Civics Education during a Lockdown: COVID-19 Containment Policies and Grade 8 Student Civic Outcomes

Discussion Paper

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Abstract

In early 2020, nations around the globe responded to the rapidly developing COVID-19 pandemic by implementing emergency containment measures to slow the spread of the virus. Educational systems were widely impacted as they made the difficult decision to close schools affecting over 1.5 billion students globally. Research has focused on quantifying the academic impact of these closures, however most evidence has focused on core subjects such as reading or mathematics. Considering how one core task of educational systems is to develop and prepare students to be engaged and active members of society, it is important to examine how the disruption impacted civics education. Using data from the International Civic and Citizenship Education Study (ICCS) on nearly 100,000 grade 8 students, we examine the relationship between COVID-19 lockdown stringency and several student civic outcomes across 15 countries. We find that longer school closures and greater lockdown stringency were associated with greater declines in average civic knowledge scores, lower trust in civic institutions, increased intentions to protest, and greater expectations to participate in elections or politics. Evidence presented here provides valuable insights into the associations between lockdown measures and early secondary student civic outcomes, highly relevant for understanding impacts of the pandemic on the future citizens of the world.

Keywords: COVID-19, civic knowledge, civic engagement, lockdown stringency, school closures, international comparisons

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1 Introduction

On January 30, 2020, the World Health Organization (WHO) declared a Public Health Emergency of International Concern (PHEIC) in response to the rapidly and internationally spreading coronavirus (WHO, 2020). Many countries responded to the crisis by implementing emergency lockdown measures to slow the spread of the virus. Examples of such measures included business closures, public event cancellations, restrictions on gatherings or travel, and even stay-at-home orders (Hale et al., 2021, 2023). While decisions to implement such measures highlighted the benefits of such policies in battling against a global pandemic, it was clear that they were weighed against the potential costs to daily life and well-being of citizens. Most sectors were impacted by lockdown measures, especially education where educational systems were forced to make the difficult decision to close schools, disrupting learning for over 1.5 billion students globally (OECD, 2021).

Recent research has focused on the impact of COVID-19 on student academic performance, including meta-analyses incorporating results from national studies (e.g. Betthäuser, Bach-Mortensen, & Engzell, 2023; Pietro, 2023) as well as studies using results from international large-scale assessments (e.g. Jakubowski, Gajderowicz, & Patrinos, 2024, 2023; Kennedy & Strietholt, 2023). A consistent finding of these studies is that there has been a significant decline in student academic performance following the onset of the COVID-19 pandemic. These studies have mainly focused on cognitive outcomes and, within these, on the core domains of mathematics and reading. However, there are other important learning outcomes that might have been affected by the pandemic.

Considering both the importance of civic education and concerns of a shift in the democratic attitudes of the population amidst the COVID-19 pandemic and the implemented measures (Bol, Giani, Blais, & Loewen, 2020), we believe it is important to examine how civic outcomes of secondary students changed as a result of the pandemic. Therefore, in the present study we examine the relationship between the stringency or duration of COVID-19-related lockdown measures and Grade 8 student civic outcomes. Our goal is to better understand the impacts of the COVID-19 pandemic and restriction measures not only on students' knowledge but also on various civic attitudes and engagement measures. In this paper, we seek to measure the relationship between the duration or stringency of COVID-19 lockdown measures and:

1. ...trends in student civic knowledge?
2. ...changes in student perspectives on civic engagement?

2 Background

In response to the COVID-19 pandemic, governments around the world implemented various measures to slow the transmission of the virus, including school closures. School closures as a policy response were debated within countries as

decision-makers weighed the benefits of closing schools to contain the spread of the virus against the potential consequences to various student outcomes. Furthermore, the various measures implemented, including those beyond school closures, posed a challenge to democracies as they involved the use of exceptional powers to enforce strict social confinement measures, sacrificing civil liberties (Amat, Arenas, Falcó-Gimeno, & Muñoz, 2020; Besand, 2020; Bol et al., 2020). Therefore, there are concerns about how COVID-19 might have affected democratic attitudes (Bol et al., 2020).

In the next section, we review the literature on school closure policies and student learning, on general civic engagement during the pandemic, and on civic education and outcomes.

2.1 School Closures and Student Learning

In this study, we focus on school closures spurred by the decision of policy-makers to suspend or shut down in-person classes and activities in schools in response to the COVID-19 pandemic. Often this was supplemented by some form of remote learning. The primary aim of these closures was to slow the transmission of the virus and safeguard the health of students, teachers, staff, and beyond to the local community. While the benefits to school closure policies in battling against a global pandemic were highlighted in decisions to close schools, they were weighed against the potential costs to student learning and well-being.

A considerable amount of public and academic discussion has centered around the potential repercussions of school closures on the education and lives of children and their families, as evidenced by studies such as those by DiPietro, Biagi, Costa, Karpiński, and Mazza (2020) and Meinck, Fraillon, and Strietholt (2022). Now, with increasing evidence emerging about these consequences, a growing body of research has been dedicated to quantifying the impact of the COVID-19 pandemic on academic learning, often referring to stalled student learning due to school closures as "learning loss" or a "learning deficit." These studies compare either the performance level or gains of students or student cohorts before and after the onset of the pandemic to quantify the learning deficit. Recently published meta-analyses and systematic reviews have synthesized the findings of this research. Drawing on over 45 individual studies from 18 countries, the recent meta-analyses by Betthäuser et al. (2023) and Pietro (2023) reveal a significant decline in academic achievement following the outbreak of the pandemic, with similar mean effect sizes of Cohen's d = -0.14 and -0.17, respectively. It is worth noting that there is substantial overlap in the studies analyzed in both meta-analyses and that they have mainly focused on the core domains of mathematics and reading. Betthäuser et al. (2023) focused only on mathematics and reading outcomes and only three studies in Pietro (2023) covered subjects like social sciences, history and politics.

There are also studies using results from international large-scale assessments (e.g. Jakubowski et al., 2024, 2023; Kennedy & Strietholt, 2023; Ludewig

et al., 2022), but also focusing on reading or mathematics achievement. Further research is still needed on other important cognitive and non-cognitive outcomes that might have been affected by the pandemic.

2.2 COVID-19 Lockdown Stringency, Democratic Attitudes, and Civic Engagement

Besides school closures, many countries implemented a wide range of measures to halt the spread of the coronavirus. This included measures such as business closures, cancellation of public events, restrictions on gatherings, travel bans, facial covering usage, vaccine and/or testing requirements, contact tracing, and even stay-at-home orders (Hale et al., 2021, 2023).

The timing, strictness, and duration of the implemented measures differed across countries. While such policies were highlighted as battling against a global pandemic, the pandemic measures also had other unintended effects. For instance, one side-effect of the pandemic was a worldwide increase in demonstration activities and protests (Kishi, 2021). These protests were, in general, about governments' management of the pandemic, but the specific reasons varied. These ranged from demands for safer working conditions for health workers and for economic support to cope with the restrictions, to protests asking for a stronger response to the pandemic or, contrarily, anti-restriction demonstrations asking to reopen businesses and schools or protesting against vaccine mandates. According to Iacoella, Justino, and Martorano (2021), protests in the United States were more likely to occur in counties with higher levels of socioeconomic inequality and which had more stringent measures in place. Similarly, Plümper, Neumayer, and Pfaff (2021) report there were more protests against containment policies in Germany where and when the coronavirus incidence rates were low and containment measures were relatively stringent.

Another consequence was a change in democratic attitudes, such as demands for more authoritarian government responses during the pandemic (Amat et al., 2020) and an increase in distrust towards institutions (Amat et al., 2020; Lello, Bertuzzi, Pedroni, & Raffini, 2022; Raffini & Penalva-Verdú, 2022). For example, Raffini and Penalva-Verdú (2022) describe how even though in Italy the multiple protests against vaccine mandates were done by heterogeneous groups of people, a common factor was a distrust in institutions. This distrust was not only towards political institutions but also towards health institutions, the pharmaceutical industry, and mainstream science and media (Lello et al., 2022). However, Bol et al. (2020) report an increased trust in government, although this was at the early stages of the pandemic. It is unknown whether these impacts will be long-lasting and if adolescents civic attitudes and engagement were also affected by the pandemic.

