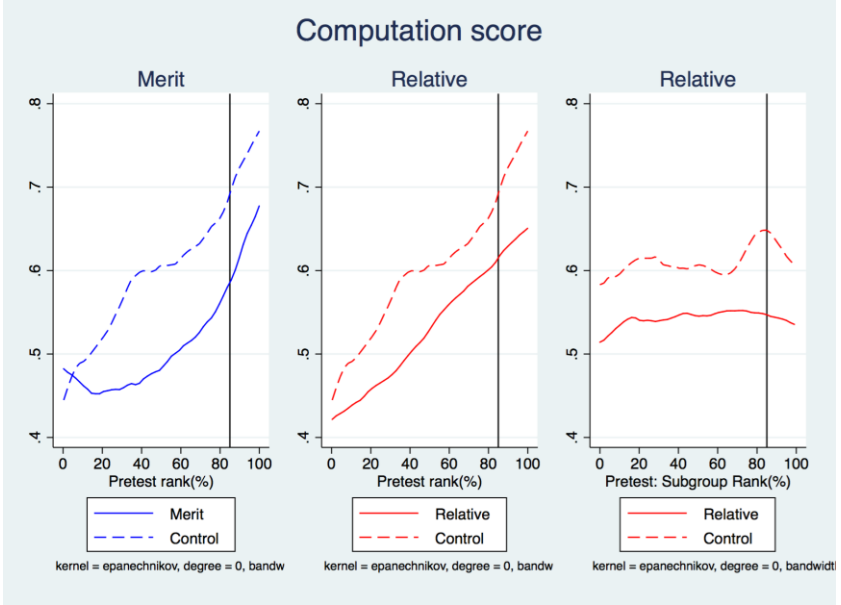
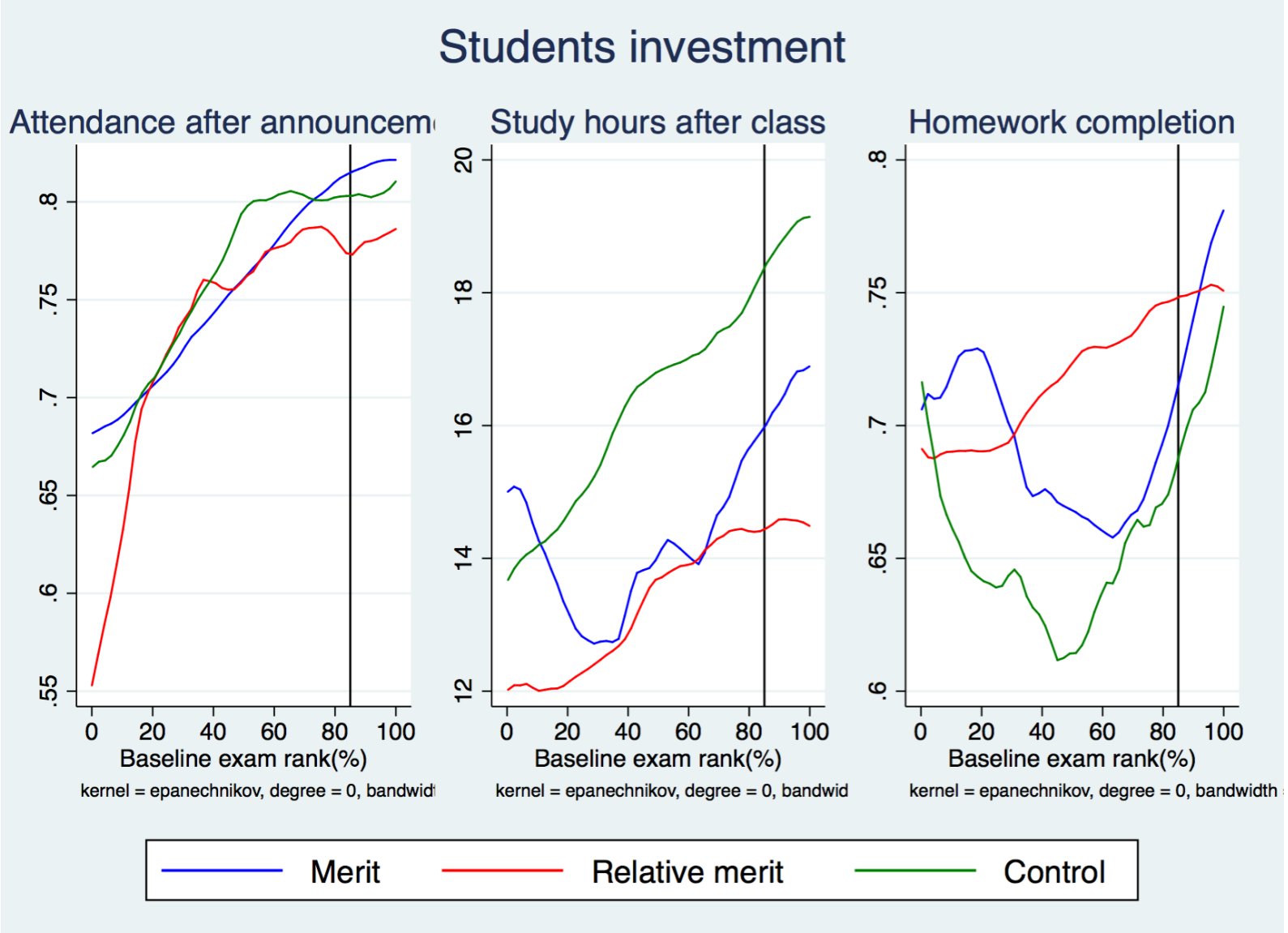

Computation score
Merit
Relative
Relative
Pretest rank(%)
Pretest rank(%)
Pretest: Subgroup Rank(%)
Merit
Control
Relative
Control
Relative
Control
kernel = epanechnikov, degree = 0, bandw
kernel = epanechnikov, degree = 0, bandw
kernel = epanechnikov, degree = 0, bandwidt

