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POLICY BRIEF

Counting the Cost: Wisconsin School Closures and Student Proficiency

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Key Findings

For the past two years, families across the country have been dealing with regular shutdowns of in-person learning in their schools. While people have speculated on what the effects of losing face-to-face class time would be on academic progress, we are beginning to have the data necessary to determine the extent of these effects. Recent data from Wisconsin allows us to conduct one of the first comprehensive analyses of this question.

Using newly available data from the 2021 administration of the state's Forward Exam, combined with data gathered on school closures at the district level from the Fall of 2020, we describe the nature and impacts of school closure. The key findings of this research include:

- **Districts that remained closed for in-person learning saw significant declines in math proficiency.** Math proficiency was approximately 4.8% lower in districts that were closed for in-person learning in Fall 2020.
- **Districts that remained closed for in-person learning saw significant declines in English proficiency.** English/Language Arts proficiency was 1.6% lower in districts that were closed for in-person learning in Fall 2020.
- **Districts with a higher percentage of African American students were more likely to remain closed in fall 2020.** Our results show that the higher the percentage of African American students in a district, the more likely that district was to remain shut down for in-person learning.
- **Districts with a higher percentage of economically disadvantaged students saw larger performance declines.** A district with 100% low-income students would be expected to have proficiency declines of more than 6% in math and 7% in ELA relative to a school with no low-income students independent of closure status.
- **More than 257,000 students in Wisconsin spent at least part of the 2020-21 school year without in-person learning.** This represents approximately 30% of all students in the state.
- **Wisconsin had a learning crisis before the pandemic and the future of our students is at stake.** Pre-pandemic, nearly 60% of Wisconsin students couldn't read or write at grade level. With the addition of school closures and student learning loss, this is the biggest crisis facing the Badger state's future.

Introduction

During the COVID-19 pandemic, policymakers across the nation were tasked with making decisions that would previously have been unthinkable: do we shut down restaurants? Can we allow attendance at sporting events? One of the most critical of these questions was what to do regarding in-person K-12 education.

In the Spring of 2020, with little data available to inform costs and benefits, school districts in many states—including Wisconsin—were forced to close their doors by a state order and adopt virtual education models with little prior experience. But, as more information came to light that COVID-19 was a low-risk proposition for most kids,[i] there was a growing variation in whether schools reopened or not during the 2020-2021 school year. Reopening decisions became less driven by sound policy and science, and more by local politics.[ii]

The consequences of this political decision-making were not immediately obvious. While some parents, educators, and journalists decried the potential long-term consequences for a generation of kids, there was little hard data to back up these concerns.[iii]

But nearly two years have passed since policymakers began to make decisions about reopening. New data in Wisconsin from the state's Forward Exam allows us to evaluate whether the decision to keep schools shuttered actually had a meaningful effect on student proficiency. Our results suggest that it did.

COVID-19 and School Closure

A growing body of research has examined the effects of COVID-19-related school disruptions to in-person instruction on educational achievement. The question of the "Why?" behind school shutdowns was among the first topics for in-depth study. Work by WILL[iv] at the state level found that COVID-19 rates in a community had little to do with whether a school district shut down or not. What mattered instead was whether there was a teachers union present in the community. Other research at the national level has reached similar conclusions.[v]

WILL used data on the percentage of curriculum a school district completed during the 2019-20 school year to estimate the long-term economic cost of school closure.[vi] This cost—which only covers the effect of the first year of school closures—was estimated at more than $7 billion.

Given that in-person learning remained unavailable to many students past the time of this study, this number has only grown.

In addition to the staggering economic impact, we are beginning to see estimates of the potential effects of shutdowns on the mental health of students. A recent study in *The Journal of the American Medical Association*[vii] found a modest relationship between closure and declining mental health among students. This association was strongest among students from low-income families.

And then, of course, there was the question of falling academic achievement. Largely because much of the testing of students around the nation was canceled during the pandemic, it has been difficult to quantify how far behind students have fallen and how much ground educators in the future will have to make up. One study[viii] projected that proficiency would fall, with students only making about two-thirds of a typical school year's gains in math and 37-50% of their typical gains in reading. But this is where Wisconsin's Forward Exam data allows us to investigate this question with real data for the first time. Do we observe the sort of proficiency declines that experts projected? And what are the demographic characteristics of schools that shut down?

