Online Appendix

Racial Discrimination in Grading: Evidence from Brazil

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Table WA1
First-Stage Regressions' Summary Statistics

	4th-order polynomial F-test of instruments [P-value]	3rd-order polynomial F-test of instruments [P-value]
Endogenous variables		
Proficiency score in Math (z-score)	769.89 [0.00]	953.22 [0.00]
Proficiency score in Math (z-score) squared	237.33 [0.00]	1679.11 [0.00]
Proficiency score in Math (z-score) to the third	338.86 [0.00]	844.63 [0.00]
Proficiency score in Math (z-score) to the fourth	192.61 [0.00]	-
Language score x Proficiency score in Math (z-score)	709.85 [0.00]	3401.08 [0.00]
Language score x Proficiency score in Math (z-score) squared	685.97 [0.00]	1461.58 [0.00]
Language score x Proficiency score in Math (z-score) to the third	326.19 [0.00]	1094.25 [0.00]
Language score x Proficiency score in Math (z-score) to the fourth	268.55 [0.00]	-
Proficiency score in Language (z-score)	3799.64 [0.00]	9523.16 [0.00]

Notes: Samples consist of 277,444 students in 10,614 classrooms. Instruments are polynomials of past test scores in Math and Language and past test scores in Natural Sciences.

Table WA2
Conditional Racial Differentials in Math Grades (z-scores) and Learning via Teacher-Student Interactions, Stratified by Teacher Characteristics - IV Estimations

	Full Sample [1]	Responding Teacher Questionnaire [2]	by evaluation methods		by teacher's race	
			Objective Grader [3]	Subjective Grader [4]	White Grader [5]	Black/Mixed Grader [6]
Teacher interacting with students over multiple academic years						
Black-White gap	-0.005	-0.003	-0.014	0.001	-0.003	0.011
	(0.010)	(0.010)	(0.020)	(0.012)	(0.011)	(0.042)
Proficiency in Math (z-score)	0.603***	0.604***	0.641***	0.574***	0.604***	0.767***
	(0.053)	(0.054)	(0.135)	(0.054)	(0.060)	(0.216)
Teacher interacting with students for the first academic year						
Black-White gap	-0.024***	-0.024***	-0.025**	-0.027***	-0.026***	-0.018
	(0.006)	(0.006)	(0.010)	(0.007)	(0.007)	(0.014)
Proficiency in Math (z-score)	0.461***	0.434***	0.381***	0.381***	0.452***	0.367***
	(0.035)	(0.039)	(0.068)	(0.048)	(0.042)	(0.094)
Difference						
Black-White gap	-0.019*	-0.021*	-0.011	-0.028*	-0.023*	-0.029
	(0.012)	(0.012)	(0.022)	(0.015)	(0.013)	(0.044)
Proficiency in Math (z-score)	-0.142**	-0.171**	-0.260*	-0.193***	-0.152**	-0.400*
	(0.064)	(0.066)	(0.150)	(0.073)	(0.073)	(0.023)
Sample of classrooms	10,614	8,925	3,305	6,548	7,153	1,772
Sample o students	277,444	233,750	86,485	171,727	187,717	46,031

Notes: Standard-errors in parentheses are clustered at the classroom level. *** 1 percent, ** 5 percent and * 10 percent significance levels. See Notes in Table 1.

Table WA3

Descriptive Statistics for Black White Differences for Strata Based on Student-Teacher Interaction