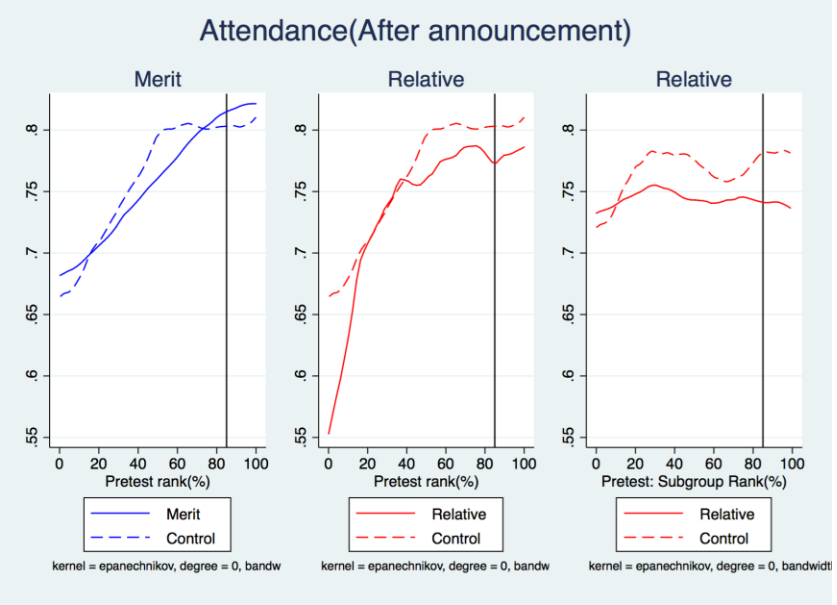
Test results

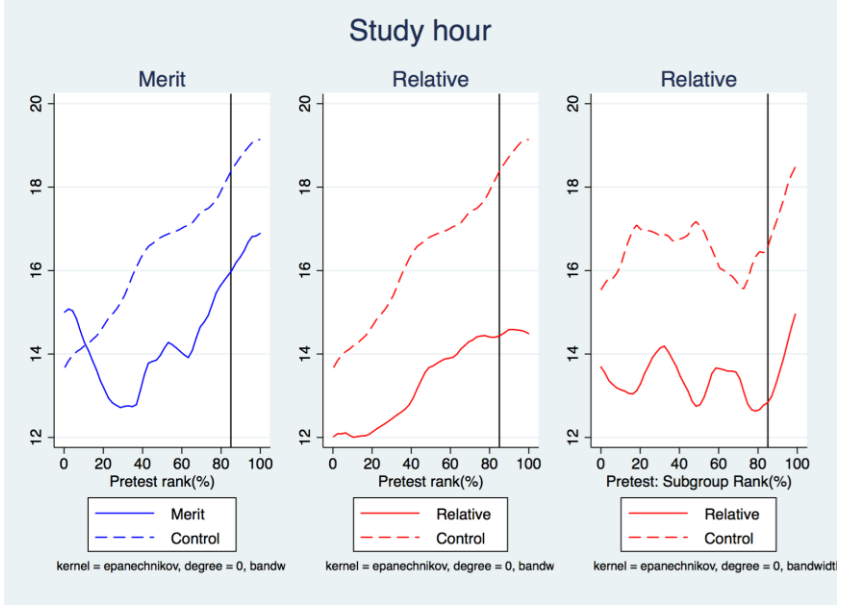
	Final exam rank(%)		Final exam score: Total		Computation test score	
	(1)	(2)	(3)	(4)	(5)	(6)
Merit	-8.32**	-10.2***	-.141	-.156	-.0834**	-.0825**
	(3.63)	(3.86)	(.104)	(.111)	(.0339)	(.0349)
Relative merit	-2.66	-1.99	.0106	.078	-.0562	-.0569
	(4.68)	(5.06)	(.124)	(.131)	(.0361)	(.0377)
Baseline top 15%		3.97		.18		.155***
		(4.62)		(.162)		(.028)
Merit x Top 15%		11.7**		.0725		.00198
		(5.03)		(.185)		(.04)
Relative x Top 15%		-4.14		-.403*		-.0236
		(6.94)		(.208)		(.0501)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	No	No
Observations	6561	6561	6561	6561	6054	6054
R-sqaured	.243	.255	.238	.25	.0699	.117
Mean of dep. var.	50.1		-.0295		.547	

