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Inequalities in responses to school closures over the course of the first COVID-19 lockdown

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Abstract

In England, school closures due to the COVID-19 pandemic represented a sudden but relatively long-lasting shock to children's education. During the first lockdown, schools were closed to all but the most vulnerable children and those with key worker parents from 23 March to the end of May; they began to reopen in June and July, but some children remained out of the classroom until September. In this paper, we follow a panel of children between April/May and June/July 2020 to document how home learning experiences changed over the course of the first lockdown, and how these changes were influenced by the partial and voluntary return to school over this period.

We find little evidence that children adapted to home learning over the course of the lockdown; instead, learning time fell among those who were not offered the chance to return to school. Pupils who returned to school saw their learning time rise substantially, even conditional on observable and unobservable characteristics. However, while the opportunity to return to in-person schooling at least part-time was relatively evenly distributed, better-off parents were around 50% more likely to send their children back to school when given the choice. Since better-off students also increased their learning time by more when they returned to school, our results suggest that substantial targeted support will be needed to help disadvantaged pupils catch up, even after all children are back in the classroom.

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1. Introduction

The COVID-19 pandemic has brought an unprecedented degree of disruption to the education of school children around the world. Widespread school closures in many countries represented a sudden, mostly unexpected, and relatively long-lasting shock to the learning environment and experience of school-aged children.

In many countries, schools reopened gradually – for a subset of year groups or regions – after a period of national full closures. In England, the setting of our study, schools initially closed for all but the most vulnerable children and children of key workers from 23 March 2020. As the sanitary public health situation improved, schools started to reopen on 1 June 2020. Children in a few 'priority' year groups were invited back first, but schools were largely free to open to other year groups if they could do so safely.

A substantial body of evidence documents the learning experiences of children during the first phase of school closures and suggests that, in addition to reducing learning and worsening educational outcomes overall, these disruptions are also likely to widen already-large inequalities between disadvantaged students and their better-off peers (Burgess and Sievertsen, 2020; Education Endowment Foundation, 2020). However, less is known about how students, families and schools adapted to distance learning during this long-lasting period of closures – and how the extent of adaptation interacted with the phased reopening of schools that began at the start of June.

In this paper, we leverage a unique panel of real-time data on children's time use and the home and school resources they have available to address these questions and document how children's learning experiences evolved from the period of full school closures to that of gradual reopenings. We document who was offered and who chose to return to school during the partial reopening in June and July 2020, and describe how the learning experiences of those who went back to school differed from the experiences of those who did not. We analyse what this meant both for overall levels of learning and – importantly – for the inequalities between disadvantaged students and their peers.

Documenting how the learning experiences of children evolved throughout the lockdown is important to understand what impact the pandemic will eventually have on children's outcomes. For many, the Summer Term 2020 was an entire term with, at best, a combination of in-school and remote learning, and it is a priori unclear how children, families and schools coped with this new situation. On the one hand, the long duration of school closures in England opens the possibility that schools and families were able to adapt to home learning and improve the average quality of learning over the course of several months. On the other hand, children's and parents' fatigue with the situation could have led to an increase in pupils disengaging from remote learning (Lucas et al., 2020). Because not all schools opened and because the return to school was voluntary, the benefits of being back in school could have been felt more by some children than by others, with direct implications for the impact of the school closures and reopenings on inequalities in children's outcomes.

Studying children's learning experiences as schools reopened is also important because it can help inform the exit strategy from subsequent long-term school closures. Most immediately, at the time of writing, the country is plunged again in total lockdown. Since January 2021, English schools have again been closed in response to COVID-19, and the government's intention is now to gradually reopen them from early March 2021 (if the public health situation allows). While current remote learning provision is likely to be quite different from what it was in the first lockdown and it is

unclear which schools or year groups will be allowed to return first, there are likely to be some lessons to draw from the country's experience of school gradual reopenings in June/July 2020 to ensure that the second return to school benefits all children, and especially the most vulnerable, as much as possible.