2.3 Civic and citizenship learning outcomes

Although an important part of education is to develop the cognitive skills of students, education has a broader set of outcomes. According to Dijkstra

([2014](#)), there is a range of social outcomes that are considered important not only for individual development but also for the economy and society at large such as social cohesion and social and civic competences ([Dijkstra](#), [2014](#)). Such outcomes relate to civic education which has become a key component of the educational policy agenda of many countries, particularly in recent years which have been characterized by challenges such as socioeconomic inequalities, political polarization, rise of violent extremism, lack of trust in democratic processes and institutions, and rising levels of misinformation ([Commission/EACEA/Eurydice](#), [2017](#); [Savage, Hamilton, Scholz, & Murray](#), [2023](#); [Winthrop](#), [2020](#)). Such challenges were present before COVID-19 but might have been exacerbated by the pandemic and the containment measures. It remains crucial to continue studying civic education and student learning outcomes in this domain.

Civic education covers a wide range of topics and outcomes. It covers knowledge and understanding of civic institutions and systems, civic principles such as equity, freedom and solidarity; civic participation (e.g., voting, volunteering, recognizing corruption), and civic roles and identities (e.g., tolerance, sense of community, social cohesion) ([Schulz, Fraillon, et al.](#), [2023](#)). Across many frameworks, civic and citizenship education consists of developing not only civic knowledge and skills but also certain dispositions and behaviors to effectively participate in society ([Savage et al.](#), [2023](#); [Schulz, Fraillon, et al.](#), [2023](#)). This includes, for example, trust in institutions, perceptions of good citizenship behavior, participation in organizations and groups, interest in political and social issues, expected future engagement in civic action, and expectations of future political participation (e.g., voting, joining a political party) as adults.

While there is evidence of a learning deficit related to COVID-19 as well as of changes in civic attitudes and engagement among the adult population, it is still uncertain whether the same applies to civic knowledge and to adolescents' civic attitudes and engagement.

2.4 The Present Study

The main objective of this study is to assess the impact of national COVID-19 containment measures on civic outcomes. Specifically, we examine the effects of two explanatory variables: the duration of school closures and a comprehensive index encompassing a broader set of COVID-19 containment policies. Our analysis focuses on student performance and attitudes in the area of civic education, encompassing both a performance measure of civic knowledge and various measures of civic attitudes and expected behaviors. We posit that the duration and stringency of COVID-19 lockdown measures will have an influence on civic knowledge, attitudinal outcomes, and expected future behaviors. This hypothesis stems from the understanding that knowledge and attitudes are not solely forged within the confines of educational institutions but are also influenced by external societal factors.

3 Data

To answer our research questions, we combine data from multiple sources. The first data source is IEA's International Civic and Citizenship Education Study (ICCS) which provides internationally comparable data of civic knowledge and other civic and citizenship measures from three cycles: 2009, 2016, and 2022. ICCS collects data from eighth-grade students across several countries, making it a valuable resource to examine the relationship between national variation in lockdown measures and student civic and citizenship outcomes.

The second data source is the Oxford COVID-19 Government Response Tracker (OxCGRT) which collects information on policy measures that were implemented in response to the COVID-19 crisis. The database includes measures of school closure duration as well as an index capturing the stringency of lockdown measures, in general. By combining these two sources of data, we can examine how international variation in lockdown measures are associated with changes in civic outcomes of Grade 8 students.

Both data sources implement strict protocols to ensure the accuracy and reliability of the data. ICCS follows several standards that aim to ensure high-quality data is collected that is representative of the target population being studied as well as internationally comparable (Martin, Rust, & Adams, 1999). OxCGRT employs a rigorous training of its data collectors and all information collected is marked for review to ensure the reliability and validity of the data (Hale et al., 2021).

3.1 Civic Outcomes

In this paper, we focus on two groups of outcomes. First, we have a measure of civic knowledge and understanding. ICCS assesses students' knowledge and understanding of civic-related issues covering four content domains: civic institutions and systems, civic principles, civic participation, and civic roles and identities (Schulz, Fraillon, et al., 2023). ICCS uses a rotated booklet and plausible value methodology to estimate students' civic knowledge (Mislevy, Beaton, Kaplan, & Sheehan, 1992). All analyses presented here are based on estimation accounting for the variation across the five plausible values (Rubin, 2004). The civic knowledge scores were transformed to a scale with an international mean of 500 and a standard deviation of 100 during the first cycle (ICCS 2009). Using trend items, all subsequent cycles have been linked to this initial scale to allow the tracking of trends over time (Schulz, Ainley, et al., 2023).

ICCS also measures student civic attitudes and engagement through a student questionnaire acknowledging that these affective-behavioral aspects are also important learning outcomes in civics education (Schulz, Fraillon, et al., 2023). ICCS constructs several scales using item response modeling based on responses to items in the student questionnaire. Estimates from the models were transformed to have an international average of 50 and a standard deviation of 10. Where possible, scales were linked to past cycles of ICCS so that

trends over time could be examined (Schulz, Losito, Carstens, & Fraillon, 2018). For this study, we focus on the following scales:

- Expected participation in legal protest activities (LEGACT).
- Expected participation in illegal protest activities (ILLACT).
- Trust in civic institutions (INTRUST).
- Expected electoral participation (ELECPART).
- Expected active political participation (POLPART).

We examine these scales as they are important outcomes to consider that we believe, based on our literature review, should be related to the duration and stringency of COVID-19 lockdown measures (see subsection 2.2). Furthermore, these scales were constructed in both ICCS 2016 and 2022 allowing us to examine trends in these measures over the previous two cycles. Higher values of the scale indicate higher likelihood of participation (ELECPART, POLPART, LEGACT, ILLACT) or better trust (INTRUST). A description of the scales and the items used to derive them can be found in Table A1.

3.2 School Closures and COVID-19 Policy Stringency

Since the onset of the pandemic until the end of 2022, OxCGRT has collected daily information on the presence of policy measures aimed at tackling the COVID-19 pandemic (Hale et al., 2021). Relevant to this study, several indicators collected by OxCGRT capture the extent to which containment and closure policies have been implemented in a country. Specifically, OxCGRT collected information about school or business closures, public event cancellations, restrictions on gatherings or travel, and stay at home orders. The full dataset is available publicly online (https://github.com/OxCGRT/covid-policy-dataset). For this paper, we make use of two measures from OxCGRT.

First, their measure of school closures captures daily information about the extent of school closures in a country. Specifically, each day is coded into one of four categories: (1) no measures in place, (2) recommended closing or schools are open with alterations resulting in significant differences (e.g., hybrid modes), (3) required closing only for some levels (e.g., only elementary schools, only public schools, etc.), (4) required closing for all levels. In addition, for each of the mentioned categories an additional flag is given to note the geographic scope of the policy. That is, the flag indicates whether the policy is targeted to certain regions or aimed at the general public.

To construct our measure of the duration of school closures, we first remove all weekends and academic holidays[1] from the daily database. We then weight each of the school closure codes differently depending on the geographical and sectoral extent of the policies with the more expansive policies getting higher weights than more targeted policies. We count only days in which schools were

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[1]To identify academic holidays, we use information collected by UNESCO Institute for Statistics (UIS) which captured school closure status during the pandemic and included an indicator for academic holidays (something not indicated in OxCGRT data). While UIS offers an alternative measure of school closures, the information collected by OxCGRT is more detailed and we opted to use it. However, measures constructed using both data sources are strongly correlated ($r = 0.89$).

required to be closed.[2] We then construct a weighted sum of the days in which schools were closed, focusing on the time period between the start of 2020 and the end of data collection, assumed to be end of June 2022 for all countries in the sample (data collection happened in "early 2022" for Northern Hemisphere participants, see Schulz, Ainley, et al. (2023)). We test the sensitivity of our results to the use of different weighting schemes or data sources for the school closures measure and discuss the findings in subsection 6.2.

Second, we use an index constructed by OxCGRT that captures the stringency of COVID-19 lockdown measures on a daily basis. The index combines information from several indicators for the presence of several containment and closure policies: closures of schools or businesses, cancellations of public events or public transport services, restrictions on gatherings or travel, and "stay-at-home" orders. In addition, the index also includes information about the presence of public information campaigns urging caution about COVID-19. Each of the indicators is coded into various categories with higher values indicating more stringent versions of such policies being in place for the broader public. Each indicator also includes a flag for the geographical extent of such policies. In addition, if policies varied by vaccination status, the code for the majority of the country, whether that is vaccinated or unvaccinated, was used. The stringency index takes into account all of this information and is calculated as a continuous scale ranging from 0 (none of these measures are in place) to 100 (all policy measures are in place affecting the largest portion of the population possible). More details on the calculation and coding can be found in Hale et al. (2023). To construct our measure of COVID-19 lockdown policy stringency, we simply calculate the average of the stringency index over the time period between January 2020 and June 2022 (the assumed end of data collection for countries in our sample).