	Black-White + FE Same Math teacher Diff (se) [1]	Black-White + FE Not Same Math teacher Diff (se) [2]	Black-White + FE Same Lang teacher Diff (se) [3]	Black-White + FE Not Same Lang teacher Diff (se) [4]	Black-White + FE Same Future teacher Diff (se) [5]	Black-White + FE Not Same Future teacher Diff (se) [6]
Grades and tests						
Math grade 2009 (z-score)	-0.318 (0.014)	-0.293 (0.007)	-0.298 (0.014)	-0.298 (0.007)	-0.266 (0.016)	-0.298 (0.007)
Blind test in Math 2010 (z-score)	-0.270 (0.014)	-0.241 (0.007)	-0.256 (0.014)	-0.246 (0.007)	-0.219 (0.017)	-0.248 (0.007)
Blind test in Reading 2010 (z-score)	-0.328 (0.014)	-0.344 (0.007)	-0.326 (0.014)	-0.344 (0.007)	-0.287 (0.017)	-0.343 (0.007)
Past blind test in Math (0-500)	-10.519 (0.552)	-11.801 (0.282)	-11.233 (0.580)	-11.527 (0.278)	-9.219 (0.679)	-11.639 (0.268)
Past blind test in Reading (0-500)	-12.524 (0.578)	-14.324 (0.302)	-13.367 (0.608)	-14.061 (0.297)	-10.635 (0.717)	-14.260 (0.285)
2008 blind test in Sciences (0-500)	-15.521 (0.718)	-16.633 (0.368)	-15.119 (0.723)	-16.761 (0.367)	-13.513 (0.882)	-16.626 (0.351)
Demographics						
Boy	0.127 (0.007)	0.134 (0.004)	0.136 (0.008)	0.132 (0.004)	0.120 (0.009)	0.135 (0.004)
Age in months (centered at pop mean)	0.100 (0.010)	0.130 (0.005)	0.119 (0.010)	0.127 (0.005)	0.115 (0.012)	0.124 (0.005)
Family Background						
Mom no schooling	0.015 (0.003)	0.012 (0.001)	0.015 (0.003)	0.012 (0.001)	0.012 (0.003)	0.013 (0.001)
Mom complete high school	-0.035 (0.006)	-0.037 (0.003)	-0.031 (0.006)	-0.038 (0.003)	-0.047 (0.007)	-0.034 (0.003)
Mom college dropout	-0.004 (0.002)	-0.002 (0.001)	-0.003 (0.002)	-0.002 (0.001)	-0.004 (0.003)	-0.003 (0.001)
Mom college grad	-0.007 (0.003)	-0.008 (0.001)	-0.009 (0.003)	-0.007 (0.001)	-0.004 (0.003)	-0.008 (0.001)
Home own	-0.034 (0.007)	-0.029 (0.004)	-0.025 (0.007)	-0.031 (0.004)	-0.032 (0.009)	-0.030 (0.003)
Autos in household	-0.136 (0.010)	-0.115 (0.005)	-0.118 (0.011)	-0.119 (0.005)	-0.117 (0.013)	-0.117 (0.005)
Bathrroms in dwelling	-0.105 (0.012)	-0.112 (0.006)	-0.114 (0.011)	-0.109 (0.006)	-0.091 (0.014)	-0.111 (0.006)
Behavioral traits (proxies)						
Retained in 8th grade in 2009	0.003 (0.001)	0.005 (0.001)	0.002 (0.001)	0.006 (0.001)	0.005 (0.002)	0.006 (0.001)
Well behaved (parents' report)	-0.094 (0.007)	-0.091 (0.004)	-0.087 (0.007)	-0.093 (0.004)	-0.087 (0.009)	-0.091 (0.003)
Poor behavior (parents' report)	0.024 (0.004)	0.028 (0.002)	0.019 (0.004)	0.030 (0.002)	0.032 (0.005)	0.026 (0.002)
High effort (parents' report)	-0.024 (0.005)	-0.022 (0.003)	-0.013 (0.006)	-0.025 (0.003)	-0.018 (0.006)	-0.023 (0.003)
Low effort (parents' report)	0.029 (0.005)	0.022 (0.003)	0.022 (0.006)	0.023 (0.003)	0.030 (0.007)	0.022 (0.003)
Level of interest (0-10, parents' report)	-0.346 (0.046)	-0.395 (0.025)	-0.263 (0.048)	-0.421 (0.025)	-0.320 (0.058)	-0.385 (0.024)
PE grade z-score (1st bimonth eval.)	-0.090 (0.012)	-0.083 (0.006)	-0.059 (0.013)	-0.089 (0.006)	-0.067 (0.015)	-0.083 (0.006)
PE grade z-score (2nd bimonth eval.)	-0.090 (0.012)	-0.087 (0.007)	-0.071 (0.013)	-0.090 (0.007)	-0.061 (0.016)	-0.087 (0.006)
Attendance (0-100, 1st bimonth eval.)	-0.498 (0.123)	-0.536 (0.066)	-0.391 (0.125)	-0.542 (0.065)	-0.086 (0.142)	-0.537 (0.063)
Attendance (0-100, 2nd bimonth eval.)	-0.436 (0.145)	-0.776 (0.079)	-0.600 (0.155)	-0.698 (0.077)	-0.164 (0.175)	-0.720 (0.075)
Skip classes (self-report)	-0.029 (0.006)	-0.031 (0.003)	-0.023 (0.007)	-0.033 (0.003)	-0.018 (0.008)	-0.032 (0.003)
Not late with homework (self-report)	-0.059 (0.006)	-0.052 (0.003)	-0.054 (0.006)	-0.054 (0.003)	-0.048 (0.008)	-0.054 (0.003)
Participation in Math Olympics (self-report)	-0.047 (0.007)	-0.044 (0.003)	-0.048 (0.007)	-0.043 (0.003)	-0.028 (0.008)	-0.046 (0.003)
Sample	*61,891*	*215,553*	*57,355*	*220,089*	*40,009*	*237,435*

Notes: Standard-errors in parentheses are clustered at the classroom level.