In this paper, we find that the fall in learning time seen at the start of the first lockdown did not improve with time; if anything, learning time continued to fall over the course of the four-month lockdown. However, this overall result hides important differences between students who did and did not return to school at least part-time. Among primary school children who returned to school, average daily learning time increased by over half an hour (compared with total daily learning of just over four hours earlier in the lockdown, and six hours among a pre-pandemic cohort). This is mainly because students added several hours a day of in-school learning time, but reduced their home learning activities by less.

While learning time did not increase for students who remained at home, school reopenings do appear to have protected learning time for the children who had the opportunity to return to school but chose not to. Looking at changes for each child over time, we find that learning time in this group was broadly protected relative to levels in the period of full school closures. This is in marked contrast to learning time among a third group of children who were not offered the chance to return to school, which fell by almost 40 minutes a day among primary school children between May and July (and by almost 50 minutes at secondary school).

We also find that these inequalities have a socio-economic gradient. Existing work on the early part of the first lockdown finds evidence that the experiences of home learning were highly unequal across socio-economic groups. Students from disadvantaged backgrounds saw larger falls in their home learning time compared with the pre-COVID period than their better-off classmates. They were also much less likely to have access to the home and school resources that might have made learning time more productive (Andrew et al., 2020a).

The new results we present in this paper suggest that these inequalities did not close over the course of the lockdown. Instead, the partial reopening of schools seems to have exacerbated rather than mitigated these inequalities. While the opportunity to return to in-person schooling at least part-time was relatively evenly distributed, take-up of that offer was not. A child whose family was at the 90th percentile of the pre-COVID equivalised earnings distribution was 22 percentage points more likely to take up the offer than a child at the 10th percentile; most of this gap remains even when controlling for a wide range of other characteristics. We find that the primary reasons for parents' caution relate to the health impacts of returning to school; however, disadvantaged families also cited practical issues with transport and a reluctance to be the first ones to return to school.

This paper contributes to the growing body of evidence on the impact of COVID-19 school closures on children by documenting how children's learning experiences adjusted to an evolving situation during the academic year 2019–20 (Cullinane and Montacute, 2020; Office for National Statistics, 2020; Villadsen et al., 2020). In doing so, it provides an important complement to the emerging evidence about the actual impact of school closures on educational outcomes. Some of the first evidence from the initial months of the pandemic suggests that, in the Netherlands, the productivity of home learning time was close to zero (Engzell, Frey and Verhagen, forthcoming). Early estimates from England find that primary school pupils lost around two months' expected progress during the first COVID-19 lockdown school closures, which lasted between 2.5 and 4 months (Rose et al., 2021).

Our findings are also pertinent to an emerging body of evidence showing that the harmful effects of school closures can be reduced through some types of school and home investments. Evidence from France, Italy and the US suggests that interactive distance learning (such as online classes) substantially reduces the negative impacts of school closures, though it is nevertheless less effective than in-person teaching (Champeaux et al., 2020; Orlov et al., 2020). These findings underline how the quality of home learning will depend on the resources and support that students have available to them, which have been found to be unevenly distributed, often along existing lines of disadvantage. Children in better-off families attend schools that, on average, are better resourced and better able to deliver programmes of distance learning (Eivers et al., 2020; Education Endowment Foundation, 2020; Grewenig et al., 2020). Within the home, better-off families are more likely to be able to provide children with resources such as technology and study space (Andrew et al., 2020a). More educated parents may also be better able to support children's home learning, and there are inequalities in the extent to which parents can compensate for school closures through increasing their own time investments in children (Agostinelli et al., 2020).

