Online Appendix

Pandemic Schooling Mode and Student Test Scores: Evidence from U.S. School Districts

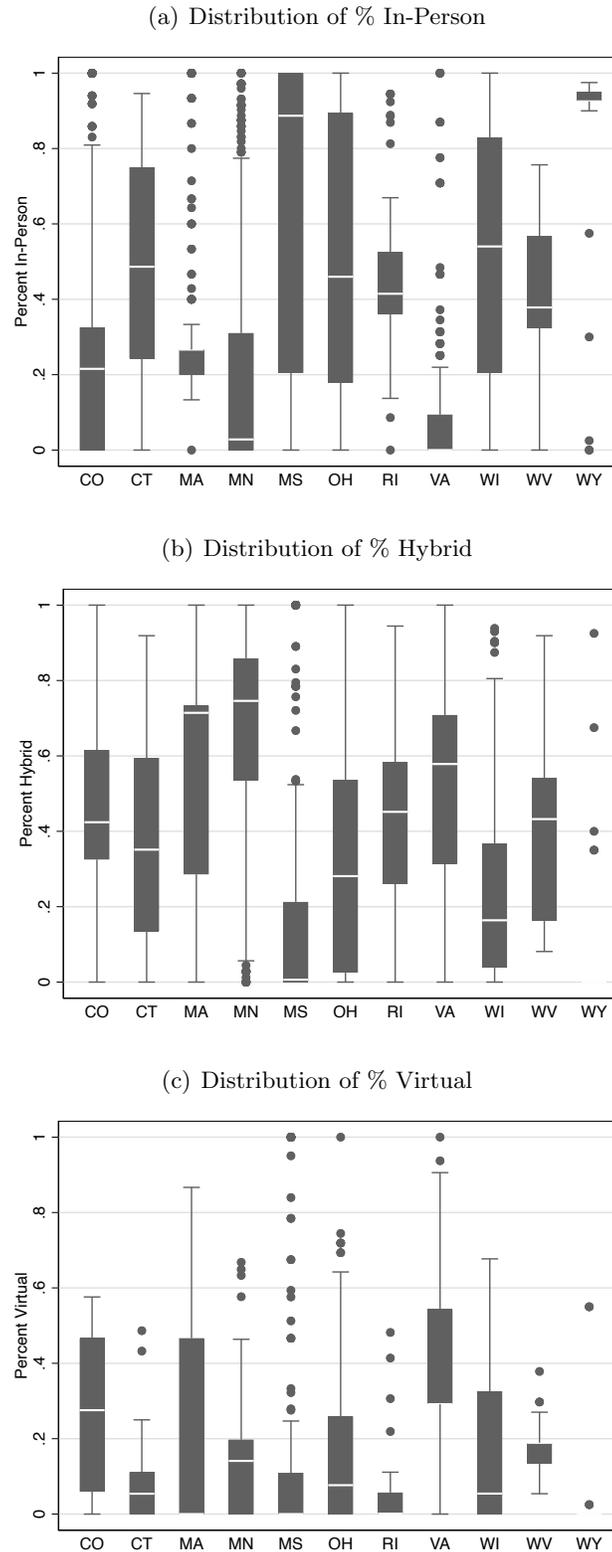Rebecca Jack   Clare Halloran   James Okun   Emily Oster

Appendix A: Additional Figures

Figure A1: Distribution of Percent Time In-Person, Hybrid, and Virtual over Districts, by State, 2020-21

(a) Distribution of % In-Person

(b) Distribution of % Hybrid

(c) Distribution of % Virtual

Notes: This figure shows the distribution over districts by state for percent of time spent in: a) full-time in-person schooling, b) hybrid schooling, and c) full-time virtual schooling. Percent of time in each schooling mode is calculated as the number of student-days spent in that mode divided by the total number of student-days in each district.