Table WA4
Conditional Racial Differentials in Math Grades (z-scores) and Learning via Teacher-Student Interactions Controlling for Propensity to Have Repeated Student-Teacher Interactions - IV Estimations

	Teacher interacting with students over multiple academic years [1]	Teacher interacting with students for the first academic year [2]	Difference [3]=[2]-[1]
Panel A: Subsample of teachers responding questionnaires			
Black-White gap in Math grades	-0.003	-0.024***	-0.021*
	(0.010)	(0.006)	(0.012)
Proficiency in Math (z-score)	0.604***	0.434***	-0.171**
	(0.054)	(0.039)	(0.066)
Panel B: Controlling for interacted term on estimated propensity to be a student-teacher repeated interaction			
Black-White gap in Math grades	-0.002	-0.026***	-0.024*
	(0.011)	(0.006)	(0.013)
Proficiency in Math (z-score)	0.634***	0.453***	-0.181**
	(0.067)	(0.040)	(0.073)

Notes: Standard-errors in parentheses are clustered at the classroom level. *** 1 percent, ** 5 percent and * 10 percent significance levels. Math teachers are classified as having previous interactions with a given student if assigned to the student's past classrooms between 2007 and 2009 (Panel A). The same is used in defining past interactions with Language teachers (Panel B). Future interaction is defined by students having the same Math teacher in 2011 as they had in 2010 (Panel C). Samples is 233,750. Propensity scores estimated using probit model and having child covariates and teacher covariates as explanatory variables. See additional notes in Table 1.

Table WA5

Conditional Racial Differentials in Math Grades (z-scores) and Learning via Teacher-Studen Interactions in Dimensions Beyond Race - IV Estimations

	Teacher interacting with students over multiple academic years	Teacher interacting with students for the first academic year
	[1]	[2]
Black-White gap	-0.006 (0.010)	-0.024*** (0.006)
Proficiency in Math (z-score)	0.604*** (0.054)	0.461*** (0.035)
Male-Female gap	-0.179*** (0.009)	-0.189*** (0.005)
Family background		
Mom high-school grad	0.015* (0.008)	0.019*** (0.004)
Mom college dropout	0.008 (0.019)	0.024** (0.010)
Mom college grad	0.016 (0.016)	0.023** (0.009)
Home ownerhsip	-0.018 (0.007)	0.008** (0.004)
Number of autos in household	-0.003 (0.005)	0.000 (0.003)
Number of bathroom in dwelling	0.003 (0.004)	0.003 (0.003)
Behavioral traits (proxies)		
Well-behaved (parents account)	0.066*** (0.007)	0.072*** (0.004)
Poorly-behaved (parents account)	-0.051*** (0.013)	-0.033*** (0.007)
High-effort (parents account)	0.054*** (0.008)	0.053*** (0.005)
Low effort (parents account)	-0.051*** (0.009)	-0.044*** (0.005)
Interest level (0-10, parents account)	0.028*** (0.002)	0.027*** (0.001)
PE grade (z-score, 1st bimonthly evaluation)	0.075*** (0.004)	0.083*** (0.003)
PE grade (z-score, 2nd bimonthly evaluation)	0.106*** (0.004)	0.106*** (0.002)
Attendance (0-100, 1st bimonthly evaluation)	0.007*** (0.000)	0.006*** (0.000)
Attendance (0-100, 2nd bimonthly evaluation)	0.009*** (0.000)	0.010*** (0.000)
Skipping classes ferquently (self-report)	0.070*** (0.011)	0.070*** (0.006)
Not late with homework (self-report)	0.102*** (0.008)	0.109*** (0.004)
Participation in Math Olympics (self-report)	0.056*** (0.007)	0.056*** (0.004)

Notes: Standard-errors in parentheses are clustered at the classroom level. *** 1 percent, ** 5 percent and * 10 percent significance levels. See Notes in Table 1.