Finally, our results have direct relevance to the policy decisions being taken now on how to deliver home learning and on when and how the return to school this spring should be managed. There is some evidence in our data that the quality of learning resources at home and – especially – available from schools improved slightly over the course of the first lockdown. However, even with better resources available, our results show a fall in learning time among children who did not have the opportunity to return to school, perhaps as a result of growing fatigue with the lockdown. This suggests that policymakers and school staff should be alert to the possibility of a similar deterioration in home learning over the course of the current period of school closures.

While our results confirm the importance of in-person learning for children's education, they also highlight the potential for inequalities to be affected by the way in which the reopening of schools is managed both within and across school cohorts. Within cohorts, allowing students to select into returning to school in Spring 2020 meant that, on average, students from better-off families returned to the classroom while those who were less able to cope with home learning remained at home. Across cohorts, students who were not prioritised to return saw much worse outcomes than those who were in priority year groups but stayed home.

In the rest of this paper, we first provide an overview of the data, focusing on the panel sample which is here being exploited for the first time. Section 3 describes the return to school in June and July 2020 and presents evidence on which students had the opportunity to return and which groups took up this opportunity. Section 4 outlines how learning time changed over the course of the lockdown and documents the strong role that the return to school played in patterns of learning time. Section 5 turns to the changes in home learning experiences over the first lockdown, documenting how home and school resources changed. Section 6 concludes with a discussion of the findings' policy implications.

2. Data

2.1 Survey of parents of school-aged children

In this paper, we use data from a bespoke online survey conducted at two points during the first COVID-19 lockdown in England.[9] The survey sampled parents of school-aged children in England, specifically those in year group Reception, 1, 4, 5, 8, 9 or 10 in the 2019–20 school year.[10] All sample participants had a pre-existing relationship with the online survey companies that administered the survey, and the sample was stratified on gender, education, region, marital status and work status to improve representativeness.

The first wave of the survey was conducted between 29 April and 20 June 2020, with 90% of responses collected in the first two-and-a-half weeks (before 15 May). In this wave, we asked 4,316 respondents (2,048 from Survey Company A and 2,268 from Survey Company B) for detailed information about how they, their partner and their school-aged child spent their time during a term-time weekday.[11] We collected information about the amount of time that the child spent on different home learning activities each week, as well as the resources they had available to them at home and from their school.[12]

In the second wave of the survey, we attempted to recontact the wave 1 participants. Our wave 2 data collection ran from 26 June to 26 July 2020, but survey responses were highly concentrated in a handful of days, with nearly 70% of responses coming from just six days.[13] Unfortunately, Survey Company A was unable to recontact participants for reasons that were not known to us at the time of contracting. We attempted to recontact the participants recruited via Survey Company B, and successfully completed wave 2 surveys with 927 participants.

As Figure 1 shows, our panel sample was more likely than those who attritted to be older, cohabiting and (relatedly) living in larger households. On the other hand, the panel was slightly less likely to be living in London and the South East and slightly more likely to live in the North West; had slightly lower earnings than those who attritted; and was less likely to have been on furlough at wave 1. This suggests that respondents included in our panel sample are somewhat more established but less economically successful than those who attritted.

[9] This is the same survey as in Andrew et al. (2020a), who use the first wave of data collection to examine the impact of COVID-19 on learning time and inequalities. This paper uses these data as well as the second wave follow-up.