Methodology

Data on student proficiency was collected from the 2021 Wisconsin state report cards released by the Department of Public Instruction (DPI). The report card makes use of data from the Forward Exam, which is required for every public-school student in grades 3-8 for ELA and math. The Exam was taken during the Spring semester of 2021.

It is worth mentioning here that a far larger number of public-school students did not participate in the exam than had not participated in previous years. In districts like Milwaukee, for example, non-participation reached more than 50%. Proficiency scores are calculated for each district among the students that did participate. To account for the potential role that non-participation could play in these results, an additional control variable for district participation rate was tested. The inclusion of this variable did not substantively change the results, and these are included in Appendix Table 1.

At a public hearing in January 2022,[ix] a DPI representative speculated that proficiency rates are likely even lower in districts with high levels of non-participation, as low-income students were more likely to have not taken the exam than higher-income student groups. Thus, we argue that this phenomenon should reduce our ability to find an effect of school closures on proficiency

rates. Our dependent variable in this analysis is the change in proficiency between the previous administration of the state exam in 2019 and the 2021 administration (Δ*Proficiency)*. We include analyses for both math and English/Language Arts (henceforth, ELA).

Our key independent variable is a measure of whether schools remained closed in the fall of 2020 (*CIPL 2020*). The 38 districts in the state that met this criterion are listed in the Appendix. These variables take on a value of "1" if a school was fully closed for in-person learning and "0" if the school building was open in some form. While this may seem like a relatively low number in light of the 421 school districts in Wisconsin, these districts represent more than 257,000 students. We utilize the initial closure status of schools in the district for the semester—we are not able to account for closure or reopening decisions that occurred at later points in the year. School districts that utilized a hybrid approach, or included a virtual option, are not counted as CIPL. This is a conservative approach that likely minimizes our ability to find significant results.

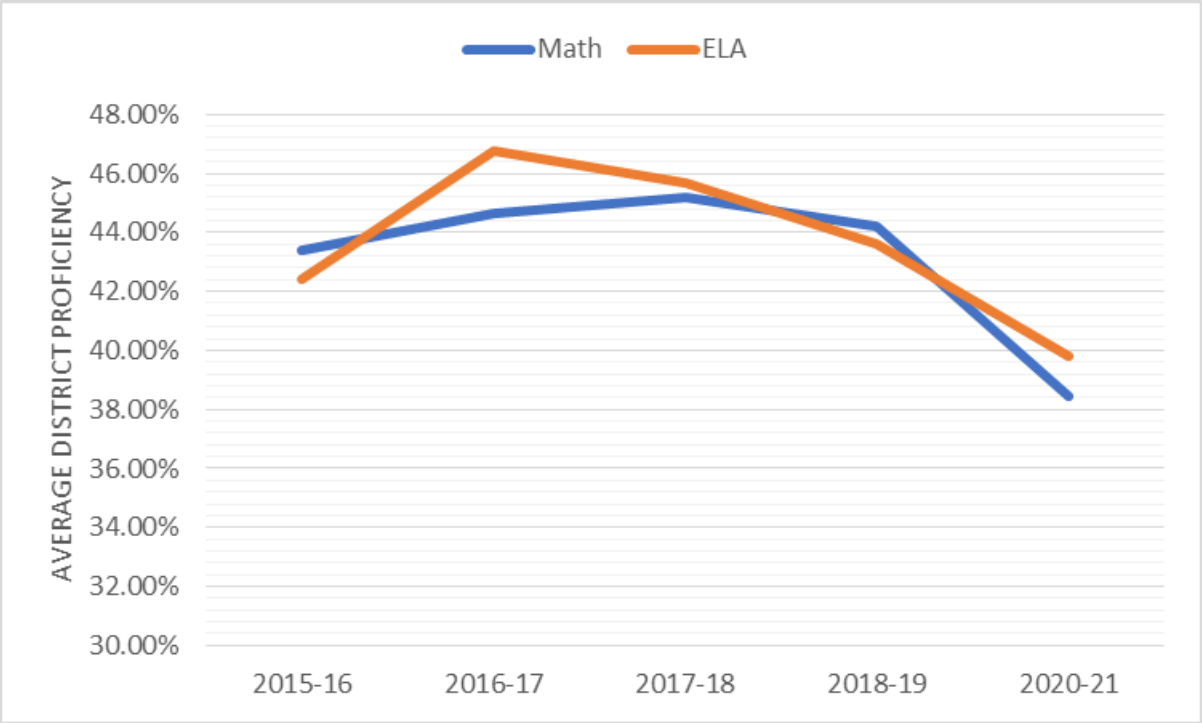
We additionally include control variables for other factors that could plausibly affect student proficiency, including the percentage of African American, Hispanic, Asian, disabled and low-income students in the district. We also control for the overall enrollment of the district in hundreds. Because our dependent variable is a change score, we follow the literature in including the base 2019 level of proficiency as a control variable.[x]