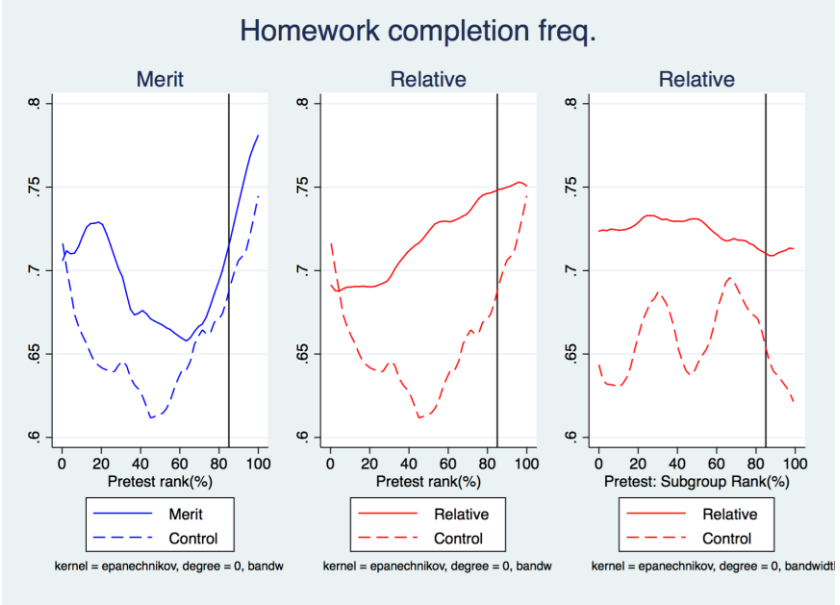
Students' investment



Students' investment



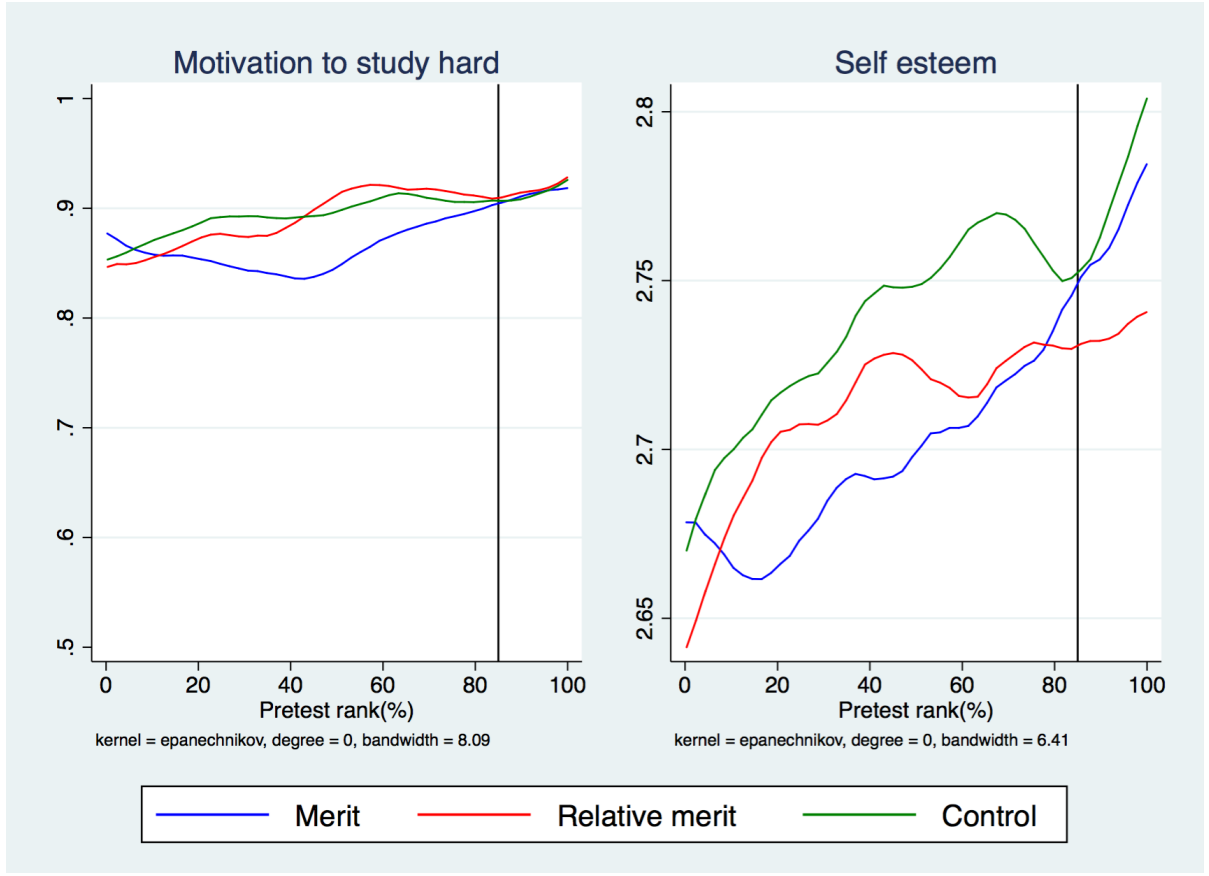




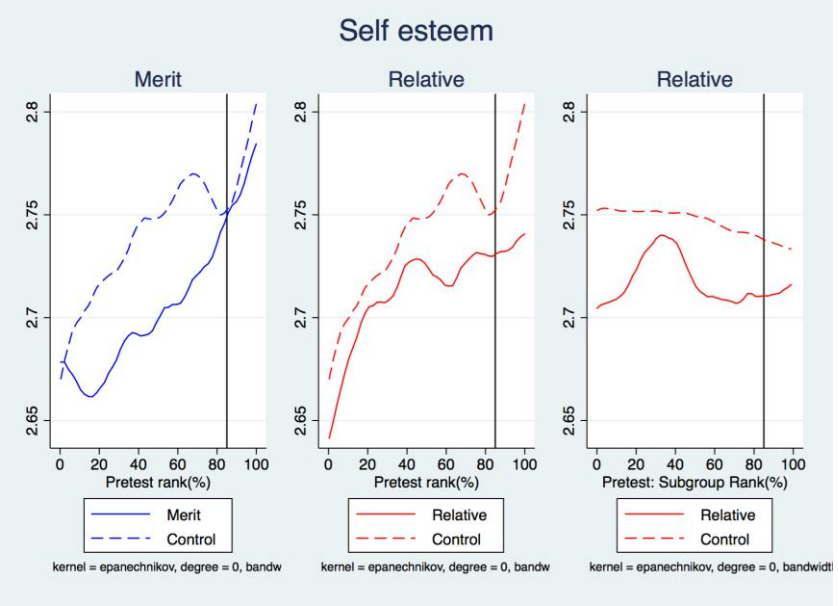
Students' investment on Education

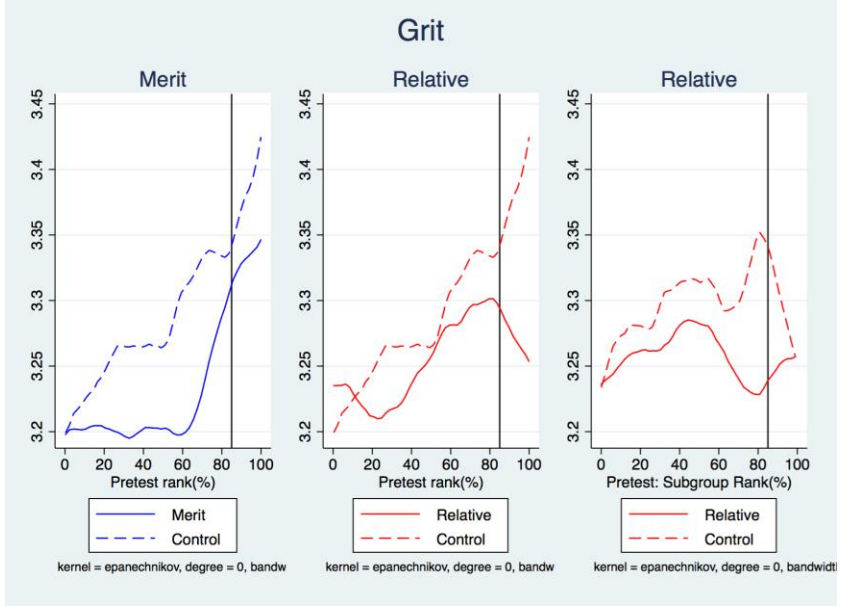
	Attendance (after announcement)		Study hours after class		Homework completion	
	(1)	(2)	(3)	(4)	(5)	(6)
Merit	-.0027	-.0044	-2.01*	-2.01	.0473	.0448
	(.0177)	(.0189)	(1.21)	(1.25)	(.0473)	(.0492)
Relative merit	-.0132	-.0113	-2.98**	-2.78**	.0677	.0716
	(.0208)	(.022)	(1.31)	(1.35)	(.0426)	(.0453)
Baseline top 15%		.0316		2.07		.0692*
		(.0192)		(1.93)		(.0353)
Merit x Top 15%		.00944		.377		.0183
		(.0234)		(2.07)		(.0495)
Relative x Top 15%		-.0186		-1.36		-.0324
		(.036)		(2.43)		(.0598)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7323	7323	5414	5414	6006	6006
R-sqaured	.16	.162	.0481	.05	.0122	.015
Mean of dep. var.	.755		14.6		.698	

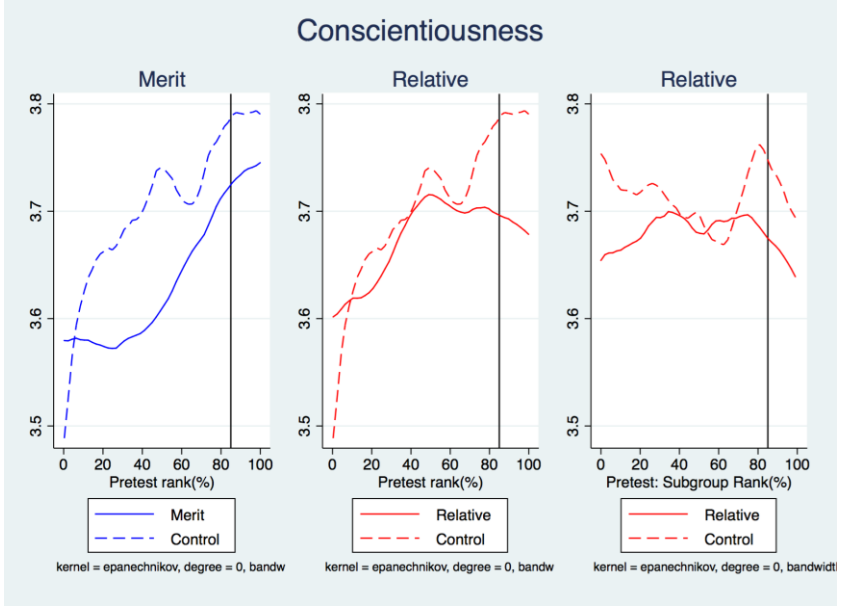
Students' motivation and non-cognitive traits