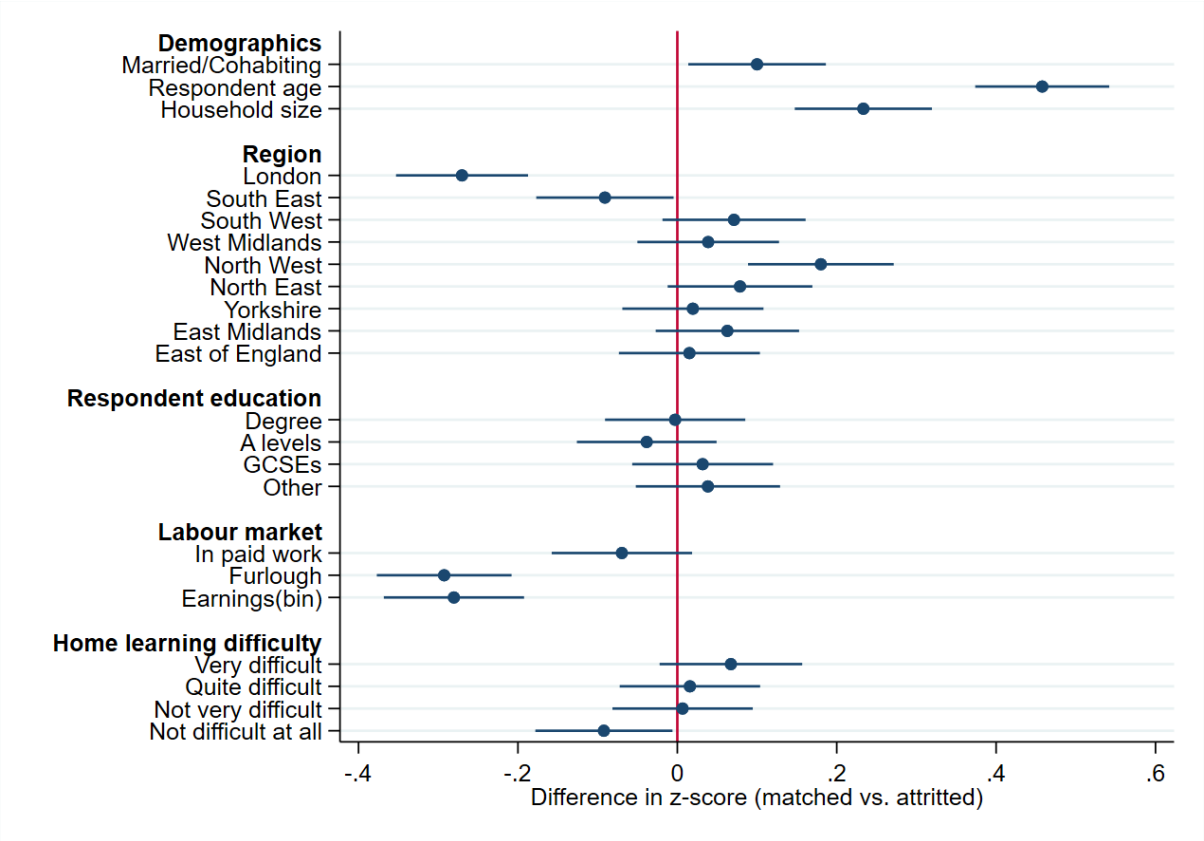
[10] We chose these year groups because they will be assessed in either the 2020–21 or 2021–22 academic years. In the future, this will make it possible to study the relationship between home learning during the first COVID lockdown and children's attainment via their government education records. These year groups roughly correspond to ages 5, 6, 9, 10, 13, 14 and 15.

[11] Figure A1 in the appendix shows how the samples from each company compare on a number of observables. While there are no statistically significant differences for most characteristics we consider, respondents recruited by Survey Company B were somewhat younger; less likely to be educated to degree level, to be in paid work or to be on furlough; and slightly less likely to be based in the North East and North West of England.

[12] In families where there were multiple children in the sample, we randomly selected one focal child.

[13] These were 26 and 27 June, right after we first launched the wave 2 survey; 9 and 10 July, when we increased the incentive for the first time; and 20 and 21 July, when we readvertised the survey to move it to the top of potential participants' dashboards. The higher response rates on these days seem to be driven by attempts to re-advertise the survey to participants, which resulted in much higher engagement for around 48 hours before subsiding.

Figure 1: Differences on observables between panel sample and those who attrit between waves 1 and 2



Note: Figure shows the difference between the panel sample and respondents who attritted after wave 1 in terms of their wave 1 observable characteristics. Each characteristic is standardised within sample to put on a common scale before differencing. Confidence intervals are based on a t-test allowing for unequal variance between groups.