Appendix B

Table B1. Details for State Assessments Included in Analysis, Grades 3–8

State	Assessment Name	2021 Dates Tests Administered	Years Included In Analysis	2021 Participation Rate	Proficiency Levels and Classifications for Analysis (P = "Passing", NP = "Not passing")	Additional Information
CO	Colorado Measures of Academic Success (CMAS)	Apr 12–May 14; online testing may begin Mar 22	2016–2019, 2021	71.6%	● P = Met or Exceeded Expectations ● NP = Did Not Yet Meet or Partially Met Expectations	In 2021, instead of all students testing in all subjects as in prior years, Grades 3, 5, and 7 were tested in ELA, and Grades 4, 6, and 8 were tested in math. Parents could choose to have their children take both tests.
CT	Smarter Balanced Assessment Consortium (SBAC)	Mar 29–Jun 4	2016–2019, 2021	88.3%	● P = Meets or Exceeds the Achievement Standard (Standards 3 & 4) ● NP = Does Not Meet or Approaching the Achievement Standard (Standards 1 & 2)	
MA	Massachusetts Comprehensive Assessment System (MCAS)	May 10–Jun 11	2017–2019, 2021	95.5%	● P = Meeting or Exceeding Expectations ● NP = Not Meeting or Partially Meeting Expectations	The state first administered the next-generation MCAS in 2017 to replace the state's former MCAS.
MN	Minnesota Comprehensive Assessments (MCA)	Mar 8–May 21	2016–2019, 2021	78.3%	● P = Meets or Exceeds Standards ● NP = Does Not Meet or Partially Meets Standards	
MS	Mississippi Academic Assessment Program (MAAP)	Mar 29–May 14	2016–2019, 2021	97.4%	● P = Passing, Proficient, or Advanced ● NP = Minimal or Basic	
OH	Ohio Achievement Assessment (OAA)	Mar 22–May 7 (ELA); Mar 29–May 21 (math)	2016–2019, 2021	94.0%	● P = Proficient, Accelerated, Advanced, or Advanced Plus ● NP = Limited or Basic	
RI	Rhode Island Comprehensive Assessment System (RICAS)	Mar 29–May 14 (ELA); Apr 12–May 28 (math)	2018–2019, 2021	88.9%	● P = Not Meeting or Partially Meeting Expectations ● NP = Meeting or Exceeding Expectations	The state first administered the RICAS assessment in 2018 to replace the PARCC assessment.

VA	Standards of Learning (SOL)	Mar 15–Jun 25	2016–2019, 2021	78.7%	● P = Measured by VA's "Pass Rate" (*VA does not have multiple categories*) ● NP = n/a	In 2019, the state updated its math cut scores to reflect the 2016 mathematics content standards. In 2021, the state updated its reading cut scores to reflect the 2017 English content standards.
WI	Forward Exam	Mar 22–May 14	2016–2019, 2021	87.0%	● P = Proficient or Advanced ● NP = Below Basic or Basic	
WV	West Virginia General Summative Assessment (WVGSA)	Mar 29–Jun 4	2016–2019, 2021	83.9%	● P = Meets or Exceeds Standard ● NP = Does Not Meet or Partially Meets Standard	
WY	Wyoming Test of Proficiency and Progress (WY-TOPP)	April 13–May 7	2018–2019, 2021	97.0%	● P = Proficient or Advanced ● NP = Below Basic or Basic	The state first administered the WY-TOPP in 2018 to replace the state's former PAWS assessment.

Note. Participation rates reflect the districts included in the 11 states in our sample, but align with state-reported participation rates as well.

Table B2. State Assessment Modifications in Spring 2021 Due to the COVID-19 Pandemic

State	Testing Window and Testing Session Accommodations	COVID-19 Safety Protocols	Administration Mode	Remote Administration Participation and Protocols	Comparability of Remote and In-Person Test Results
CO	● Extended test administration window (CDE, 2021b)	● Limited sharing of materials ● Spacing between students maximized ● Staff/students with symptoms asked to stay home ● Ventilation maximized ● Staff/students asked to wash hands before/ after testing (CDE, 2021b)	In-person only	-	-
CT	● No publicly-documented changes to administration due to COVID-19.	● No publicly-documented changes in COVID-19 protocols from general district safety procedures specific to Spring 2021 assessments.	In-person and remote	● 12% (of these students, over 90% also used a fully or mostly remote schooling mode during the school year (CSDE, 2021b). ● Use of Remote Proctoring Tools to administer test remotely (e.g., proctors able to see and speak with students via broadcast) (CSDE, 2021c)	● State-level demographics between in-person and remote students were comparable. However, initial CSDE analyses found statistically significant differences between groups in all grades for math and in Grade 3 for ELA. Further analyses are needed to determine if differences are due to testing mode. (CSDE, 2021a).
MA	● Extended test administration window ● Shortened the testing experience (students took only one session of the tests instead of two sessions) (DESE, 2021a)	● MA did not offer stand-alone COVID guidance for test administration, but advised principals that MCAS test administration protocols must align with DESE COVID-19 health and safety protocols.	In-person and remote	● 20% ● Test administrators monitored test-takers through an audio/video-based platform (Zoom, etc.) (DESE, 2021b)	● On average, across the majority of test questions, students who took a remote test performed similarly to students who took an in-person test. (DESE, 2021a)
MN	● No publicly-documented changes to administration due to COVID-19.	● Schools are required to follow health and safety measures any time students are in school, as outlined by MDE and MDH. ● Masking required. ● Social distancing required. ● Surfaces expected to be cleaned and disinfected regularly. ● Test materials cleaned before each use. (MDE, 2021b)	In-person only	-	-