Students' motivation and non-cognitive traits



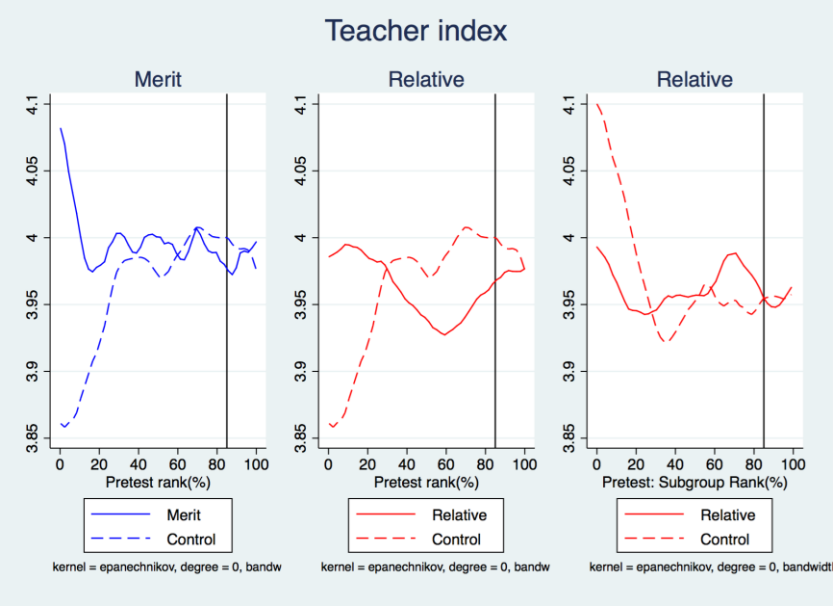


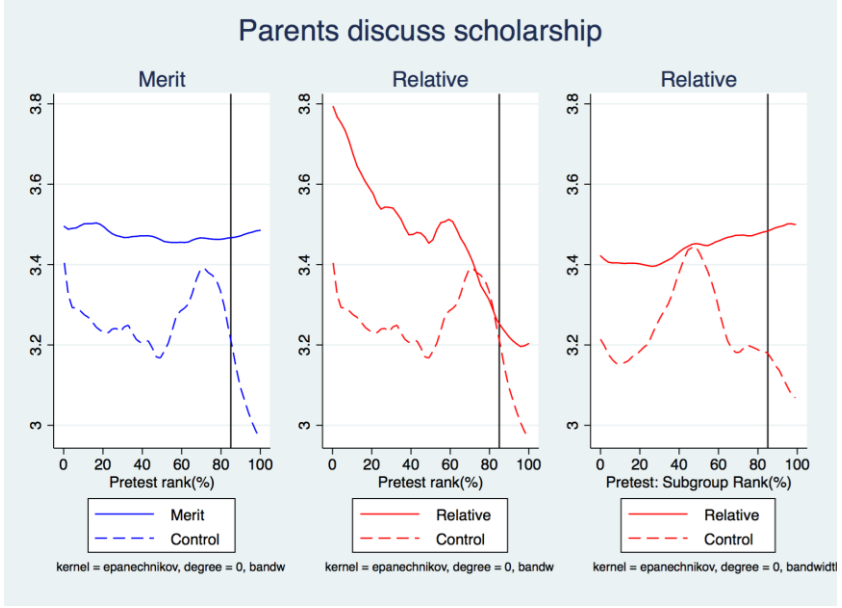


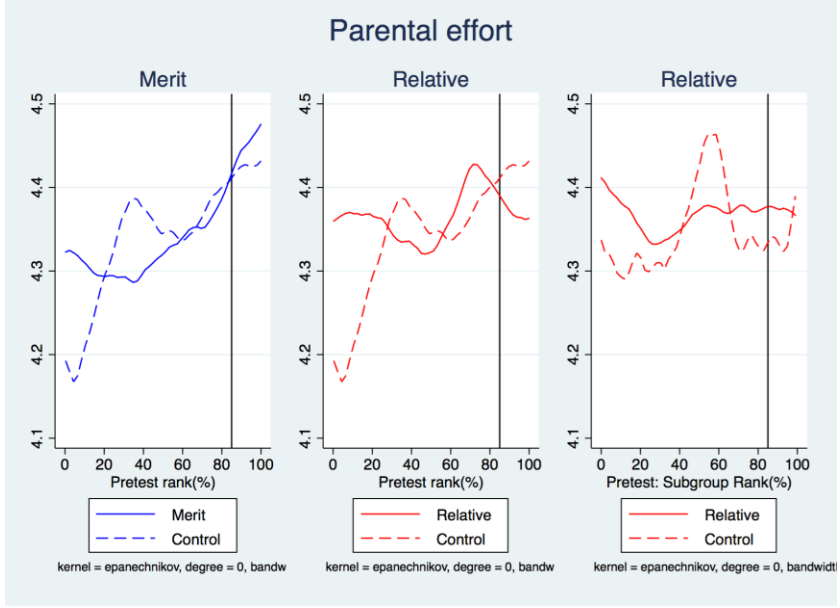
Students' motivation and non-cognitive traits

	Motivation to study hard		Self esteem		Grit scale		Conscientiousness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Merit	-.0262	-.0284	-.0398**	-.0449**	-.0567*	-.0625**	-.0706**	-.0833**
	(.0162)	(.0185)	(.0169)	(.0177)	(.031)	(.0294)	(.0341)	(.0327)
Relative merit	-.00125	.000414	-.031	-.0283	-.0394	-.0269	-.0455	-.0362
	(.0146)	(.017)	(.0193)	(.0204)	(.0323)	(.0326)	(.0368)	(.0325)
Baseline top 15%		.0363		.0368		.0813***		.0326
		(.0225)		(.0325)		(.0302)		(.0824)
Merit x Top 15%		.0154		.0335		.0374		.0813
		(.0319)		(.0397)		(.0513)		(.0912)
Relative x Top 15%		-.0151		-.0208		-.0802*		-.0547
		(.0281)		(.0377)		(.0427)		(.0964)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5947	5947	6037	6037	6037	6037	6039	6039
R-sqaured	.00866	.0106	.0343	.037	.0287	.0333	.0683	.0709
Mean of dep. var.	.888		2.72		3.26		3.67	