3.3 Student Background and Other Control Variables

In addition to collecting information on civic knowledge, attitudes, and engagement from students, ICCS also collects contextual background information. Given that we are examining country-level trends in several measures, we believe it is important that we account for changes in the student population due to migration or economic developments. Therefore, we include several control variables in all of our analyses capturing characteristics of students. First, we include an indicator for student gender. We acknowledge this is not likely to change much across cycles, but it could be an important control variable given the documented gender differences observed in civic knowledge and other outcomes present in many countries (Schulz, Ainley, et al., 2023). Age is also included as a control variable to account for age effects and difference in testing time across cycles. Another set of items asks the student in which

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[2]We apply the following weights: 0 for no measures, recommended closing, or schools open with alterations, 0.25 for required closing for some levels with a targeted geographical scope, 0.5 for required closing for some levels with general geographical scope, 0.75 for required closing for all levels with targeted geographical scope, and 1 for required closing for all levels with general geographical scope.

country they and their parents were born. Responses to this question are combined to create a categorical variable indicate whether the student is native, first-generation, or non-native of the country.

Several items in the student questionnaire ask students to report on their home background. One item asks them to report the number of books in their home (five responses: 1 = 1-10; 2 = 11-25; 3 = 26-100; 4 = 101-200; 5 = More than 200). Information about a student's parents' occupation and education level are also collected. A variable is derived indicating the highest occupation level of either of a student's parents using the Duncan Socioeconomic Index (SEI) scale. In addition, the highest education level of either of the student's parents is also recorded using the International Standard Classification of Education (ISCED). All of these measures have been used to approximate the socioeconomic background of a student (see Schulz, Ainley, et al. (2018, 2023)). The information here is combined into a factor score called the national index of students' socioeconomic background (NISB) which is a continuous score with mean of 0 and standard deviation of 1 within each country. When information was missing on any of the categorical variables a separate category was coded indicating that it was missing.

In addition, we include country-level information in our analysis. Given that ICCS 2022 data collection happened during a pandemic, albeit during the later stages, there could be concerns that non-participation in the study as a result of the COVID-19 pandemic may bias the results (e.g., Werner & Woessmann, 2023). Excluding the two countries that had low participation rates in 2022, Germany (North Rhine-Westphalia) and Denmark, the remaining countries experienced an average decline in participation rates of 4%, ranging from a 14% drop in Estonia to a 3% increase in Slovenia. To account for the effects of non-participation, we include a time-varying measure of the weighted participation and exclusion rates (capturing the percentage of schools and students from the target population that were excluded prior to sampling). Both pieces of information are taken from the appendix of the ICCS 2022 International Report (Schulz, Ainley, et al., 2023).

Additionally, we acknowledge potential concerns that our measure of COVID-19 lockdown duration and stringency is likely correlated with COVID-19 pandemic severity. This would make any estimated relationship using just the OxCGRT measures potentially biased (i.e., it would include both the effect of COVID-19 policies as well as general pandemic effects). As a result, we include several country-level indicators of the extent to which COVID-19 impacted the country. These include COVID-19 case and death rates per capita which we obtain from the publicly available data compiled by the World Health Organization (WHO). In addition, we also use information gathered in the OxCGRT database measuring the vaccination rates at the time of data collection as well as the number of days it took for the country to reach majority vaccination ($> 50\%$).

3.4 Sample

As our study aims to examine trends in civic outcomes across time, we focus our analysis on countries that participated across multiple cycles of ICCS. We use data for 14 countries and 1 benchmarking participant (Germany's North Rhine-Westphalia) that participated in both ICCS 2016 and ICCS 2022. A list of the countries included in the sample can be found in Table 1. Note that, for the one benchmarking participant, COVID-19 lockdown policies are measured at the national level, rather than regional.

[Insert Table 1 About Here]

ICCS utilized a stratified two-stage cluster sample scheme, first selecting approximately 150 schools with probability proportional to size of the school. Classrooms were then sampled within the schools to get a sample of roughly 4,000 students. This sampling design was employed to ensure that the samples could approximate the national target population of eighth-grade students in each country. As a result, all analyses presented here apply sampling weights. In pooled analyses, senate weights are used so that each country contributes the same, regardless of size. Standard errors have been calculated using a jackknife repeated replication technique that accounts for sampling variance arising from the complex sampling design (Schulz, Losito, et al., 2018).

4 Methods

To the extent possible, we follow methods used in Kennedy and Strietholt (2023) that also analyze COVID-19 policy impacts on international assessment outcomes in PIRLS. As ICCS has only three cycles (2009, 2016, 2022), we are limited in our options to control for baseline measures of the outcome. We therefore utilize a model that accounts for levels of the outcome from ICCS 2016, rather than estimating departures from country-level trends in the outcome which would require more cycles of data to confidently measure. We fine it reassuring that Kennedy and Strietholt (2023) find that the choice of model (i.e., country-specific long-term trends or short-term trends) does not have a large effect on the results. We estimate the following model using data for countries that participated in both ICCS 2016 and ICCS 2022:

$$Y_{ict} = \alpha + \beta \text{COVID\_Policy}_c * I(t = 22) + \mu_c + \tau_t + \gamma X_{ict} + \phi X_{ct} \varepsilon_{ict} \quad (1)$$

where Y_{ict} is some civic outcome for student i in country c during cycle t. It is important to note that we do not have repeated observations for students across cycles, so student i would not be observed in multiple t. That is, we do not have student panel data, but only country-level trend data. COVID_Policy$_c$ is some measure of COVID-19 restriction severity in country c. We use both a measure of the duration of school closures and the average stringency index here, though not together in the same model. COVID_Policy$_c$ is interacted

with an indicator variable for year, $I(t = 22)$, so that the measures are only considered in relation to the ICCS 2022 results. μ_c represents country fixed-effects and τ_t represents a time fixed effect (essentially a dummy variable for ICCS 2022 data). ε_{ict} is the error term that accounts for sampling variance due to the complex sampling design. β represents our parameter of interest.

In addition, our model includes several control variables. X_{ict} represents a vector of student-specific control variables that includes measures of age, gender, immigrant status, and socioeconomic status. We also include X_{ct}, a vector of country-level characteristics: participation/exclusion rates, COVID-19 case/death rates per capita, and vaccination rate information. The measures are described in greater detail in subsection 3.3.

5 Results

Table 2 presents the estimated β coefficients from Equation 1 measuring the relationship between student civic outcomes and either the average stringency index or the days of school closures after controlling student demographics as well as important country-level measures (i.e., participation/exclusion rates and measures of COVID-19 severity in a country). All coefficients have been standardized. This is done by centering the civic outcomes at their international mean (500 for civic knowledge, 50 for scales) and dividing by the international standard deviation (100 for civic knowledge, 10 for scales). We then center the independent variables at their mean across the 15 countries in our sample (44 for average stringency, 114 for duration of school closures) and divide by the standard deviation (8 for average stringency, 47 for duration of school closures). With these transformations we are able to interpret the coefficients in terms of standard deviations and can compare magnitudes. That is, a one standard deviation increase in the COVID-19 lockdown policy measures is associated with an X standard deviation increase in the civic outcome. Unstandardized coefficients can be found in the Appendix in Table A2 to allow for interpretation of the relationships on the original scales.

[Insert Table 2 About Here]

In the first column Table 2's panel (a), we can see the estimated relationship between average stringency and civic knowledge. Specifically, we estimate that greater lockdown stringency is correlated with greater declines in civic knowledge: a one standard deviation increase in average lockdown stringency is associated with a -0.05SD decline in average civic knowledge. Putting this back on the original scale, that would imply about a 5-point decline in average civic knowledge for a country with an increase in average stringency of about 8-points. Similarly, in a separate regression model, we observe that longer school closures are associated with lower average civic knowledge. The coefficient is slightly more negative than that found in the average lockdown

stringency results, perhaps due to the stronger influence of school closure policies on student academic learning than the more general policies captured by the stringency measure (-0.07 versus -0.05). The relationship implies that an increase of school closures by one standard deviation (47 days, approximately 9 school weeks) would be associated with a 0.07SD (or 7-points on the ICCS scale) decrease in average civic knowledge scores for a country.

In examining the rest of the results in Table 2, we observe that both average lockdown stringency and the duration of school closures were related with greater declines in trust in civic institutions as well as increases (or smaller decreases) in expectations to participate in protest activities (with the relationship being higher for legal activities). For expected political (POLPART) and electoral participation (ELECPART), we find significant positive relationships with our measures of COVID-19 policies. Specifically, we find that greater lockdown stringency and longer school closures were associated with increases (or smaller decreases) in both expected political and electoral participation. While results suggest that the knowledge aspect of civics education might have been negatively impacted by the measures introduced to curb the pandemic, it does appear, at least from these estimated relationships, that students were motivated or inspired by such policies to become more actively engaged in having their voice heard through protests, politics, and elections.