Results

Preliminary Findings

First, we note that proficiency fell across the state in 2021, even after accounting for reduced student participation. Statewide, the average level of district proficiency pre-pandemic (2018-2019 school year) was 43.64% in ELA and 44.2% in math. This year, ELA proficiency fell by 3.9 percentage points to 39.7% and by 5.7 percentage points in math to 38.47%. As depicted in Figure 1, such declines are not the norm across the years of the Forward Exam, beginning in the 2015-16 school year.

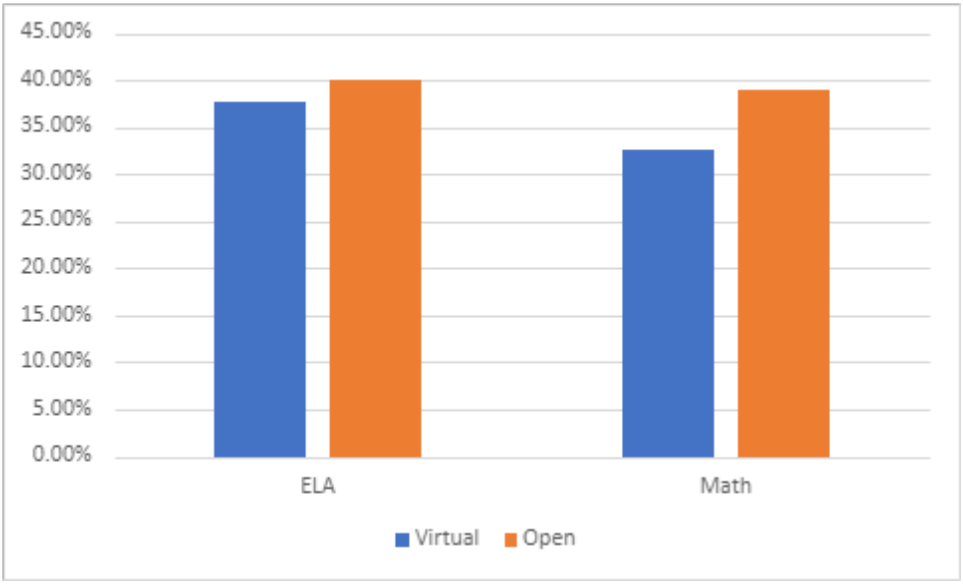
Figure 1. Proficiency Over Time (2015-2021)



On average, districts had their lowest average proficiency on the Forward Exam in its history in 2020-21, falling below 40% for the first time. This pattern was consistent across both subjects, with a slightly larger decline recorded in math.

Even looking just at the surface level with no control variables, we see that school districts that shut down in-person learning again in Fall 2020 tended to have lower levels of proficiency than those that opened their doors. Figure 2 shows the average proficiency in schools that closed for in-person instruction in Fall 2020 versus those that remained open. In ELA, we see a slight advantage for reopened schools, with proficiency rates of 39.97% relative to 37.78% in virtual districts. The differences in math are more substantial—districts that remained virtual saw math proficiency rates at about 32.6% on average compared with 39.04% in reopened districts. The inclusion of control variables in the subsequent section will help us determine whether these differences are mere correlates of other factors.

Figure 2. Proficiency by Open Status, 2020



We also take a look at the demographic factors that were predictive of a school remaining closed through the fall of 2021 The results in Table 1 are a logistic regression with remaining closed as the dependent variable.