Teachers and family response change





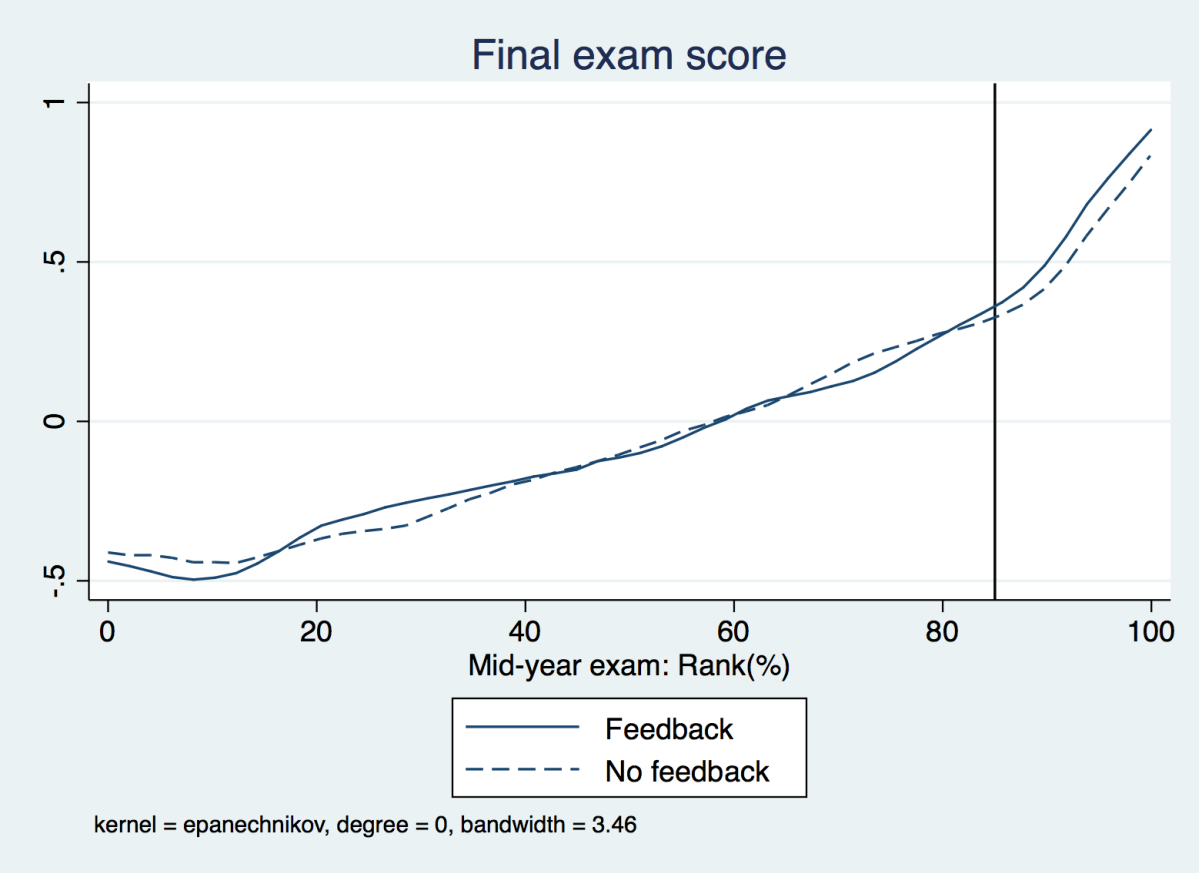


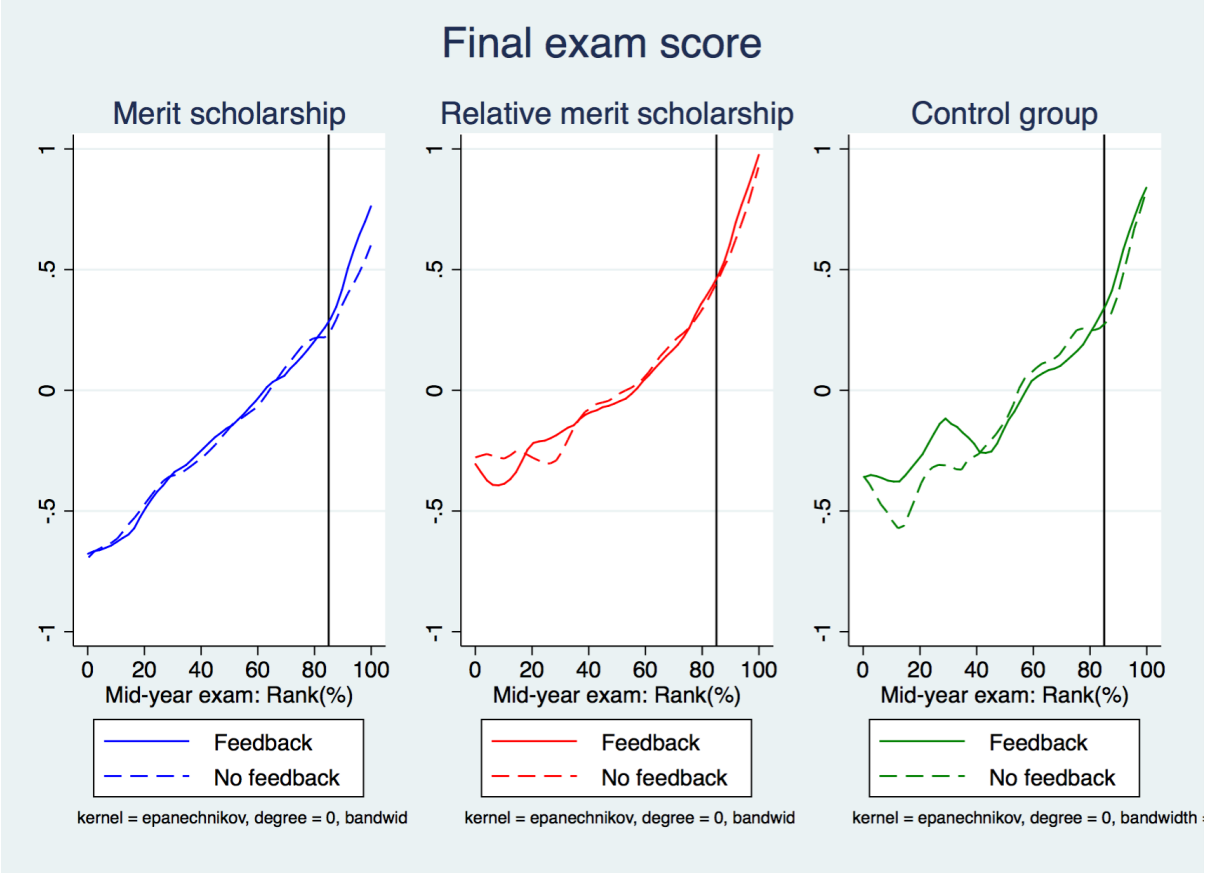
Teachers and family response change

	Teacher Effort Index		Parents' mentioning scholarship		Parental effort	
	(1)	(2)	(3)	(4)	(5)	(6)
Merit	.00111	.00243	.2**	.149*	.00748	-.00117
	(.0522)	(.0552)	(.0804)	(.0838)	(.0506)	(.0539)
Relative merit	-.0388	-.0411	.172**	.199**	.0282	.0465
	(.0543)	(.0587)	(.0831)	(.0826)	(.0505)	(.0541)
Baseline top 15%		.00128		-.237***		.0856
		(.0433)		(.0868)		(.0526)
Merit x Top 15%		-.00793		.312**		.0552
		(.0591)		(.119)		(.075)
Relative x Top 15%		.0121		-.101		-.111
		(.066)		(.126)		(.0706)
Constant	3.2***	3.2***	4.02***	4.04***	3.72***	3.72***
	(.17)	(.171)	(.254)	(.251)	(.171)	(.173)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	No	No	Yes	Yes
Observations	6033	6033	6044	6044	6043	6043
R-sqaured	.0654	.0654	.0171	.0229	.0443	.0463
Mean of dep. var.	3.98		3.41		4.36	

Feedback effects

Feedback effect on test result





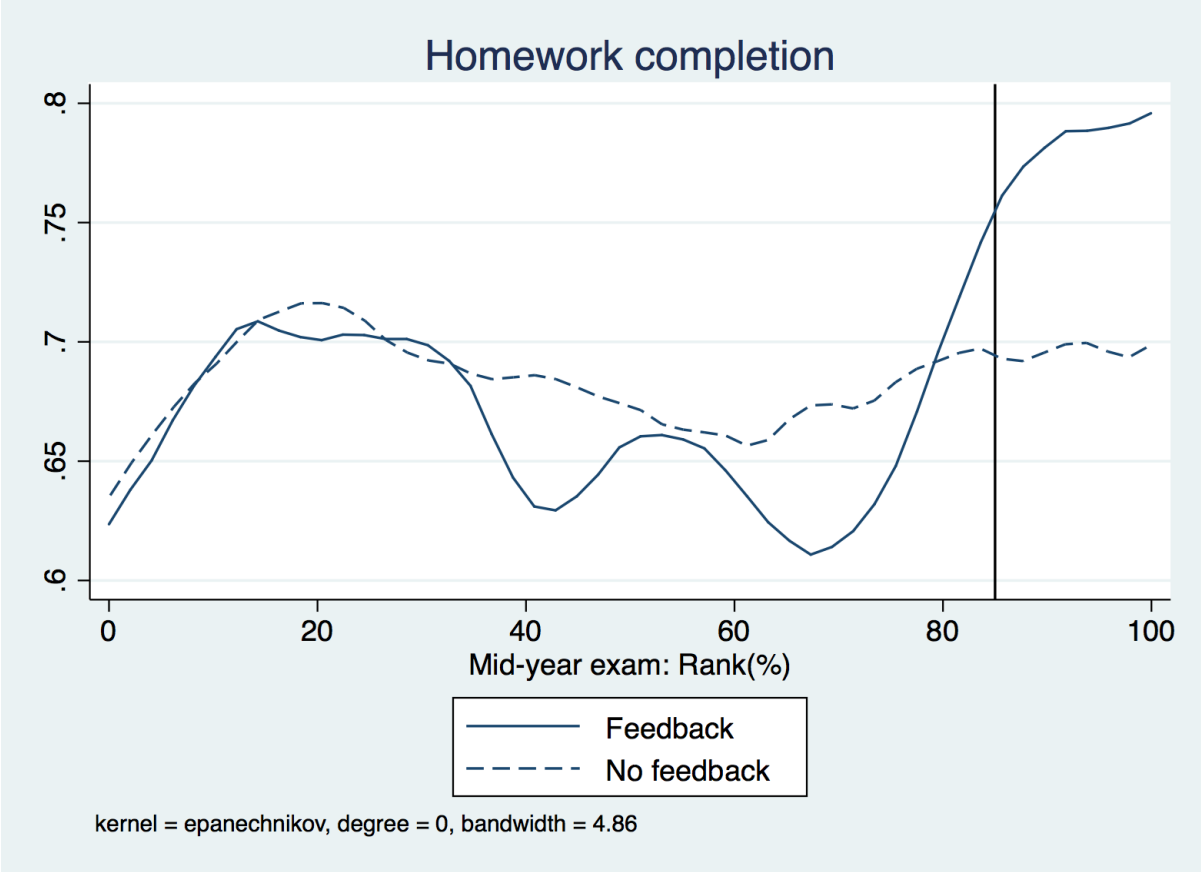
Test results (1)