Comparing the standardized coefficients across the different outcomes gives us an idea of the magnitude of the relationships presented. For instance, the strongest associations are found for the legal protest activities scale for both the average stringency measure (0.11SD) and school closure duration (0.07SD). Beyond this, most of the standardized coefficients reveal very similar magnitudes of effects across the several civic outcomes that we found to be statistically significant (ranging between 0.04-0.07SD). The smallest coefficient is in the relationship between school closure duration and expected political participation, which was only marginally significant at the 0.05 level, with an estimated relationship of 0.03. We may not expect school closures to have significant influence on student intentions to join political parties or trade unions, whereas broader sets of policies beyond the school may have greater influence.

6   Sensitivity Analyses

To build confidence in our results, we conduct several extended analyses to check their sensitivity to different considerations and analytical choices. We place the results of these tests in the Appendix and describe them below. All results presented in sensitivity analyses have not been standardized and should be compared against the unstandardized coefficient estimates (see Table A2).

6.1 Sample Considerations and Outliers

We are effectively focusing on policy variation across a relatively small sample of countries (15). As a result, there may be concerns over the influence of outliers in our analysis. To test the presence of outliers, we rerun our models

removing one country at a time to see how estimates change as a result of removing one data point. In addition to removing one country at a time, we also remove two countries at once: Denmark and Germany, North Rhine-Westphalia. The reason we do this is to test whether data quality concerns from these participants in the 2016 and/or 2022 cycles influence the findings (Schulz, Ainley, et al., 2018, 2023).

First, we examine the results looking at the relationship between average lockdown stringency and civic outcomes (see Figure A1). The y-axis of the figure shows the country (or group of countries) excluded from the analysis, with the estimated coefficient shown on the x-axis along with a 95% confidence interval. We observe that the full sample coefficient estimating the relationship between the average stringency index and civic knowledge does not appear to differ excluding different countries in our sample. All coefficients are negative and significant and does not appear to be influenced by outlier countries. Removing the Netherlands (NLD) leads to the largest difference in the coefficient estimate and it shows a more negative coefficient. Similar consistent findings can be found for the legal protest scale. The remaining coefficient estimates show that they may be influenced by some outlier countries. For example, with the trust in civic institutions scale outcome, we find that the coefficient becomes insignificant when removing Bulgaria or Taiwan.

We find slightly more consistency when looking at the results for the relationship between school closure duration and civic outcomes (Figure A2). Specifically, the coefficients remain significant across different samples of countries for the outcomes: civic knowledge, trust in civic institutions, and legal protest activities. However, outliers may influence the coefficients on the other outcomes. For example, we see coefficients no longer significant after the removal of countries for the illegal protest activities (Colombia, Latvia), electoral participation (Latvia), and political participation (Taiwan, Croatia, Slovenia).

It should be noted that prior work examining the impact of national COVID-19 lockdown policies have also done tests excluding federal decentralized countries where national policies may not be applicable to all states or regions within a country (Kennedy & Strietholt, 2023). There is only one federal decentralized country within our sample, Germany. So, this robustness check would already be examined in the results excluding Germany, North Rhine-Westphalia (DNW).

Results from this exercise do indicate that some of the coefficients may be susceptible to influence from outlier data points, however results for the civic knowledge and legal protest activities appear to be consistent across different data samples. It is also important to mention that the influence of outliers does not appear to be too large as most coefficient estimates tend to hover around the overall average estimate with no drastic swings or switches in signs. In addition, we find it promising that it is not a single country that seems to be influencing our findings and acting as an outlier. That is, there does

not appear to be one single country that is making our findings significant, it changes depending on the outcome of interest.

6.2 Measures of COVID-19 Lockdown Stringency and Duration

In our main results, we focus on two simple measures of COVID-19 lockdown stringency and duration: (1) average stringency index and (2) duration of required school closures as measured by OXCGRT and weighted by geographical scope. Both were measured from the start of the pandemic to the end of data collection. However, the definition of such measures was an analytical choice. Here, we explore how model results change by replacing our main predictor variables with alternative measures. Results are presented in Table A3.

For the measure of lockdown stringency, we examine two alternative measures. First, we calculate the standard deviation of the stringency index to capture how the stringency index varies within a country. If a country continually changes the stringency of its lockdown measures, we may expect students (and adults) to react differently than in countries with relatively stable lockdown measures. We also calculate the number of days in which the stringency index was above 50 (i.e., at least half of the policies tracked were in place for the full population).

While the comparison of the coefficients cannot be explicitly made as they are measuring different aspects of lockdown stringency, we can see mostly consistent results across the different models. For instance, all measures of stringency were negatively related with civic knowledge and positively related with expectations to participate in protest activities (legal and illegal types) and be engaged in elections or politically.

As mentioned in the Data section, our measure of the duration of school closures is a weighted sum of the days in which schools were required to be closed. However, we can examine alternative measures. For instance, we could construct a more narrow measure of school closures in which we count only those days in which there was required school closures for all levels with a general (rather than targeted) geographical scope. That is, we would be certain that the schools under study would be affected by school closure measures. We call this days in which schools were "Fully closed." In contrast, we could also create a looser measure of school closures and account for *recommended* school closures in addition to the required ones. These are ignored in our original measure. We add these days with lower weight than required school closures.[3]

In examining these different ways of measuring school closures, we find generally consistent results with slightly different magnitudes (which should be

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[3]Specifically, we apply a weight of 0 for no measures, 0.17 for recommended closing with a targeted geographical scope, 0.33 for recommended closing with a general geographical score, 0.5 for required closing for some levels with a targeted geographical scope, 0.67 for required closing for some levels with a general geographical scope, 0.83 for required closing for all levels with a targeted geographical scope, and 1 for required closing for all levels with general geographical scope.

expected as we are changing the relationship that we are examining). In some cases, the more stringent measure of school closures ("Fully closed") is found to be insignificant (e.g., for LEGACT and ELECPART) or marginally significant (only at the 0.05 level, POLPART). One explanation for this difference is that the "Fully closed" measure potentially ignores important information about the required school closures for certain levels or geographical areas. The measure that accounts for recommended school closures ("All weighted"), leads to very similar findings as those presented in the main results.

An alternative data source for the duration of school closures is from the UIS, which has been used to measure school closure duration in other studies (Jakubowski et al., 2024, 2023; Kennedy & Strietholt, 2023). There is a high correlation between the UIS measures and OxCGRT measures, yet the UIS measures offers more limited information on the extent of school closures and whether they were mandatory or just recommended. The UIS categorizes each day into one of four categories: closed due to COVID-19, partially open, fully open, and on academic break. The partially open category accounts for several situations such as schools being open in certain regions, for some grade levels, or age groups, or utilizing hybrid models. In addition, the geographical scope of the UIS database is narrower than the one offered in OxCGRT. For instance, no information is collected separately for Taiwan. However, we may still be interested in understanding the relationship using a different data source collecting a measure of school closure policies. Therefore, we examine three measures constructed from the UIS database: days in which schools were fully closed, fully or partially closed (weighting partially closed days by 0.5), and fully or partially closed (weighting full and partial school closures equally). Note that the UIS data is publicly available (https://en.unesco.org/covid19/educationresponse).

In comparing coefficients, note that differences are due to the use of a different measure as well as the exclusion of one country (Taiwan) from the analysis. We again find negative relationships with the civic knowledge measure. One exception is that we do not find a relationship using the "Closed" measure. This is not too surprising as it matches with the "Fully closed" measure we constructed from OxCGRT and potentially ignores important information about school closures happening for certain grade levels or geographical areas. In examining other civic outcomes, however, despite a strong correlation between the UIS and OxCGRT measures, there do appear to be differences in estimated coefficients. For instance, we find no association with the expected electoral participation and limited associations (i.e., only for one way of measuring school closure duration from UIS) for the trust in civic institutions and legal protest activities scales. We decided to choose the OxCGRT measure because of the greater detail as well as the ability to include one additional country in the model, yet it appears that results would slightly change had we used an alternative data source for school closures.

In reading all these results it is important to note that the coefficient estimates remain mostly consistent in their sign, if not in their significance.

This leads us to have some confidence that our choice of independent variable measures does not have a large impact on the direction of our findings.

6.3 Civic Outcome Items

Trends in the civic outcome scales from ICCS 2022 are often reported (Schulz, Ainley, et al., 2023). However, this can sometimes mask the true changes in student responses over time as they involve the combination of responses to several items. For this reason, we examine the relationship between our measures of COVID-19 lockdown measures and student responses to the specific items used to construct the ICCS civic outcome scales to better understand how student perspectives may change. Specifically, we predict the probability of a positive response on each of the items listed in Table A1. The positive response is defined as selecting one of the two more positive response options (e.g., responding "Completely" or "Quite a lot" to the question about how much students trust certain civic institutions). Results are presented in Table A4.