MS	● No publicly-documented changes to administration due to COVID-19.	● No publicly-documented changes in COVID-19 protocols from general district safety procedures specific to Spring 2021 assessments.	In-person only	-	-
OH	● Extended test administration window (ODE, 2021) ● Different test administration windows within a district permitted if pandemic- related issues such as quarantines interfered with the original testing window (ODE, 2021b)	● The Ohio Department of Education advised that districts should assessments should occur only if they can be administered "safely" and that "safety may be determined locally at the student, teacher, building, district or county levels, depending on the circumstances and in consultation with the local department of health." (ODE, 2021b)	In-person only	-	-
RI	● Concurrent testing requirement adjusted given that social distancing protocols may prevent all students in a grade level from participating in the assessment at the same time. (RIDE, 2021b)	● Masking and hand washing required.. ● Hand sanitizer available for use. ● Students tested at a safe distance according to RI Department of Health guidelines. ● Rooms and testing equipment sanitized thoroughly after each use. ● Additional protective gear, such as plexiglass barriers, gloves, and/or face shields, may be used to maintain a safe testing environment. (RIDE, 2021b)	In-person only	-	-
VA	● Extended test administration window (VDOE, 2021b)	● All local requirements for the use of personal protective equipment and social distancing within the school must be followed. (VDOE, 2021b)	In-person only	-	-
WI	● Extended test administration window ● Shortened testing sessions by removing field test items from ELA, math and science, and by removing a Text Dependent Analysis item ● Offered extended testing hours (WI DPI, 2021)	● No publicly-documented changes in COVID-19 protocols from general district safety procedures specific to Spring 2021 assessments.	In-person only	-	-

WV	● No publicly-documented changes to administration due to COVID-19.	● Counties and schools directed to administer assessments in a way that would allow them to follow mitigation protocols to ensure students' safety. (WVDE, 2021)	In-person only	-	-
WY	● No publicly-documented changes to administration due to COVID-19.	● No publicly-documented changes in COVID-19 protocols from general district safety procedures specific to Spring 2021 assessments.	In-person only	-	-

Table B3. Details for 2020-21 Schooling Mode Data for States Included in Analysis

State	Data Source	Original Data Level (District or School)	Data Interval	Time Period Covered	Additional Information
CO	Colorado Department of Education (CDE)	District	Monthly	8/1/20- 6/30/21	Schooling mode data were collected for P-EBT purposes.
CT	Connecticut State Department of Education (CSDE)	District	Weekly	8/30/20- 6/5/21	
MA	Massachusetts Department of Elementary and Secondary Education (DESE)	District	Bi-weekly	10/1/20 - 5/26/21	
MN	Minnesota Department of Education (MDE)	District	Weekly	9/1/20 - 5/31/21	
MS	Mississippi Department of Human Services (MDHS)	School	Monthly	8/1/20- 5/31/21	Schooling mode data were collected for P-EBT purposes.
OH	Ohio Department of Education (ODE)	District	Weekly	8/2/20- 5/22/21	
RI	RI Department of Elementary & Secondary Education (RIDE)	School	Weekly	9/13/20- 6/19/21	
VA	Virginia Department of Education (VDOE)	District	Monthly/bi-weekly/weekly	9/8/20-5/9/21	
WI	Wisconsin Department of Public Instruction (DPI)	School	Monthly	8/1/20- 6/30/21	Schooling mode data were collected for P-EBT purposes.
WV	West Virginia Department of Education (WVDE)	District	Weekly	9/6/20-6/12/21	
WY	Wyoming Department of Education (WDE)	District	Weekly	8/16/20-6/12/21	

Note. In Colorado, Mississippi, and Wisconsin, the schooling mode information provided by state agencies was collected as part of the state's plan to determine and disburse benefits as part of the Pandemic Electronic Benefit Transfer (P-EBT) program through the U.S. Department of Agriculture. This program was designed to offer temporary emergency nutrition benefits to eligible students who were not able to receive meals at school (that they would have otherwise received from the National School Lunch Program) due to school closures or schools operating with reduced hours.