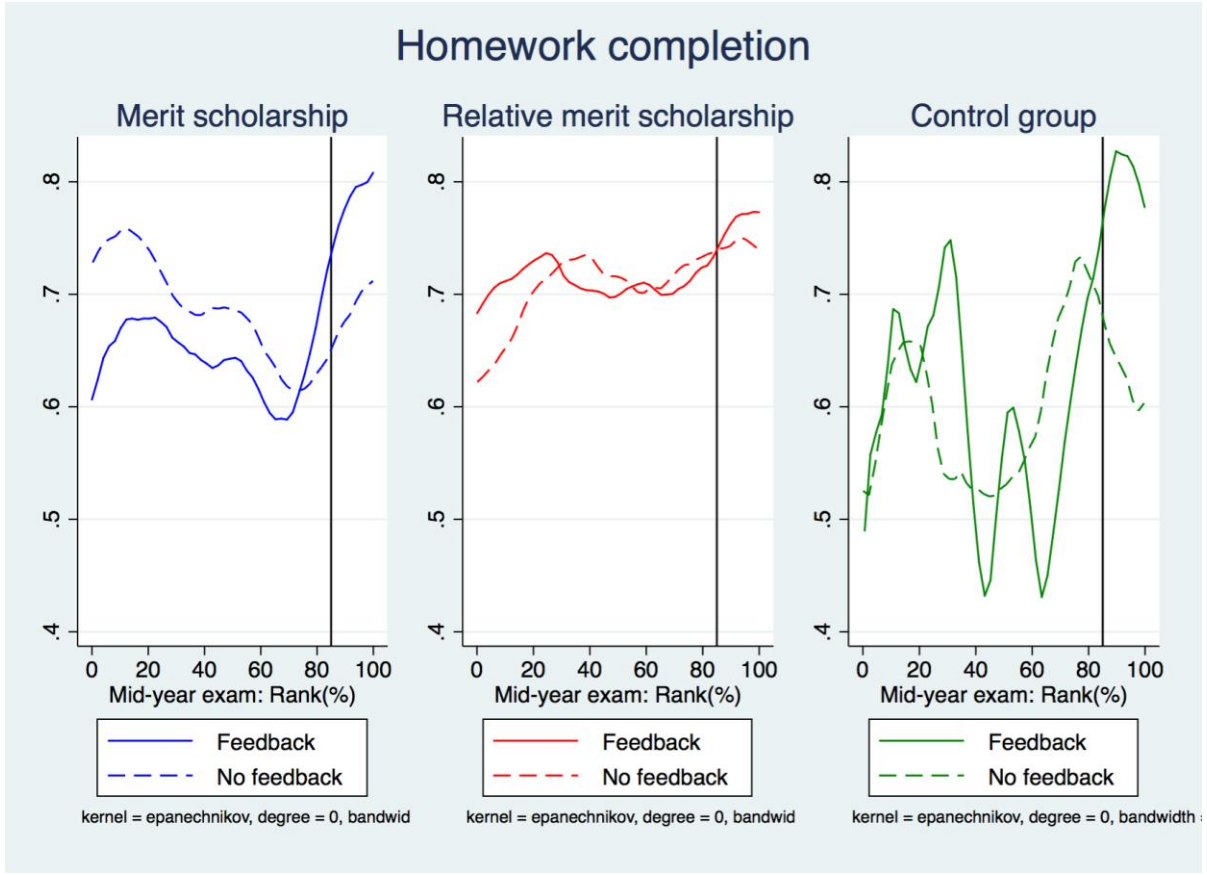
	Final exam rank(%)			Final exam score		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(1)	(2)	(3)	(4)	(5)	(6)
Feedback	1.38	2.69	.612	.0336	.0968	.0051
	(1.57)	(3.49)	(1.83)	(.0349)	(.0722)	(.0378)
Merit	-9.58*	-9.23	-9.44**	-.156	-.131	-.161**
	(4.98)	(9.05)	(4.26)	(.103)	(.212)	(.0784)
Relative merit	-2.17	.585	-2.1	.008	.0798	.00349
	(5.9)	(9.67)	(5.2)	(.126)	(.226)	(.102)
Merit x Feedback	-.127	-.429	.44	-.0148	-.0499	.00794
	(1.77)	(3.84)	(2.06)	(.0381)	(.0797)	(.0418)
Relative merit x Feedback	-1.59	-.5	-1.44	-.0324	-.0321	-.0198
	(1.75)	(4.38)	(2.06)	(.039)	(.0933)	(.0425)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5373	1320	4053	5373	1320	4053
R-squared	.224	.353	.147	.208	.303	.12
Mean of dep. var.		45.4			-.116	

Test results (2)

	Raven test score			Computation test score		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(1)	(2)	(3)	(4)	(5)	(6)
Feedback	.0212*	.0381	.0125	.00525	.0637**	-.021
	(.0108)	(.0359)	(.0147)	(.0134)	(.0303)	(.0154)
Merit	-.00487	-.00214	-.00543	-.0763*	-.0326	-.0896**
	(.0262)	(.0343)	(.0282)	(.0388)	(.0475)	(.0417)
Relative merit	.0192	.0434	.0123	-.026	.0138	-.0377
	(.0264)	(.037)	(.028)	(.0425)	(.0495)	(.0458)
Merit x Feedback	-.0136	.00477	-.0161	.0108	-.0677*	.0441**
	(.0156)	(.041)	(.0198)	(.0161)	(.0387)	(.0189)
Relative merit x Feedback	-.0257*	-.0507	-.0141	-.00708	-.0424	.0142
	(.014)	(.041)	(.0182)	(.0165)	(.0365)	(.0192)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	No	No	No
Observations	5046	1253	3793	5053	1254	3799
R-squared	.0667	.12	.0585	.0419	.065	.0466
Mean of dep. var.		.497			.492	

Students' investment on Education





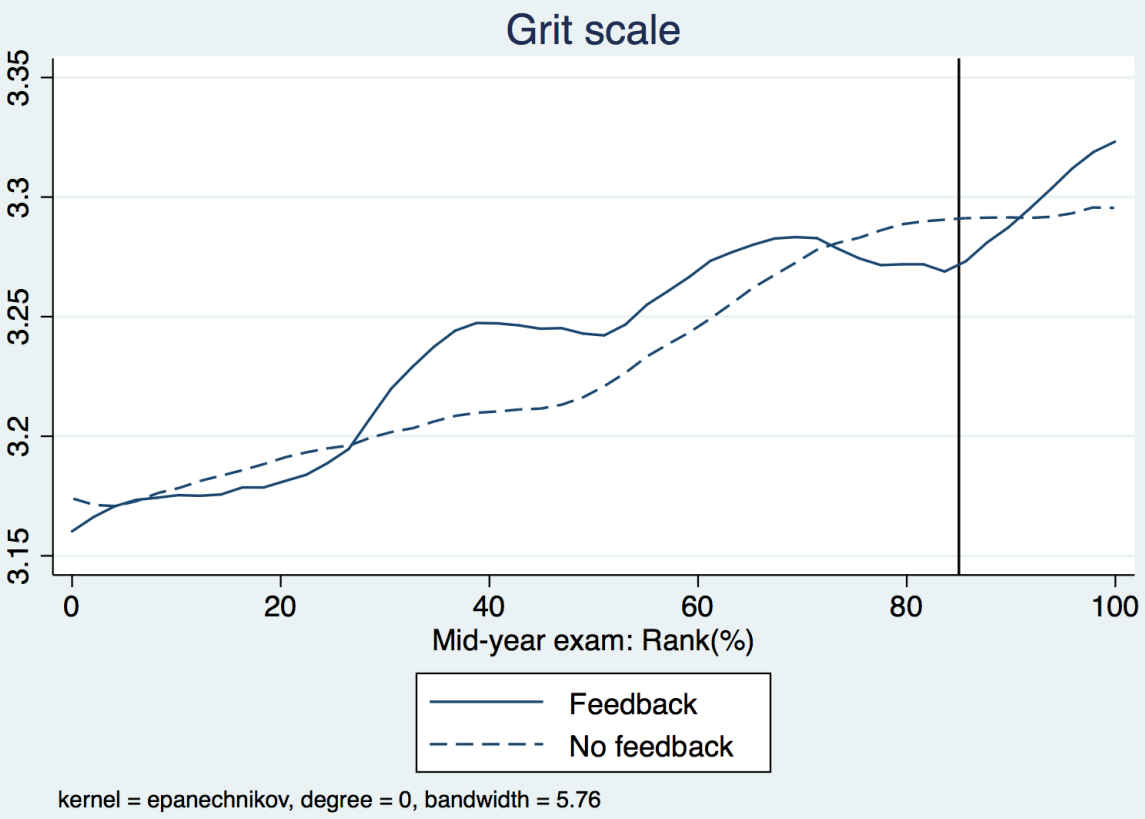
Students' investment on Education (1)