Overall, we find that the institutional trust scale tended to decline in countries with greater lockdown stringency or longer school closures. When examining the item level results, this appears mainly driven by declines in trust of the national government, local government, the police, and parliament/congress. Positive coefficients are observed on all items making up the legal protest activities scale, except for the one asking students whether they would expect to talk to others about their views on political or social issues (no significant changes associated with the COVID-19 lockdown measures).

All items from the expected electoral participation scale were found to be significantly related with both measures of COVID-19 lockdown policies. For political participation, longer school closures were mainly associated with increases (or smaller decreases) in responses to students asked whether they would stand as a candidate in local elections or join organizations for a political or social cause rather than other items. However, the average lockdown stringency measure was significantly associated with most items, mainly joining a political party, standing as a candidate in a local election, and helping a candidate or party during an election campaign.

The results of this test do not contradict the main findings of the paper and add further information into the relationships estimated in the main results. The findings here provide a look at the main drivers of the changes we observe related to the lockdown duration and stringency measures.

7 Conclusion

We note two areas that have been understudied in the literature on the impacts of the COVID-19 pandemic. First, while an expanding body of literature has estimated significant learning deficits connected with COVID-19 pandemic, most have focused on the impacts in core subjects: math, science, and reading. Very few studies of the academic impacts of COVID-19 have focused on

domains outside of these subjects. With the rising importance of civics education, it is imperative to estimate how learning in this realm changed after the onset of the pandemic. With this understanding, we can have a more holistic view of the pandemic's impacts on education.

A second body of research has observed shifts in democratic attitudes of the general population amidst the measures implemented to combat the spreading coronavirus. Yet, most of the studies have focused on the views of adult populations. Therefore, we believe it to be important to examine how civic attitudes and expected behaviors have shifted for the secondary student population. Not only is this important to fill a gap in the literature, but it will also provide a view into the shifting attitudes of the next generation of world citizens entering the important formative years of their civic outlook.

This study provides evidence for these understudied areas by examining (1) the academic impacts of the pandemic on civics education and (2) shifts in student civic attitudes and expected engagement.

7.1 Lockdown Measures Associated with Declines in Civic Knowledge and Shifts in Civic Attitudes and Expected Engagement

We present some of the first evidence on the relationship between the duration or stringency of lockdown measures and several secondary student civic outcomes. In examining the link between COVID-19 policies and civic knowledge, we estimate that an additional day of school closures would be associated with a 0.14 point drop in average civic knowledge scores (see Table A2). On average, countries in our sample closed schools for about 114 days. This would imply that, the average country's civic knowledge score would decline by about 16 points more than a country that did not close schools at all. With an international standard deviation of 100, this would be an average effect of 0.16SD which aligns quite well with results presented in several meta-analyses which have focused mainly on core subject areas (e.g., Betthäuser et al., 2023; DiPietro et al., 2020; König & Frey, 2022; Storey & Zhang, 2021). Greater average lockdown stringency also was found to be linked with larger declines in civic knowledge scores. Specifically, we find that a 1-point increase in average lockdown stringency is associated with a 0.72 point decline in average civic knowledge (again, refer to Table A2). In the standardized coefficient results presented in the Results section, the estimated relationships are of similar magnitudes, with the coefficient for school closure duration (-0.07SD) being slightly higher than the coefficient for average lockdown stringency (-0.05SD).

In addition, we examined the relationship between COVID-19 containment measures and several other secondary student civic outcomes. We find that longer school closures and greater lockdown stringency were associated with declines in trust of civic institutions, increases (or smaller decreases) in intentions to protest (both legal and illegal forms), and greater expectations to participate in elections or politics. Taken together, it appears that secondary

students in countries with longer and more stringent COVID-19 lockdown measures lost some trust in civic institutions and as a result want to participate in more activities aimed at having their voice heard (e.g., through protests or political participation).

7.2 Limitations

Some limitations of the present study should be acknowledged.

First, there may be a temptation to interpret our findings as causal. We acknowledge that the assumptions needed to make causal interpretations of the results are not explicitly testable and therefore have avoided the use of causal language in writing about the results. However, we feel that the evidence we present is strong. In order to interpret the β coefficient as causal, we would need factors related to both the stringency or duration of lockdown policies to be unrelated to civic outcomes, or else explicitly controlled for. We have attempted to control for several factors that may fit this description, notably, several measures of pandemic severity (COVID-19 case/death rates, vaccination rates) which are clearly related with the COVID-19 containment policies as well as likely linked with student civic outcomes.

Second, the estimates presented here are based on a small sample of countries. With a small sample, there may be concern over the influence of outliers. We attempt to address this in the Sensitivity Analyses section by checking the robustness of the estimates to the removal of each country from the analysis. While we do find that some results change (significant to insignificant) with the removal of a country providing some concern about the influence of outliers, we do note that most results remain roughly similar to the overall estimated result with confidence intervals overlapping with the full sample estimate. In addition, it does not appear that one single country is contributing to the significance of all of our results. The results for civic knowledge and legal protest activities show the greatest robustness to these tests providing greater confidence in those findings. Another concern with a small sample is the generalizability of the results. Interpretation of the findings should consider the set of countries included in the analysis which includes mainly European countries.

Third, limitations in the measurement of our main independent and dependent variables may lead to the estimation of relationships that are not aligned with our research questions. For the independent variables, we use data from the OxCGRT which collects very detailed information on national pandemic containment policies. However, data collection on national policies with such an international scope may be prone to error. We are assured that some of our results remain qualitatively similar when using data from an independently collected source (UIS). Furthermore, definitions of school closure duration and lockdown stringency aggregated a wealth of information to a single point for each country. We check the sensitivity of our results by estimating the relationship of civic outcomes with different ways of measuring duration and stringency of COVID-19 policies. While we observe some differences in the estimated

parameters across the different measures, none of the significant results change in the direction of the relationship pointing to some consistency in the results. Furthermore, it is important to note that differences should be expected as the meaning of the independent variables changes as the definition of the measure changes.

For dependent variables, we use civic outcomes scales produced for the ICCS database, however, error associated with linking these scales across cycles is not accounted for in the analysis. To check whether this has any implications on our results, we run our analysis using individual items used to generate the scales as our dependent variables. The items remain the same across cycles. Results indicate that the main findings remain roughly the same across some or all of the items. The analysis also helps us to narrow down which specific items are driving the relationships that we are observing in the main findings. In addition, several of the items and scales ask students to project their own behavior later into the future. Conclusions from our results should account for the fact that these responses reflect only student expectations for future behavior (e.g., that they expect to vote in national elections in the future), rather than actual actions.

7.3 Implications

The observed decline in civic knowledge associated with COVID-19 policy duration and stringency adds to the concern over the academic impacts of school closure policies. Previous research suggests that learning deficits can have lasting and long-term consequences for educational careers. Hanushek and Woessmann (2020) highlights that learning deficits may even extend beyond individual educational outcomes and may have economic ramifications at the national level. Given the focus of this study on early secondary students, it is imperative that later secondary and tertiary educational sectors make it a focus to address the learning deficits to mitigate the long-term consequences on not just students, but future economic growth. Through the proactive implementation of strategies and interventions, educational systems can significantly contribute to mitigating long-term effects and ensuring that students are well-prepared to successfully navigate their educational journeys in the aftermath of school closures.

However, depending on the priorities of national governments and democracies, in general, the news does not appear to be completely negative. It appears that discourse spurred by the implementation of COVID-19 containment measures using exceptional powers by governments has led to unexpected changes in secondary student civic attitudes and expected participation (at least compared to students in countries that did not implement such stringent measures). While institutional trust does appear to have declined in response to COVID-19 containment measures, secondary students appear eager to have their voices heard in the future in an effort to ignite positive changes to national and local policies. Countries which implemented stronger lockdown measures, can expect the next generation of citizens to be more engaged politically through both

conventional (elections, political participation) and social-movement related (protests) means compared to those countries that implemented less strong measures.