2.2 Sample selection

In order to base our results on as coherent a sample as possible, we further restrict these 927 responses on a number of criteria. First, we drop respondents who responded to the wave 1 survey after 18 May (n = 38) or who responded to the wave 2 survey after 20 July (n = 18).[14] We also remove 180 respondents whose child was attending school either at wave 1 or wave 2 when their school was not officially open. The majority of these observations (87) are children of key workers; the rest are likely children deemed vulnerable. While these are important groups of children in their own right, the focus of this paper is on understanding the experience of school closures and home learning, so we restrict our attention to children with more standard educational experiences over this period.[15] Finally, we drop 35 people for whom we cannot determine whether their child's school is open at wave 2, and 3 people for whom we do not have wave 2 learning time data for the child. Taken together, this leaves us with a balanced panel of 653 respondents.

[14] Since policy and practice were changing quite a bit over this period, we focus our sample on the weeks at the beginning of each wave when we collected the vast majority of responses. This allows us to control very flexibly for response dates, to avoid inappropriately comparing experiences at quite different points in the pandemic.

[15] In-school provision for children of key workers and children deemed vulnerable was intended to be more focused on childcare than structured education, so may give a misleading reflection of in-school learning experiences.

2.3 Weighting

Unsurprisingly, the profile of respondents is not fully representative of the characteristics of parents of school-aged children in England as a whole. As discussed in Andrew et al. (2020a), we used the Labour Force Survey (LFS) to compare our sample with a large representative sample, concluding that respondents to our survey tended to be better educated and better-off than the population. We construct balancing weights based on a subsample of the LFS, selected based on similar criteria to our sampling framework. We use a number of characteristics to construct these weights, including parental education; pre-lockdown working status, income, industry and occupation; and region of residence. Table A1 in the appendix shows that, with weighting, our sample looks similar to the LFS sample both in terms of these characteristics and on a wider range of observable characteristics not directly used in constructing the weights.

2.4 Key variables

Children's time use

Our survey collects information on children's learning time via several 'slider scale' questions on the weekly number of hours spent on various educational activities. There are four different learning activities captured in this module: the weekly hours spent on online classes; on other schoolwork; with a paid private tutor; and on other educational activities. In addition, at wave 2 we also asked about weekly time in school. In this paper, we add these together and divide by five to arrive at a measure of average daily total learning time.

Home and school resources

We also ask parents about the resources that their child has available to support home learning. We break these into two categories: home learning resources (access to technology and a quiet study space) and school resources (online classes; online videoconferencing; online chat; an online platform to set and collect work; physical home learning packs; and emails). In each case, parents are asked to report whether or not the resource has been made available by their child's school, regardless of whether the family used it.

For home technology, we combine questions on the type of device a student has access to and the extent of that access to create a measure of whether a child has a computer or laptop available for them to do schoolwork 'whenever they need it'. This contrasts to other types of devices (smartphone or none) and other levels of access (most of the time, some of the time or rarely). We also create an indicator for whether the child has access to a quiet study space, which can be either for the student's sole use or shared.

Finally, while not a home learning resource per se, we also ask parents to report how difficult they find supporting their child's home learning, on a four-point scale from 'not very difficult at all' to 'very difficult'. We do not use this as a measure of parental inputs into home learning, since this scale will be affected by the home and school resources available to the family as well as by the school's expectations and the parents' other commitments. However, we use this measure as a summary statistic for how easily a family is coping with home learning during the first lockdown.

Socio-economic status

In our survey, we measure socio-economic background using the family's pre-tax annual earnings in 2019. We equivalise this measure to best reflect the amount of resources available to household members, accounting for the fact that bigger families need higher earnings to enjoy the same

standard of living and that adults typically require more resources than children.[16] We then construct the family's 'earnings rank' by taking percentiles of this equivalised earnings variable and rescaling to between zero and one.