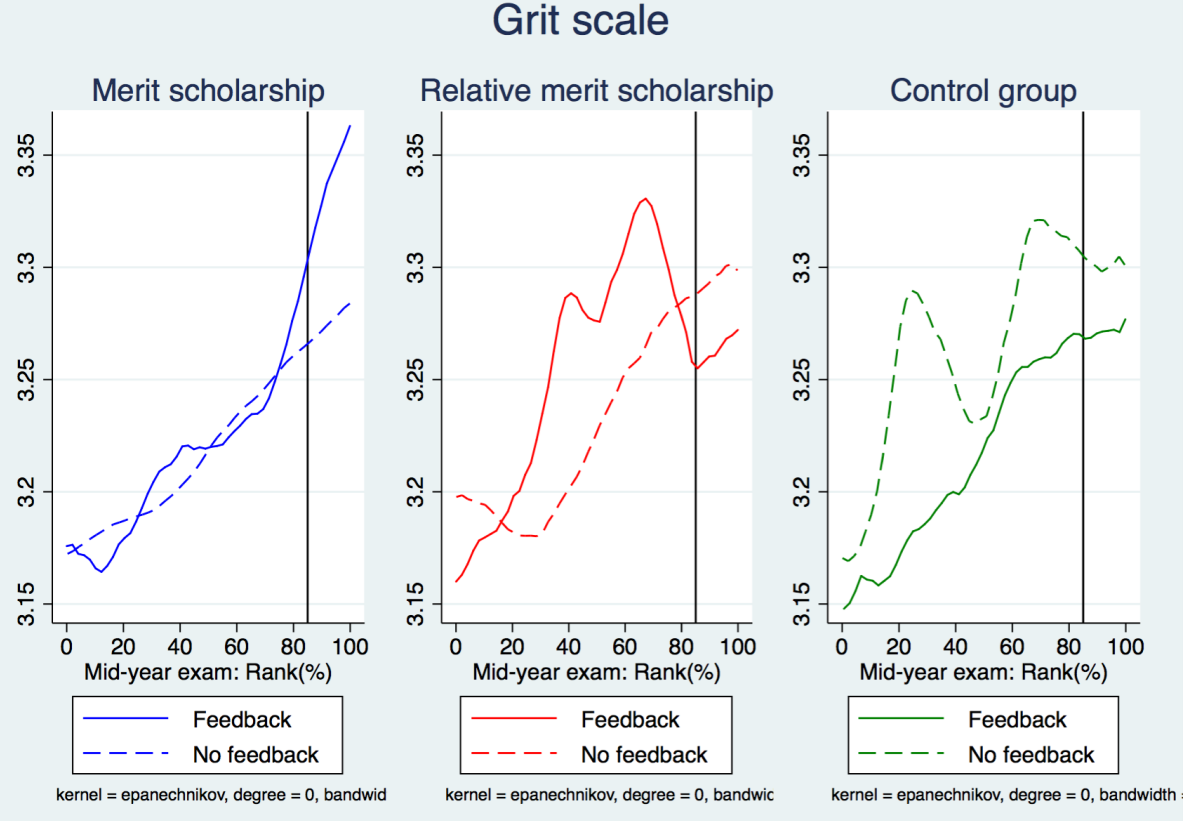
	Attendance after announcement			Study hours after class		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(1)	(2)	(3)	(4)	(5)	(6)
Feedback	.00496	-.0464**	.0226	.534	4.11***	-1.03
	(.0101)	(.0202)	(.0158)	(1.12)	(1.39)	(1.36)
Merit	.0279*	.00287	.0221	-1.2	-.0953	-1.61
	(.0146)	(.0393)	(.0185)	(1.58)	(2.31)	(1.53)
Relative merit	.0292	.00279	.0259	-2.01	-2.12	-2.04
	(.0194)	(.0327)	(.0227)	(1.62)	(2.2)	(1.66)
Merit x Feedback	-.0168	.0365	-.027	-.0351	-4.01**	1.73
	(.0152)	(.0349)	(.0187)	(1.32)	(1.99)	(1.55)
Relative merit x Feedback	-.0186	.0263	-.0306	-.474	-2.34	.629
	(.0143)	(.0288)	(.0189)	(1.34)	(1.86)	(1.6)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6044	1647	4397	4503	1119	3384
R-squared	.175	.338	.0854	.0341	.0667	.0319
Mean of dep. var.		.733			13.3	

Students' investment on Education (2)

	Study hours on weekends			Homework completion		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(1)	(2)	(3)	(4)	(5)	(6)
Feedback	.225	-1.81	1.26	.0336	.201***	-.0423
	(1.59)	(2.73)	(1.63)	(.0253)	(.0623)	(.036)
Merit	.32	-2.45	1.43	.0868	.143	.0612
	(1.87)	(3.16)	(1.66)	(.0611)	(.0947)	(.0618)
Relative merit	-1.29	-3.15	-.431	.0999*	.13	.0806
	(1.98)	(3.3)	(1.75)	(.0562)	(.083)	(.0588)
Merit x Feedback	-.437	3.76	-2.16	-.0548	-.168**	.00318
	(1.71)	(3.22)	(1.82)	(.0333)	(.0734)	(.0427)
Relative merit x Feedback	-.266	2.32	-1.5	-.0195	-.15**	.047
	(1.76)	(2.98)	(1.85)	(.0298)	(.0707)	(.0406)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4621	1166	3455	5011	1244	3767
R-squared	.0204	.0288	.0218	.0146	.0325	.0166
Mean of dep. var.		14.8			.68	

Students' motivation and Non-cognitive traits





Students' motivation and Non-cognitive traits (1)

	Motivation to study hard			Self esteem		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(1)	(2)	(3)	(4)	(5)	(6)
Feedback	-.0145	-.00786	-.0196	-.0368	-.034	-.0372
	(.0154)	(.0236)	(.0217)	(.0279)	(.047)	(.029)
Merit	-.039*	-.01	-.0484*	-.0465*	-.0401	-.0429*
	(.0218)	(.0327)	(.027)	(.0235)	(.0354)	(.0257)
Relative merit	.014	-.00981	.0209	-.0533**	-.0714*	-.0425
	(.0204)	(.0284)	(.0242)	(.0252)	(.0419)	(.0269)
Merit x Feedback	.0334	.00807	.0438	.0324	.0155	.0362
	(.0214)	(.0431)	(.0308)	(.0306)	(.0545)	(.0329)
Relative merit x Feedback	-.0034	.0117	-.00462	.0569*	.0926	.0465
	(.0196)	(.0314)	(.0262)	(.0307)	(.0568)	(.0322)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4984	1233	3751	5038	1251	3787
R-squared	.013	.0233	.0141	.0282	.0668	.0218
Mean of dep. var.		.882			2.71	

Students' motivation and Non-cognitive traits (2)

	Grit scale			Conscientiousness		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(1)	(2)	(3)	(4)	(5)	(6)
Feedback	-.0343*	-.00375	-.0526	.0355	.084	.0101
	(.0192)	(.0294)	(.0333)	(.0374)	(.0861)	(.0283)
Merit	-.0445	.00269	-.0645	-.0503	.0184	-.0739*
	(.039)	(.0608)	(.039)	(.0453)	(.0669)	(.0442)
Relative merit	-.0398	-.014	-.0553	-.018	.0115	-.0268
	(.0396)	(.061)	(.04)	(.0478)	(.0749)	(.0461)
Merit x Feedback	.0407	.0345	.0507	-.0232	-.097	.0111
	(.0303)	(.0574)	(.0414)	(.0424)	(.0969)	(.0372)
Relative merit x Feedback	.0465*	-.0265	.0797**	-.0254	-.0627	-.00409
	(.0263)	(.048)	(.0392)	(.0432)	(.0997)	(.0363)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5038	1251	3787	5040	1252	3788
R-squared	.0223	.0526	.0206	.0564	.0522	.0616
Mean of dep. var.		3.24			3.65	

Conclusion

- Financial incentives for students based on school performance may not work.
  - Especially when they are unlikely to win
  - Significant decrease of exam result in merit scholarship group
  - Study hours after class and non-cognitive traits also decrease significantly.

- No significant effect of feedback on the school performance in general.