Table 1 List of Countries in Sample by Civic Knowledge, School Closure Duration, and Average Stringency Index

Country	Average Civic Knowledge		School Closure Duration (Days)	Average Stringency Index (0-100)
	2022	2016		
Bulgaria	456	485	151	41
Colombia	452	482	224	57
Croatia	531	531	78	38
Denmark	556	586	130	40
Estonia	545	546	70	36
Germany*	524	519	143	51
Italy	523	524	139	59
Latvia	490	492	121	41
Lithuania	509	518	143	41
Malta	490	491	106	46
Netherlands	509	523	104	49
Norway	529	564	61	40
Slovenia	504	532	138	46
Sweden	565	579	58	42
Taiwan	583	581	43	31

* Data from Germany are for North-Rhine Westphalia.
Note: Countries included in the sample are those that participated in ICCS 2016 and ICCS 2022. School closure duration has been rounded up to the nearest day and is calculated as a weighted average of the number of days in which schools were required to be closed (see Data section for details). The stringency index has been averaged between January 2020 to the end of June 2022.

Table 2 Estimated association between COVID-19 containment measures and Grade 8 student civic outcomes (standardized coefficients)

(a) Civic Knowledge, Institutional Trust, and Expected Protest Activities

	CIVKNO	INTRUST	LEGACT	ILLACT
Avg. Stringency	-0.054***	-0.044***	0.111***	0.045***
(S.E.)	(0.012)	(0.011)	(0.011)	(0.013)
Days Closed	-0.066***	-0.061***	0.071***	0.038**
(S.E.)	(0.013)	(0.014)	(0.009)	(0.014)
# Cty	15	15	15	15
# Students	99,587	97,527	96,407	95,898

(b) Expected Electoral and Political Participation

	ELECPART	POLPART
Avg. Stringency	0.054***	0.051***
(S.E.)	(0.011)	(0.013)
Days Closed	0.038***	0.028*
(S.E.)	(0.009)	(0.014)
# Cty	15	15
# Students	95,937	95,899

*p<0.05; **p<0.01; ***p<0.01

Avg. Stringency = Average stringency index; Days Closed = Duration of school closures in days (removing school holidays and weekends). CIVKNO = Civic Knowledge; INTRUST = Trust in civic institutions; LEGACT = Expected participation in legal protest activities; ILLACT = Expected participation in illegal protest activities; ELECPART = Expected electoral participation; POLPART = Expected active political participation.

Note: Coefficient estimates are from separate regressions with different dependent variables (columns) and independent variables (rows). All variables have been standardized. Civic outcomes have been centered at their international mean and are divided by the international standard deviation. Average stringency and school closures are also centered at their mean across the 15 countries in the sample and divided by their standard deviation. All models have controlled for student demographics, ICCS participation rates, and country-level measures of pandemic severity. All regressions have utilized sampling weights (senate weights). Standard errors have been calculated accounting for sampling variation using jackknife repeated replication.

Appendix

Table A1 Items used for constructing civic attitudes and expected engagement scales

Scale	Item
INTRUST	How much do you trust each of the following groups, institutions or sources of information? (Not at all - A little - Quite a lot - Completely)
	• The [national government] of [country of test] • The [local government] of your town or city • Courts of justice • The police • Political parties • [Parliament/congress]
LEGACT	Would you take part in any of the following activities to express your opinion in the future? (I would certainly not do this - I would probably not do this - I would probably do this - I would certainly do this)
	• Talk to others about your views on political or social issues • Contact an [elected representative] • Take part in a peaceful march or rally • Collect signatures for a petition • Contribute to an online discussion about social or political issues • Organize an online campaign in support of a political or social issue
ILLACT	Would you take part in any of the following activities to express your opinion in the future? (I would certainly not do this - I would probably not do this - I would probably do this - I would certainly do this)
	• Spray-paint protest slogans on walls • Stage a protest by blocking traffic • Occupy public buildings as a sign of protest
ELECPART	When you are an adult, what do you think you will do? (I would certainly not do this - I would probably not do this - I would probably do this - I would certainly do this)
	• Vote in [local elections] • Vote in [national elections] • Get information about candidates before voting in an election
POLPART	When you are an adult, what do you think you will do? (I would certainly not do this - I would probably not do this - I would probably do this - I would certainly do this)
	• Help a candidate or party during an election campaign • Join a political party • Join a trade union • Stand as a candidate in [local elections] • Join an organisation for a political or social cause

Table A2 Estimated association between COVID-19 containment measures and Grade 8 student civic outcomes

(a) Civic Knowledge, Institutional Trust, and Expected Protest Activities

	CIVKNO	INTRUST	LEGACT	ILLACT
Avg. Stringency	-0.718***	-0.059***	0.147***	0.060***
(S.E.)	(0.162)	(0.015)	(0.014)	(0.017)
Days Closed	-0.141***	-0.013***	0.015***	0.008**
(S.E.)	(0.027)	(0.003)	(0.002)	(0.003)
# Cty	15	15	15	15
# Students	99,587	97,527	96,407	95,898

(b) Expected Electoral and Political Participation

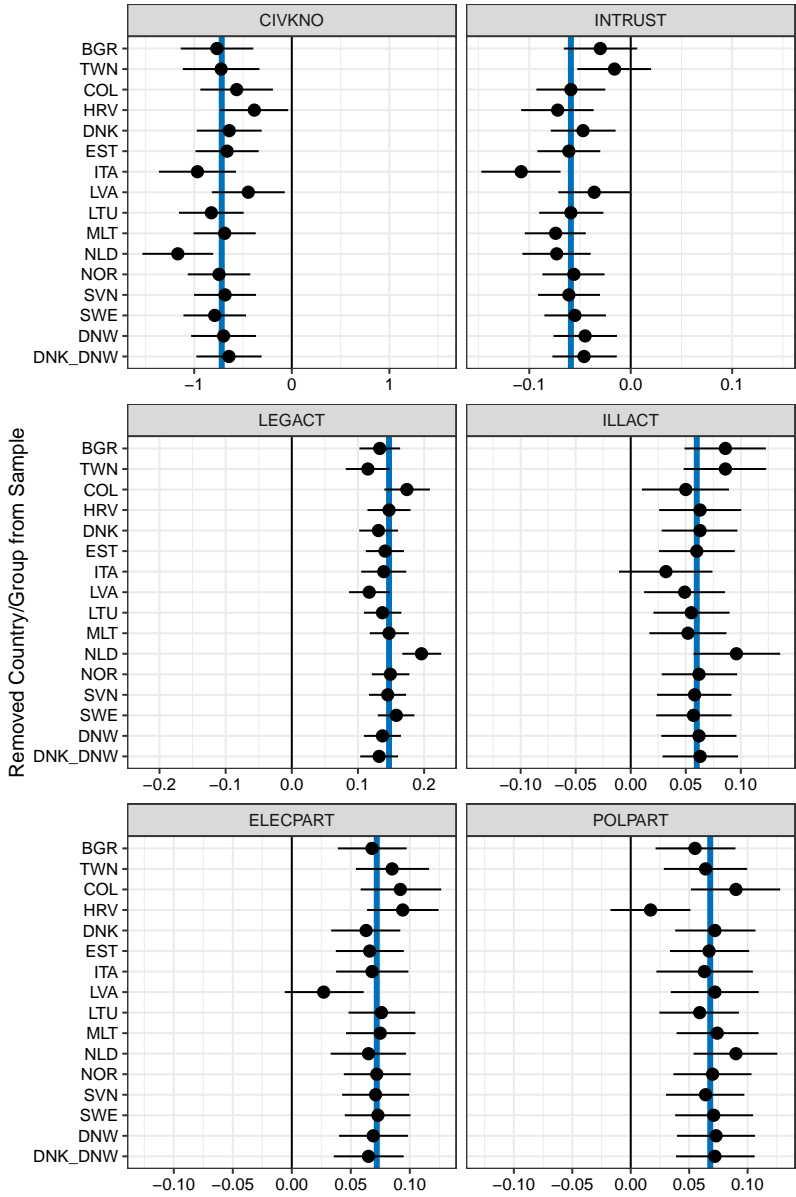|	ELECPART	POLPART
Avg. Stringency	0.072***	0.068***
(S.E.)	(0.014)	(0.017)
Days Closed	0.008***	0.006*
(S.E.)	(0.002)	(0.003)
# Cty	15	15
# Students	95,937	95,899