3. School closures and reopenings in England in academic year 2019–20

In England, schools initially closed for all pupils except vulnerable children and children of key workers on 23 March 2020. These closures lasted for seven term-time weeks, with a partial reopening beginning on 1 June. However, as we document in this section, many children did not return to school before the end of the school year, spending over 14 weeks of the term away from school.

This partial reopening of schools was one of the most important policy developments between April/May and June/July. In this section, we first outline the guidance on how this reopening was managed before using data from our survey to document the patterns of school reopening. We consider both the predictors of whether a child was given the option to return to school (Section 3.2) and the predictors of whether they chose to take that option up (Section 3.3).

3.1 Guidance on school reopening

The framework for reopening set out certain 'priority' year groups: children in Reception, Year 1 and Year 6 were invited back first, from 1 June, and 'up to a quarter' of students in Years 10 and 12 were allowed some contact from 15 June.[17] Schools were also able to open to other year groups if they could do so safely.

Beyond this national guidance on priority groups, schools and local education authorities had almost complete discretion over reopening. Schools were able to set their own schedules, which ranged from full-time in-person teaching to a day or two a week to occasional 'keep in touch' days. Schools were also asked to continue to provide resources for pupils learning at home. Here again, provision varied substantially; some schools livestreamed in-class lessons for students at home, while others had children attending in person carry out the same online learning that their classmates at home were doing, and still others delivered two sets of provision for children in the classrooms and at home.[18]

Statistics from the Department for Education show that, by the end of June, around 90% of primary schools and 75% of secondary schools were open to students in the priority year groups Mondays through Thursdays (around 10% fewer schools were open on Fridays).[19] While schools were able to choose their schedule of in-person provision, parents were also able to choose whether to send their children back if given the option. Fines for unexcused absences were suspended, and national statistics show that the return to school was far from complete; among priority year groups, around

[16] We use standard procedures to equivalise earnings and count the first adult as one member, subsequent adults and children aged 14 and over as half an equivalent member each, and younger children as 0.3 of an equivalent member.
[17] See https://www.bbc.co.uk/news/education-52792769.
[18] For example, see data from the TeacherTapp survey of teachers: https://teachertapp.co.uk/return-of-the-kids-what-is-happening-in-primary-and-secondary-schools/.
[19] Since schools were able to offer different schedules for in-person, it is likely that a larger share of schools were open at least some of the time. See table 3 of 'Attendance in education and early years settings during the coronavirus (COVID-19) outbreak'.

40% of primary school children and just over 10% of children in Years 10 and 12 were attending school in person on any given day.

This policy landscape means that national policymakers, local schools and education authorities, and individual families all made meaningful decisions about whether or not children would be in the classroom in June and July. In the rest of this section, we analyse how these decisions differed based both on the factors included in the national guidance and on the characteristics of students, families and schools.