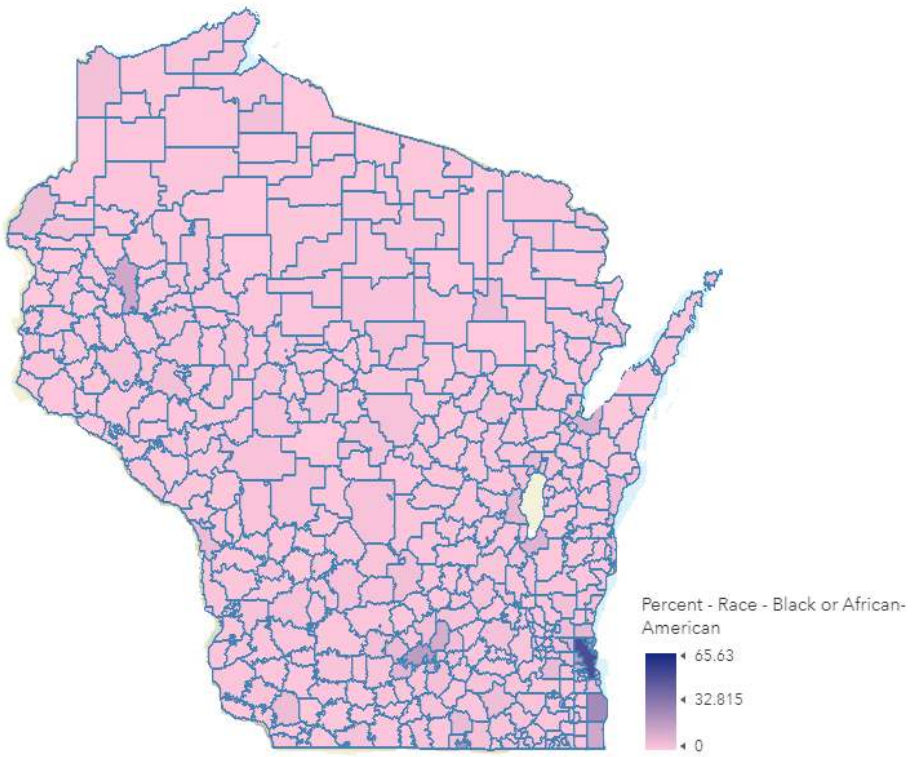
Table 1. Variables that Predicted Schools Remaining Closed for In-Person Instruction (CIPL)

VARIABLES	(1) CIPL Both Districts
Economic Status	-2.019
	(1.988)
Enrollment 100s	0.00118
	(0.00733)
African American	21.94***
	(6.336)
Hispanic	3.456
	(2.667)
Asian	19.06***
	(5.795)
Disability	1.546
	(9.170)
Constant	-3.296***
	(0.988)
Observations	404

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

On average, schools with more African American and Asian students were more likely to remain shut down relative to other school districts in the state. Figure 3 below shows the share of African American students in each district using DPI data.[xi] While many districts have a low percentage of such students, the Figure makes clear that they represent a meaningful share of the school population even outside of Milwaukee. Indeed, this finding still holds even if Milwaukee Public Schools—the most heavily African American district in the state—is excluded from the analysis.

Figure 3. Percent African American by School District



In light of Wisconsin having one of the largest racial achievement gaps in the nation, according to scores from the National Assessment of Educational Progress (NAEP), this is especially problematic. School districts with more Asian students were also more likely to remain closed for in-person instruction during the Fall of 2020. Districts like Wausau and Appleton with large Hmong populations were among the key drivers of results here.

Schools with more Hispanic students were also directionally more likely to remain closed, but this variable did not reach traditional levels of statistical significance. If there is a positive take away from this, perhaps it is that economic status and disability status did not appear to play a

role in continued shutdowns of in-person learning. However, we must note that much of that potential effect is absorbed in our other demographic variables. If we exclude race from the model, the economic status variables become significant.

Main Analysis

Table 2 presents our main results for the relationship between closure for in-person learning in the Fall of 2020 and proficiency changes across two subjects—math and ELA.

Table 2. Changes in Proficiency and Closure Status (2020 Fall)

	(1)	(2)
VARIABLES	ΔMath	ΔELA
CIPL 2020	-0.0483***	-0.0161**
	(0.0103)	(0.00769)
Enrollment (100s)	9.65e-05	6.74e-05
	(7.53e-05)	(5.62e-05)
African American	-0.0907	-0.0619
	(0.0717)	(0.0535)
Asian	-0.0101	0.0785
	(0.107)	(0.0798)
Hispanic	0.00398	-0.0173
	(0.0337)	(0.0250)
Disability	-0.192**	-0.0749
	(0.0967)	(0.0727)
Economic Status	-0.0631**	-0.0674***
	(0.0252)	(0.0190)
Proficiency(t-1)	-0.152***	-0.198***
	(0.0333)	(0.0283)
Constant	0.0650**	0.0857***
	(0.0255)	(0.0208)
Observations	404	404
R-squared	0.123	0.127

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Among the control variables in Table 2, we see that economic status and proficiency in the prior time period are significant (given that the dependent variable was created from this variable, this is almost guaranteed). The economic status variable is interesting in its own right. This suggests that, independent of closure status, schools with more economically disadvantaged students saw bigger proficiency declines during the pandemic than schools with fewer students in that category. These declines were about 6.3% in math and 6.7% in English—a tremendous problem for educators moving forward. With regard to our variable of interest, we do see significant declines in both math and ELA among schools that closed for in-person instruction. On average, in schools that shut down in 2020, rates of proficiency declined by about 4.8% more in math and 1.6% more in ELA than schools that remained open.