2nd year trial

- Purpose
  - Explore ways that student incentive works
  - Complementarity between scholarship based on school performance and other school inputs such as after school tutoring
  - Focus only on mathematics

- Interventions
  - Relative merit based scholarship
  - After-school mathematics tutoring program

- 122 grades (4-7) in 31 schools are randomized as follows:
  - Group 1 (21 grades): No scholarship, no tutoring
  - Group 2 (40 grades): No scholarship, tutoring randomly assigned to half of students
  - Group 3 (21 grades): Scholarship, no tutoring
  - Group 4 (40 grades): Scholarship, tutoring randomly assigned to half of students

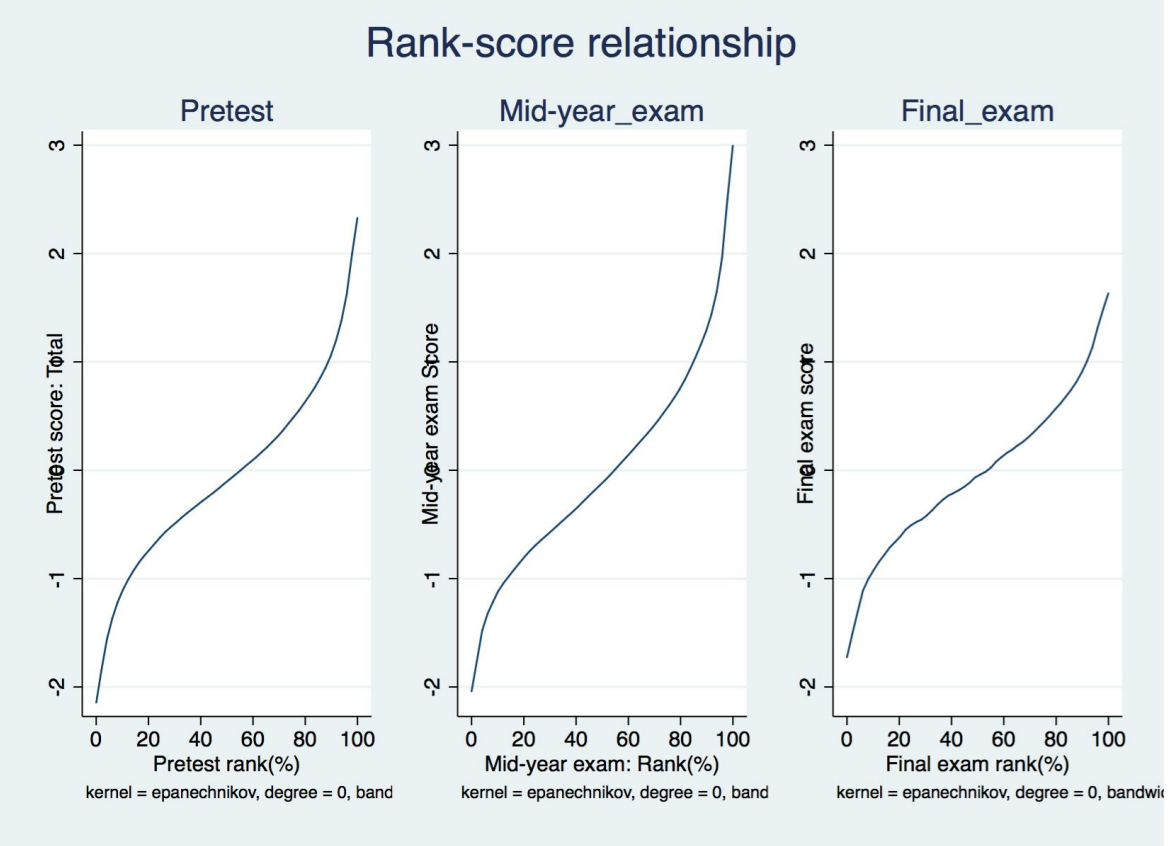
Teacher and Parental response (1)

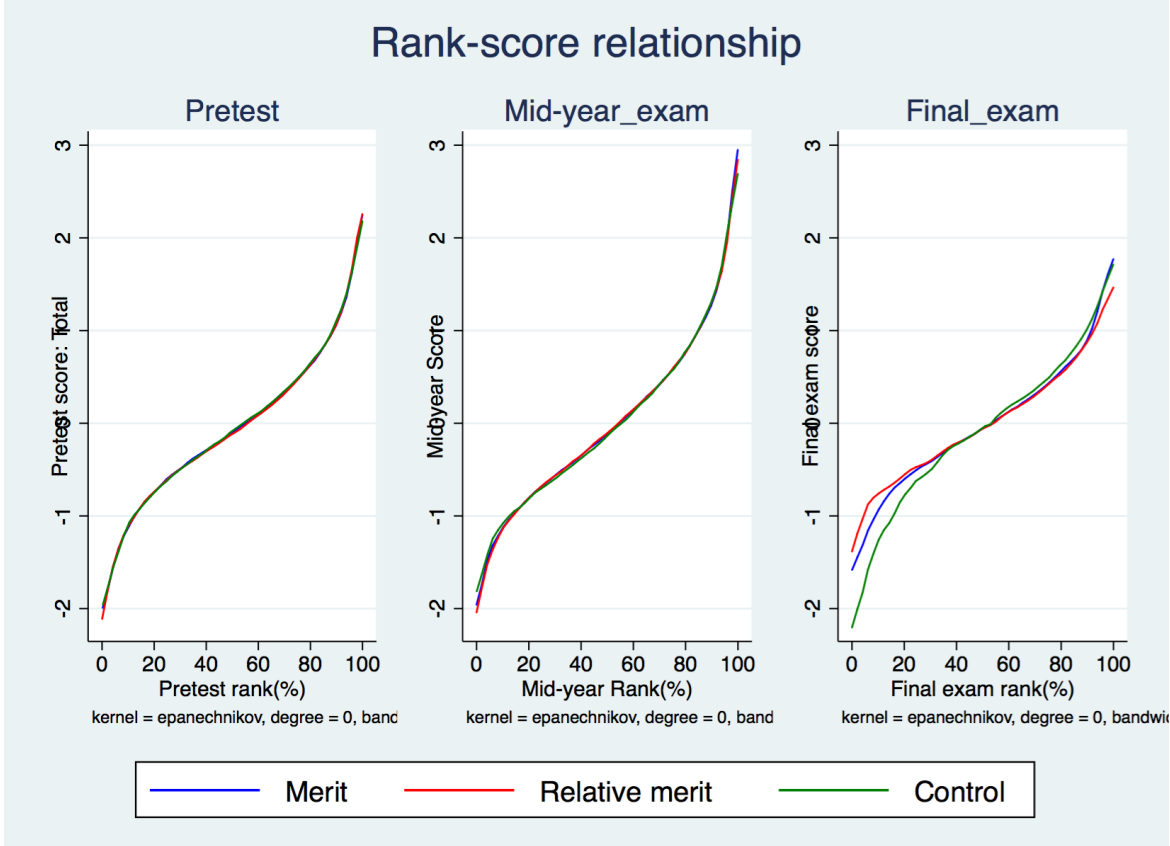
	Teacher Effort Index		
	All	Top 15%	Bottom 85%
	(1)	(2)	(3)
Feedback	-.0141	.00248	-.0211
	(.0228)	(.0396)	(.0247)
Merit	-.049	.0321	-.0794
	(.0675)	(.0859)	(.0696)
Relative merit	-.0723	-.0337	-.0866
	(.0658)	(.0818)	(.0691)
Merit x Feedback	.0178	-.0244	.0323
	(.0269)	(.0492)	(.0305)
Relative merit x Feedback	.00844	.0501	-.00151
	(.0291)	(.0536)	(.0343)
Demographic Control	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes
Observations	5034	1251	3783
R-squared	.065	.077	.0668
Mean of dep. var.		3.98	

Teacher and Parental response (2)

	Parental effort			Parents' mentioning scholarship		
	All	Top 15%	Bottom 85%	All	Top 15%	Bottom 85%
	(4)	(5)	(6)	(7)	(8)	(9)
Feedback	.0385	-.00355	.0526	-.0574	-.12	-.0246
	(.0629)	(.12)	(.0554)	(.0631)	(.167)	(.0738)
Merit	.0597	.197**	.00798	.117	.287*	.0471
	(.0523)	(.0896)	(.0566)	(.0904)	(.165)	(.0892)
Relative merit	.0616	.205***	.00741	.0699	-.00197	.0844
	(.0539)	(.0743)	(.0579)	(.0957)	(.177)	(.0927)
Merit x Feedback	-.0942	-.0967	-.0942	.0404	-.0489	.0603
	(.0695)	(.134)	(.0641)	(.0852)	(.197)	(.101)
Relative merit x Feedback	-.0337	-.0614	-.0225	-.00775	.141	-.0726
	(.0704)	(.136)	(.0666)	(.0871)	(.202)	(.102)
Demographic Control	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Control	Yes	Yes	Yes	No	No	No
Observations	5044	1253	3791	5046	1252	3794
R-squared	.0367	.0616	.0361	.0113	.0246	.0136
Mean of dep. var.		4.34			3.48	

Score-Rank relationship





Distribution of Baseline characteristics (cont.)