A Short Null Report on the Relationship Between Online Learning and Various Outcomes

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Abstract

Using COVID Pulse Data collected by the U.S. Census Bureau I establish that there are weak to no correlational relationships between a household reporting a child attending virtual or in-person school and various outcomes including expectations of loss of employment, child hunger, anxiety. Due to the coarseness of the data, it is unclear if this is an artifact of the data or a reflection of the lack of underlying causal relationships between mode of schooling and the outcomes. Therefore, these results should not be used to make policy decisions or draw substantive conclusions about the decision to reopen schools and are reported only to avoid the file-drawer effect.

I. INTRODUCTION

THE coronavirus-19 pandemic resulted in an unprecedented shutdown of schools nation-wide. While little literature exists about the effects of a largescale shift from in-person schools to a virtual approach and back again, it is plausible that this would have impacts on a variety of household outcomes. In particular, schools serve the community as childcare systems and sources of food through the free and reduced lunch program.

Accordingly, I investigated the following hypotheses:

- The ordered reopening of schools will reduce child hunger.
- The reduction of child hunger will be concentrated in low income households.
- The reduction of child hunger will be differential by reported race of household.
- The ordered reopening of schools will reduce expected loss of employment.

- The reduction of child hunger of expected loss of employment will be concentrated in low income households.
- The reduction of child hunger of expected loss of employment will be differential by reported race of household.

These hypotheses were pre-registered at <https://osf.io/yx9c2>

II. METHODS

i. Data

To investigate these hypotheses I used the COVID-Pulse Data collected by the U.S. Census Bureau collected from March 2020 to March 2021. Covid Pulse Data was collected through 20-minute surveys administered by text or over the computer. For this study only the respondents that reported having children that attended a public school were included. Missing data was deleted listwise in the analyses which is known to induce bias but is likely to have a

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negligible impact given the results of the analyses.

ii. Analytic Strategy

Correlational analyses were run between the variables representing attending virtual school and attending in-person school and various outcomes. Outcomes were those specified in the pre-registration as well as additional exploratory outcomes. Follow on analyses were conducted utilizing a staggered difference-in-difference design with the Callaway and Sant’Anna estimator [2020] with states acting as the units of treatment. Several specifications and sets of units were used. The first was the states where a governor ordered schools to reopen and the date of each order was considered the date of treatment. Then a specification where states that experienced a ten percent increase or more increase in in-person learning after schools re-opened in August were considered treated. Finally, a specification where states that experienced a twenty percent decrease in online schooling after the start of the school year were considered treated and states that had five percent decrease or less were considered untreated was used.

III. RESULTS

All correlational analyses had correlations with absolute values less than .07 see Table 1. Due to the large number of households in the dataset every correlation was statistically significant with $p < .0001$ and accordingly no p-values are reported. Not surprisingly given the low correlations between variables there were no consistent pattern of effects in any of the analyses using the DiD design. The results from the DiD analyses are not reported because they are not readily interpretable.

IV. DISCUSSION

The surprising finding that there were very small correlational relationships between forms

Table 1: *Correlations between Outcomes and In-Person/Distance Learning*

Outcome	In-Person	Distance
Caring for Child	−.022	−.012
Expected Job Loss	−.064	−.022
Food Confidence	.015	.040
Free Food Receipt	−.004	−.026
School Free Food	−.004	−.013
Worry	−.008	.009

of schooling which likely precluded the detection of causal effects is difficult to interpret. There are a number of reasons that this could be, but the COVID-Pulse data does not provide the necessary tools to investigate further. I am unable to establish the importance of these results in the context of the broader literature regarding schools’ roles in the community. This report documents the null relationship between attendance of virtual/ in person school in the interest of transparency. This report should not be used to make policy decisions or draw substantive conclusions about the decision to reopen schools. Its primary use is as a reference point for other researchers interested in similar questions and to provide an empirical basis for intuitions about the importance of virtual vs. in-person school. Code used for this report is found at <https://osf.io/48gnj/> while the data is publicly available through the U.S. Census website.

REFERENCES

- [2020] Callaway, B. J. and Sant’Anna, P. H. C. (2020). Difference-in-Differences with Multiple Time Periods. *ArXiv:1803.09015 [Econ, Math, Stat]*.