Conclusion

Education reformers have been sounding alarms since the beginning of the pandemic on the potential long-term effects of school shutdowns on student outcomes. The data here confirms that many of the fears of these reformers were justified: shutdowns are leading to an important additional drop in student proficiency that is even greater than that observed in school districts that have applied other reopening models.

As local school districts evaluate whether to shut down again in response to new variants, this research will hopefully inform their weighing the potential costs of closing schools. The resulting declines in student proficiency are no longer found just in the realm of the predictions of school reopening advocates, but are rather tangible in observable data. In light of continued evidence that most students are safe from the worst effects of COVID-19,[xii] and even more safe from some of the newer variants,[xiii] broad shutdowns should once again be considered an emergency measure—not a new normal.

Appendix

List of Districts Coded as "Virtual" for Fall 2020

District Name	Confirmation	Enrollment
Appleton Area School District	https://www.postcrescent.com/story/news/education/2020/12/15/appleton-area-school-district-may-reopen-students-january/6534328002/	15,745
Bangor School District	https://www.facebook.com/permalink.php?story_fbid=2979884398788640&id=358876914222748	597
Bayfield School District	https://www.apg-wi.com/ashland_daily_press/covid-19/bayfield-unveils-plan-to-reopen-schools-sept-2/article_73a115de-d599-11ea-8fee-a732702eb9d6.html	408
Beloit School District	https://www.beloitdailynews.com/news/covid-19/beloit-school-district-votes-to-approve-hybrid-model/article_1c03a973-e05a-5eaa-a03a-83bac2eaffc4.html	5923
Brown Deer School District	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	1490
De Forest Area School District	https://www.hngnews.com/deforest_times/news/covid-19/article_5ed10304-641e-5b89-a790-bbbc76896730.html	3870
Deerfield Community	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	726
Glendale-River Hills School District	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	961
Green Bay Area Public	https://www.wearegreenbay.com/news/local-news/green-bay-area-public-school-district-vote-to-start-school-year-virtually/	19171
Greenfield School District	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	3367
Gresham School District	https://www.gresham.k12.or.us/cms/lib/OR02216641/Centricity/Domain/2181/Version%202%20Eng%20Return%20to%20Learn%20Plan%209.25.20.pdf	248
Holmen School District	https://www.holmen.k12.wi.us/community/2020_21_reopening/School%20District%20of%20Holmen%20Reopening%20Plans%20for%20Families%208-26-20.pdf?fbclid=IwAR1aKiqn1BFLIxiGjhOe3PuYHeKOk-a6Bt3Khi83nkmhq3EqpZd2pGS5JXg	3855

La Crosse School District	https://www.news8000.com/la-crosse-schools-to-phase-in-re-opening-schools/	6269
Lodi School District	https://resources.finalsite.net/images/v1603284844/lodik12wius/o9xvajacvaot6h6r6u9l/91820parentcommunication.pdf	1491
Madison Metropolitan	https://www.nbc15.com/2020/07/17/madison-schools-announce-all-virtual-start-to-the-school-year/	26151
Marshall School District	https://www.marshallschools.org/District/Reopening%20Schools%20Plan%20July%2028%202020.pdf?fbclid=IwAR2Fg7NAgyK9zRIK-ofsYpSYNpM8dfvzHt0jmqB-LoPU3M22mONn0OV28gA	990
McFarland School District	https://www.mcfarland.k12.wi.us/CampusLinks/School%20Board%20Fall%20Reopening%20Update%208-17-2020.pdf	6091
Mequon-Thiensville	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	3521
Middleton-Cross Plains Area	https://www.nbc15.com/2020/07/21/middleton-cross-plains-school-district-to-have-100-online-classes-for-beginning-of-2020-21-school-year/	7410
Milwaukee School District	https://mps.milwaukee.k12.wi.us/News/Milwaukee-Public-Schools-Reopening-Plan-Approved-by-Board-of-School-Directors.htm	71510
Monona Grove School District	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	3449
Mount Horeb Area	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	2423
Nicolet UHS School District	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	1087
Oak Creek-Franklin Joint	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	6400
Onalaska School District	https://www.wxow.com/news/onalaska-looks-to-start-school-year-with-distance-learning/article_261dc97c-673e-58bc-aab1-66ae785d81d0.html	3056
Oregon School District	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	4119
Port Washington	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	2526
Racine Unified School District	https://www.cbs58.com/news/racine-unified-school-district-considers-whether-to-return-to-in-person-classes-or-continue-remote-learning	16254
Saint Francis School District	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	1045

