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Decentralization and the Efficacy of Intervention Strategies to Promote Academic Recovery

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Appendix to:

Decentralization and the Efficacy of Intervention Strategies to Promote Academic Recovery

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Methodology

The second stage of the analysis compares learning growth across students and how it varies with the duration of school intervention blocks. To do this, we estimate student achievement models of the following form:

$$A_{i,g,s,t}^{End} = \alpha_0 + \alpha_1 B_{s,t} + \alpha_2 \mathbf{X}_{i,g,s,t} + \alpha_3 A_{i,g,s,t}^{Beg.} + \alpha_4 D_{i,g,s,t} + \gamma_g + \delta_t + \epsilon_{i,g,s,t} \quad (1)$$

where $A_{i,g,s,t}^{End}$ is a student's (normalized) test score in grade g of school s at the end of semester t , $B_{s,t}$ is the duration (in minutes per week) of the intervention block at school s in semester t , $\mathbf{X}_{i,g,s,t}$ is a vector of individual student characteristics, $A_{i,g,s,t}^{Beg.}$ is a student's (normalized) test score at the beginning of semester t , γ_g is a grade fixed effect, and δ_t is a semester/year fixed effect. We cluster estimated standard errors at the school level.

Supplemental Results

Placebo Tests

In the main report, we discuss our strategy for determining if school-level decisions about intervention implementation could be correlated with other (unobserved) factors driving student achievement growth (e.g., school leadership or school climate), thus biasing our estimates of the impact of interventions. The so-called “placebo” tests involve re-estimating the achievement growth models for years in which the interventions did not occur. In Table A1 and A2, we report the estimated “effects” of the SY 2022–23 interventions on student growth in math and reading, respectively, for two pre-pandemic years: SY 2017–18 and SY 2018–19.

Accounting for Differing Types of Tutoring

In the main analysis, we measure the average effect of tutoring minutes per week, ignoring any variation based on tutoring group size or time of day the tutoring occurred. As noted in the main paper, tutoring primarily occurred outside of regular school hours, and groups typically included four or more students. We did estimate models where the minutes-per-week treatment variable interacted with the indicators for small-group tutoring (1–3 students per tutor) and in-school tutoring. In all cases, the estimated coefficients on the interaction terms were not statistically significant. This is not unexpected given the relatively infrequent use of small-group and in-school tutoring.

Table A1. Estimates of the “Effect” of Future Intervention Block and Tutoring Use on Pre-Pandemic Math Student Achievement Growth for Elementary and Middle Schools

	Elementary		Middle		Elementary/Middle	
	SY 2017–18	SY 2018–19	SY 2017–18	SY 2018–19	SY 2017–18	SY 2018–19
Began year in bottom quintile	-0.123*** (0.015)	-0.127*** (0.029)	-0.146*** (0.028)	-0.162*** (0.022)	-0.125*** (0.012)	-0.132*** (0.016)
Intervention block weekly minutes (100s)	-0.024* (0.012)	-0.018 (0.016)	0.009* (0.004)	-0.002 (0.007)	-0.002 (0.006)	-0.003 (0.007)
Intervention block weekly minutes (100s) x bottom quintile	0.005 (0.009)	0.006 (0.013)	0.010 (0.006)	0.007 (0.006)	0.004 (0.006)	0.007 (0.005)
Tutoring weekly minutes (100s)	0.002 (0.007)	0.001 (0.009)	-0.006 (0.008)	0.019 (0.015)	0.001 (0.006)	0.004 (0.008)
Tutoring duration x bottom quintile	-0.001 (0.006)	-0.004 (0.006)	-0.007 (0.019)	0.008 (0.012)	-0.004 (0.005)	-0.006 (0.006)
Beginning-of-semester score	0.840*** (0.006)	0.862*** (0.006)	0.872*** (0.007)	0.881*** (0.005)	0.847*** (0.005)	0.867*** (0.005)
Beginning-of-semester score squared	0.162*** (0.014)	0.010*** (0.002)	0.029*** (0.003)	0.022*** (0.002)	0.018*** (0.002)	0.013*** (0.002)
Additional controls for						
Number of instructional days	✓	✓	✓	✓	✓	✓
Student demographics	✓	✓	✓	✓	✓	✓
Grade level	✓	✓	✓	✓	✓	✓
Semester	✓	✓	✓	✓	✓	✓
Constant	✓	✓	✓	✓	✓	✓
R-squared	0.791	0.813	0.840	0.848	0.805	0.825
Observations	73,651	64,158	30,943	33,916	104,594	98,074

Notes. *p<.10, **p<.05, ***p<.01

Table A2. Estimates of the “Effect” of Future Intervention Block and Tutoring Use on Pre-Pandemic Reading Student Achievement Growth for Elementary and Middle Schools

	Elementary		Middle		Elementary/Middle	
	SY 2017–18	SY 2018–19	SY 2017–18	SY 2018–19	SY 2017–18	SY 2018–19
Began year in bottom quintile	-0.112*** (0.023)	-0.160*** (0.026)	-0.211*** (0.048)	-0.225*** (0.053)	-0.152*** (0.019)	-0.195*** (0.023)
Intervention block weekly minutes (100s)	-0.015 (0.019)	-0.007 (0.017)	0.004 (0.008)	-0.003 (0.009)	-0.006 (0.008)	-0.002 (0.008)
Intervention block weekly minutes (100s) x bottom quintile	-0.003 (0.018)	-0.001 (0.012)	0.021 (0.012)	0.016 (0.010)	0.016* (0.009)	0.021** (0.009)
Tutoring weekly minutes (100s)	0.005 (0.009)	-0.001 (0.009)	-0.024 (0.013)	0.024 (0.022)	0.001 (0.009)	0.003 (0.009)
Tutoring duration x bottom quintile	-0.008 (0.009)	-0.001 (0.008)	0.019 (0.036)	0.035 (0.026)	-0.005 (0.009)	0.002 (0.007)
Beginning-of-semester score	0.796*** (0.006)	0.808*** (0.006)	0.792*** (0.009)	0.809*** (0.008)	0.794*** (0.005)	0.807*** (0.005)
Beginning-of-semester score squared	0.016*** (0.004)	0.012*** (0.003)	0.022** (0.007)	0.024** (0.008)	0.018*** (0.003)	0.015*** (0.003)
Number of instructional days						
Additional controls for						
Student demographics	✓	✓	✓	✓	✓	✓
Grade level	✓	✓	✓	✓	✓	✓
Semester	✓	✓	✓	✓	✓	✓
Constant	✓	✓	✓	✓	✓	✓
R-squared	69,429	62,656	28,617	32,682	98,046	95,338
Observations	0.756	0.783	0.748	0.762	0.755	0.776

Notes. *p<.10, **p<.05, ***p<.01