*p<0.05; **p<0.01; ***p<0.01
Avg. Stringency = Average stringency index; Days Closed = Duration of school closures in days (removing school holidays and weekends). CIVKNO = Civic Knowledge; INTRUST = Trust in civic institutions; LEGACT = Expected participation in legal protest activities; ILLACT = Expected participation in illegal protest activities; ELECPART = Expected electoral participation; POLPART = Expected active political participation.
Note: Coefficient estimates are from separate regressions with different dependent variables (columns) and independent variables (rows). All models have controlled for student demographics, ICCS participation rates, and country-level measures of pandemic severity. All regressions have utilized sampling weights (senate weights). Standard errors have been calculated accounting for sampling variation using jackknife repeated replication.
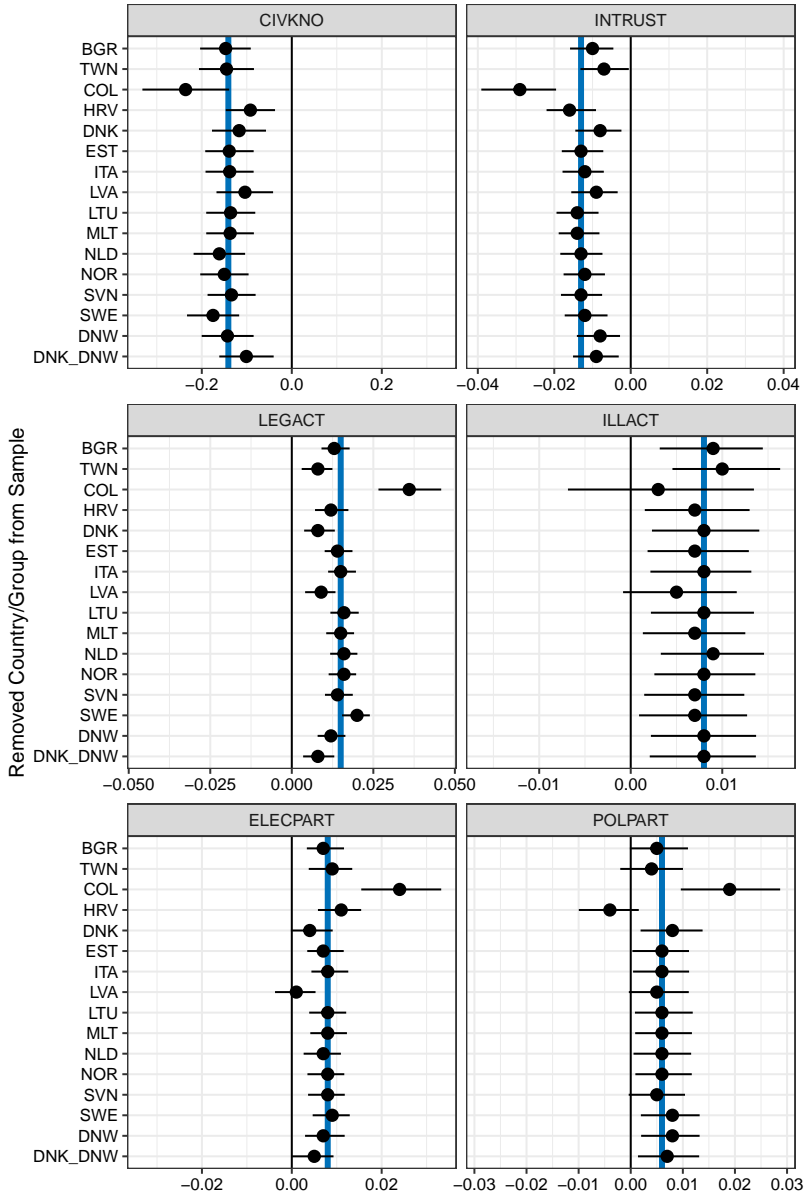
Fig. A1 Coefficient on average stringency for different data samples removing countries

CIVKNO = Civic Knowledge; INTRUST = Trust in civic institutions; LEGACT = Expected participation in legal protest activities; ILLACT = Expected participation in illegal protest activities; ELECPART = Expected electoral participation; POLPART = Expected active political participation. BGR = Bulgaria; TWN = Taiwan; COL = Colombia; HRV = Croatia; DNK = Denmark; EST = Estonia; ITA = Italy; LVA = Latvia; LTU = Lithuania; MLT = Malta; NLD = Netherlands; NOR = Norway; SVN = Slovenia; SWE = Sweden; DNW = Germany (North-Rhine Westphalia); DNK_DNW = Denmark and Germany (North-Rhine Westphalia).
Note: Blue vertical line presents the overall sample estimate.

Fig. A2 Coefficient on school closure duration for different data samples removing countries

CIVKNO = Civic Knowledge; INTRUST = Trust in civic institutions; LEGACT = Expected participation in legal protest activities; ILLACT = Expected participation in illegal protest activities; ELECPART = Expected electoral participation; POLPART = Expected active political participation. BGR = Bulgaria; TWN = Taiwan; COL = Colombia; HRV = Croatia; DNK = Denmark; EST = Estonia; ITA = Italy; LVA = Latvia; LTU = Lithuania; MLT = Malta; NLD = Netherlands; NOR = Norway; SVN = Slovenia; SWE = Sweden; DNW = Germany (North-Rhine Westphalia); DNK_DNW = Denmark and Germany (North-Rhine Westphalia).
Note: Blue vertical line presents the overall sample estimate.

Table A3 Estimated coefficients on different definitions of the COVID-19 stringency and school closure duration measures

	Predictor	CIVKNO	INTRUST	LEGACT	ILLACT
	Average	-0.718***	-0.059***	0.147***	0.060***
	(S.E.)	(0.162)	(0.015)	(0.014)	(0.017)
Stringency	SD	-3.616***	-0.115**	0.439***	0.140**
Index	(S.E.)	(0.480)	(0.042)	(0.035)	(0.042)
	Days > 50	-0.059***	-0.002	0.012***	0.004**
	(S.E.)	(0.011)	(0.001)	(0.001)	(0.001)
	Fully closed	-0.096**	-0.010**	0.003	0.009**
OxCGRT	(S.E.)	(0.032)	(0.003)	(0.003)	(0.003)
School	Required only	-0.141***	-0.013***	0.015***	0.008**
Closures	(S.E.)	(0.027)	(0.003)	(0.002)	(0.003)
Measure	All Weighted	-0.098***	-0.013***	0.013***	0.010***
	(S.E.)	(0.027)	(0.003)	(0.002)	(0.003)
	Closed	-0.043	-0.013**	-0.006	0.007
UIS	(S.E.)	(0.041)	(0.004)	(0.003)	(0.004)
School	Closed + 0.5 Partial	-0.103***	-0.001	0.003	0.009***
Closures	(S.E.)	(0.027)	(0.003)	(0.002)	(0.002)
Measure	Closed + Partial	-0.075***	0.001	0.003**	0.006***
	(S.E.)	(0.017)	(0.002)	(0.001)	(0.002)

	Predictor			ELECPART	POLPART
	Average			0.072***	0.068***
	(S.E.)			(0.014)	(0.017)
Stringency	SD			0.234***	0.121**
Index	(S.E.)			(0.036)	(0.041)
	Days > 50			0.004***	0.006***
	(S.E.)			(0.001)	(0.001)
	Fully closed			0.005	0.006*
OxCGRT	(S.E.)			(0.002)	(0.003)
School	Required only			0.008***	0.006*
Closures	(S.E.)			(0.002)	(0.003)
Measure	All weighted			0.007**	0.004
	(S.E.)			(0.002)	(0.003)
	Closed			0.000	0.011**
UIS	(S.E.)			(0.003)	(0.004)
School	Closed + 0.5 Partial			0.000	0.008***
Closures	(S.E.)			(0.002)	(0.002)
Measure	Closed + Partial			0.000	0.005**
	(S.E.)			(0.001)	(0.001)

CIVKNO = Civic Knowledge; INTRUST = Trust in civic institutions; LEGACT = Expected participation in legal protest activities; ILLACT = Expected participation in illegal protest activities; ELECPART = Expected electoral participation; POLPART = Expected active political participation.
Three ways of defining lockdown stringency are used: average, standard deviation, number of days over 50. Three ways are used to define school closures from OxCGRT: only days in which all schools were required to be closed, days in which schools were required to be closed weighted by the geographical extent, and any type of school closure (required or recommended) but weighted. Three ways are used to define school closures tracked by UIS: only days in which schools were fully closed, days in which schools were fully closed plus partial closures weighted by 0.5, and days in which schools were fully or partially closed.