Shorewood School District	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	1891
South Milwaukee	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	2819
Stoughton Area School District	https://www.stoughton.k12.wi.us/covid-19/fall-reopening	2783
Sun Prairie Area	https://www.nbc15.com/2020/07/20/sun-prairie-schools-expect-to-start-year-online/	8366
Watertown Unified	https://www.wdtimes.com/news/editors_pick/article_553855e1-ad0d-51c5-a5ca-547a342d5c3e.html	3296
Wausau School District	https://www.wausaudailyherald.com/story/news/2020/10/12/wausau-schools-reopen-person-classes-starting-nov-2-covid-19-pandemic/5968722002/	7786
West Allis-West Milwaukee	https://www.jsonline.com/story/communities/lake-country/news/2020/07/07/coronavirus-mps-and-other-milwaukee-waukesha-schools-announce-plans/5363867002/	7418
West Salem School District	https://www.wsalem.k12.wi.us/uploads/content_files/files/district/School_Reopening_8_21_20.pdf	1782
Wisconsin Heights	https://www.channel3000.com/school-districts-determine-back-to-school-plans/	738

Appendix Table 1. Inclusion of "Participation" Variable

VARIABLES	(1) delta_math	(2) delta_ela
CIPL 2020	-0.0450***	-0.0148*
	(0.0107)	(0.00797)
Enrollment (100s)	0.000154*	8.99e-05
	(8.98e-05)	(6.70e-05)
African American	-0.0875	-0.0606
	(0.0717)	(0.0536)
Asian	-0.0158	0.0758
	(0.107)	(0.0800)
Hispanic	0.00258	-0.0177
	(0.0337)	(0.0250)
Disability	-0.195**	-0.0759
	(0.0967)	(0.0728)
Economic Status	-0.0610**	-0.0662***
	(0.0253)	(0.0191)
Proficiency(t-1)	-0.155***	-0.199***
	(0.0334)	(0.0284)
Participation	0.0676	0.0267
	(0.0579)	(0.0431)
Constant	0.000684	0.0598
	(0.0607)	(0.0467)
Observations	404	404
R-squared	0.126	0.128

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.

End Notes

[i] https://www.researchsquare.com/article/rs-689684/v1
[ii] https://will-law.org/study-unions-politics-appear-to-drive-fall-school-reopening-decisions-in-wisconsin/
[iii] https://www.thesun.co.uk/news/13549231/parent-fury-school-closed-january-mutant-strain-covid/ ; https://news.un.org/en/story/2020/12/1079462 ; https://www.vox.com/2020/4/21/21223585/school-closure-impact-students-children
[iv] https://will-law.org/wp-content/uploads/2020/12/reopening-brief.pdf
[v] https://onlinelibrary.wiley.com/doi/abs/10.1111/ssqu.12955
[vi] https://will-law.org/wp-content/uploads/2021/02/COVID-Learning-Loss-2021-final.pdf
[vii] https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2783714
[viii] https://journals.sagepub.com/doi/full/10.3102/0013189X20965918
[ix] https://docs.legis.wisconsin.gov/raw/cid/1653265

[x] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjm07a56cP1AhW8pXIEHbbxDIgQFnoECAkQAQ&url=https%3A%2F%2Fstatisticalhorizons.com%2Fwp-content%2Fuploads%2FAllison.SM90.pdf&usg=AOvVaw2AXNuapMzBvO-MHNkfmx-J

[xi] https://data-wi-dpi.opendata.arcgis.com/datasets/f6da89e068bb4cfca43b337311fc7957_0/explore?location=44.650869%2C-89.466717%2C6.66&style=PCT_RACE_B

[xii] https://www.wsj.com/articles/should-vaccinate-children-covid-19-infection-natural-immunity-vaccine-mandate-coronavirus-11636384215

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