Table A4 Coefficient Predicting Positive Response on Civic Outcome Scale Items

Item	Avg. Stringency		Days Closed	
	Estimate	(S.E.)	Estimate	(S.E.)
INTRUST				
National government	-0.223**	(0.074)	-0.074***	(0.012)
Local government	-0.401***	(0.067)	-0.065***	(0.011)
Courts of justice	-0.072	(0.064)	-0.023*	(0.011)
The police	-0.209**	(0.070)	-0.043***	(0.012)
Political parties	0.084	(0.067)	0.014	(0.013)
Parliament/congress	-0.343***	(0.074)	-0.032**	(0.012)
LEGACT				
Talk to others about your views on political or social issues	0.146*	(0.073)	-0.018	(0.011)
Contact an elected representative	0.680***	(0.076)	0.078***	(0.010)
Take part in a peaceful march or rally	0.406***	(0.059)	0.053***	(0.010)
Collect signatures for a petition	0.440***	(0.054)	0.062***	(0.008)
Contribute to an online discussion about social or political issues	0.735***	(0.068)	0.091***	(0.011)
Organize an online campaign in support of a political or social issue	0.676***	(0.062)	0.068***	(0.009)
ILLACT				
Spray-paint protest slogans on walls	0.278***	(0.061)	0.056***	(0.011)
Stage a protest by blocking traffic	0.196**	(0.068)	0.036**	(0.012)
Occupy public buildings as a sign of protest	0.285***	(0.070)	0.053***	(0.011)
ELECPART				
Vote in [local elections]	0.324***	(0.051)	0.047***	(0.008)
Vote in [national elections]	0.399***	(0.050)	0.050***	(0.006)
Get information about candidates before voting in an election	0.240***	(0.055)	0.031***	(0.008)
POLPART				
Help a candidate or party during an election campaign	0.257***	(0.077)	0.022	(0.013)
Join a political party	0.281***	(0.070)	0.025*	(0.011)
Join a trade union	0.212**	(0.066)	0.004	(0.012)
Stand as a candidate in [local elections]	0.279***	(0.068)	0.051***	(0.011)
Join an organization for a political or social cause	0.183*	(0.071)	0.037***	(0.010)

Note: Coefficient estimates are from a linear probability model predicting a positive response to each individual item (2 most positive responses). See Table A1 for more details on the items. Coefficients have been transformed by multiplying by 100 to allow interpretation in probability percentage terms.

References

Amat, F., Arenas, A., Falcó-Gimeno, A., Muñoz, J. (2020). Pandemics meet democracy. experimental evidence from the COVID-19 crisis in spain.

Besand, A. (2020). The crisis as an opportunity to learn. or: 'collateral civic education' in the context of the covid-19 pandemic. *JSSE - Journal of Social Science Education*, *19*, SI.

Betthäuser, B.A., Bach-Mortensen, A.M., Engzell, P. (2023). A systematic review and meta-analysis of the evidence on learning during the COVID-19 pandemic. *Nature Human Behaviour*, *7*(3), 375–385.

Bol, D., Giani, M., Blais, A., Loewen, P.J. (2020). The effect of COVID-19 lockdowns on political support: Some good news for democracy? *European Journal of Political Research*, *60*(2), 497–505.

Commission/EACEA/Eurydice, E. (2017). *Citizenship education at school in Europe, 2017.* Retrieved from https://data.europa.eu/doi/10.2797/536166 ([Accessed 29-09-2023])

Dijkstra, A.B. (2014). Social outcomes of education: concept and measurement. In *Social outcomes of education: The assessment of social outcomes and school improvement through school inspections.* Amsterdam University Press.

DiPietro, G., Biagi, F., Costa, P., Karpiński, Z., Mazza, J. (2020). *The likely impact of covid-19 on education – reflections based on the existing literature and recent international datasets* (Tech. Rep.). doi/10.2760/126686

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., ... Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*, *5*(4), 529–538.

Hale, T., Petherick, A., Phillips, T., Anania, J., Adretti de Mello, B., Angrist, N., ... Vaccaro, A. (2023, June). Variation in government responses to COVID-19 (Version 15). *Blavatnik Centre for Government Working Paper, University of Oxford*. Retrieved September 26, 2023, from www.bsg.ox.ac.uk/covidtracker

Hanushek, E.A., & Woessmann, L. (2020). *The economic impacts of learning losses.* OECD.

Iacoella, F., Justino, P., Martorano, B. (2021, March). *Do pandemics lead to rebellion? policy responses to COVID-19, inequality, and protests in the USA.* UNU-WIDER.

Jakubowski, M., Gajderowicz, T., Patrinos, H. (2024). COVID-19, School Closures, and Student Learning Outcomes: New Global Evidence from PISA. *World Bank Policy Research Working Paper*, *10666*.

Jakubowski, M., Gajderowicz, T., Patrinos, H.A. (2023). Global learning loss in student achievement: first estimates using comparable reading scores. *Economics Letters*, *232*, 111313.

Kennedy, A.I., & Strietholt, R. (2023). School closure policies and student reading achievement: Evidence across countries.

Kishi, R. (2021). *A Year of COVID-19: The Pandemic's Impact on Global Conflict and Demonstration Trends* (Tech. Rep.). The Armed Conflict Location & Event Data Project (ACLED). Retrieved October 18, 2023, from https://acleddata.com/acleddatanew/wp-content/uploads/2021/04/ACLED$_A$ $-$ $Year$ $-$ of $-$ $COVID$19$_A$$pril$2021.pdf

König, C., & Frey, A. (2022). The impact of COVID-19-related school closures on student achievement—A meta-analysis. *Educational Measurement: Issues and Practice*, *41*(1), 16–22.

Lello, E., Bertuzzi, N., Pedroni, M., Raffini, L. (2022). *Vaccine hesitancy and refusal during the covid-19 pandemic in italy: Individualistic claims or repoliticization?* University of Salento.

Ludewig, U., Kleinkorres, R., Schaufelberger, R., Schlitter, T., Lorenz, R., König, C., . . . McElvany, N. (2022, May). COVID-19 pandemic and student reading achievement: Findings from a school panel study. *Frontiers in Psychology*, *13*.

Martin, M.O., Rust, K., Adams, R.J. (1999). *Technical standards for IEA studies* (Tech. Rep.). Amsterdam, Netherlands. Retrieved September 26, 2023, from https://www.iea.nl/publications/iea-reference/technical-standards-iea-studies

Meinck, S., Fraillon, J., Strietholt, R. (2022). *The impact of the covid-19 pandemic on education: international evidence from the Responses to Educational Disruption Survey (REDS)* (Tech. Rep.).

Mislevy, R.J., Beaton, A.E., Kaplan, B., Sheehan, K.M. (1992). Estimating population characteristics from sparse matrix samples of item responses. *Journal of Educational Measurement*, *29*(2), 133–161.

OECD (2021, April). *The State of School Education: One Year into the COVID Pandemic* (Tech. Rep.). Paris. Retrieved April 12, 2023, from https://doi.org/10.1787/201dde84-en

Pietro, G.D. (2023). The impact of covid-19 on student achievement: Evidence from a recent meta-analysis. *Educational Research Review*, *39*, 100530.

Plümper, T., Neumayer, E., Pfaff, K.G. (2021, September). The strategy of protest against covid-19 containment policies in germany. *Social Science Quarterly*, *102*(5), 2236–2250.

Raffini, L., & Penalva-Verdú, C. (2022). The problematic relationship between science, politics and public opinion in late modernity: The case of the anti-vax movement in spain and italy. *Populism and science in europe* (pp. 141–162). Springer International Publishing.

Rubin, D.B. (2004). *Multiple imputation for nonresponse in surveys* (Vol. 81). John Wiley & Sons.

Savage, C., Hamilton, L.S., Scholz, C., Murray, O. (2023). *Pressing needs in research on k-12 civic learning: A call to the field.* Retrieved from https://www.air.org/sites/default/files/2023-09/Pressing-Needs-in-Research-on-K-12-Civic-Learning-September-2023.pdf

Schulz, W., Ainley, J., Fraillon, J., Losito, B., Agrusti, G., Friedman, T. (2018). *Becoming citizens in a changing world: IEA International Civic and Citizenship Education Study 2016 International Report.* Springer Nature.

Schulz, W., Ainley, J., Fraillon, J., Losito, B., Agrusti, G., Valeria, D., Friedman, T. (2023). Education for citizenship in times of global challenge.

iea international civic and citizenship education study 2022 international report.

Schulz, W., Fraillon, J., Losito, B., Agrusti, G., Ainley, J., Damiani, V., Friedman, T. (2023). *IEA International Civic and Citizenship Education Study 2022 Assessment Framework.* Springer Nature.

Schulz, W., Losito, B., Carstens, R., Fraillon, J. (2018). ICCS 2016 Technical Report. IEA International Civic and Citizenship Education Study 2016. *International Association for the Evaluation of Educational Achievement.*

Storey, N., & Zhang, Q. (2021). A meta-analysis of COVID learning loss. *Preprint at EdArXiv*, 1–15.

Werner, K., & Woessmann, L. (2023). The legacy of covid-19 in education. *Economic Policy*, eiad016.

WHO (2020). *Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV).* Retrieved August 31, 2023, from https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)

Winthrop, R. (2020). *The need for civic education in 21st-century schools.* Retrieved from https://www.brookings.edu/articles/the-need-for-civic-education-in-21st-century-schools/