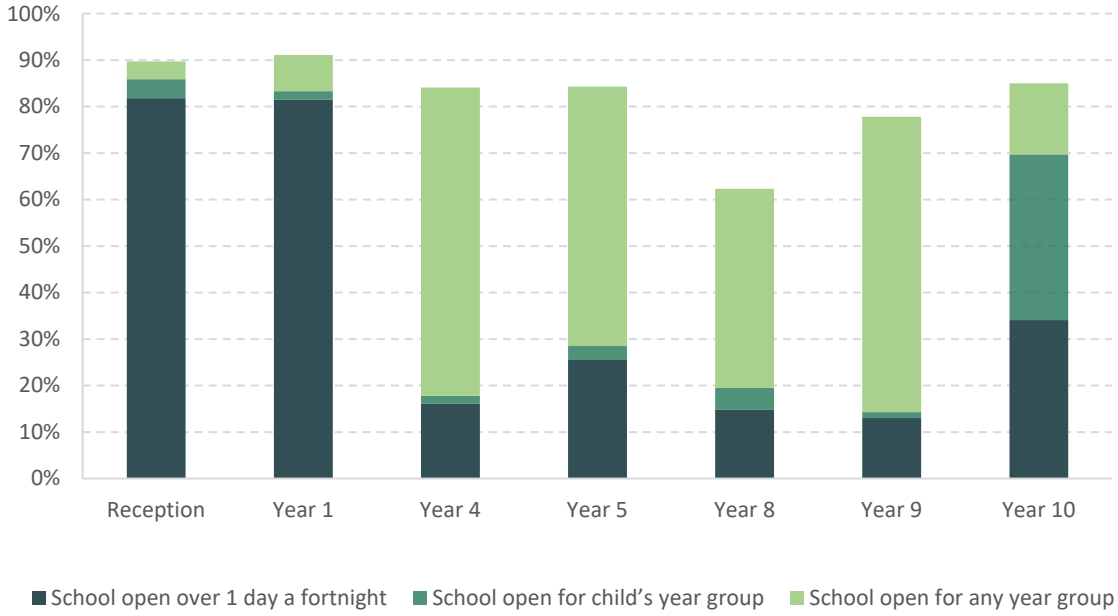
3.2 Patterns of school reopening

We start by analysing schools' decisions over whether to open, to whom to reopen, and how much in-person learning they offered. Figure 2 shows the share of parents who reported that their child's school had reopened.

The loosest criterion for whether a school had reopened is whether it was allowing back any year groups for in-person learning (not necessarily the year group of the focal child). The total height of the columns in Figure 2 shows that the vast majority of parents reported that their child's school was open under this definition; overall, 86% of primary school parents and 83% of secondary school parents reported that their school was open to at least some students. This corresponds well with statistics from the Department for Education, which also suggest very high levels of reopening in June and July.

For an individual child's learning experience, though, it is likely more relevant to consider whether the child herself was offered the chance to return to school. This is shown by the combined height of the dark and medium green column in Figure 2, which looks at the share of children whose school was open to their year group. In line with the official guidance, this is over three times as high among students in the priority years of our sample (Reception, Year 1 and Year 10) as it is for those in other year groups (Years 4, 5, 8 and 9 in our sample). Among priority year groups, the vast majority of students whose school was open reported that the school was open to their year.

Figure 2: Share of students whose school had reopened at all or to their year group



Note: Based on parent reports of whether the school had reopened at all and to their child's year group, regardless of whether the child had taken up his/her place.

A final, stricter criterion takes into account the intensity of in-person learning on offer. Particularly at secondary school, where the guidance simply advised 'some contact' in priority year groups, schools often opened only for a short time. The darkest bar in Figure 2 therefore shows the share of students whose school was open for more than one day a fortnight. This level of contact is very infrequent compared with regular schooling; even so, we find that half of secondary schools that are open to the child's year group are in fact open less frequently than this.

In Table 1, we explore some of the factors that could have been associated with schools reopening.

In Column 1, we regress an indicator for whether the school was open to the child's year group on the child's year group and when the survey was completed,[20] to capture the phased nature of the reopening (analogous results for predictors of whether a school reopened to any students can be found in Appendix Table A3). As suggested by Figure 2, we find strong evidence that the offer to return to school depended strongly on a child's year group, in line with the official guidance. Compared with children in Reception, those in non-priority year groups (Years 4, 5, 8 and 9 in our sample) were between 60 and 70% less likely to open. Students in Year 10 were also significantly less likely than Reception students to have been offered a chance to return to school, though as a prioritised year group they were still more likely than other non-prioritised years to return. We also find that families responding to our survey in later weeks were more likely to report that their child's school was open to them.

We next explore whether these patterns of reopening were associated with the socio-economic status of the family. We find no significant differences in the likelihood that a school reopened by the rank of a family's pre-pandemic earnings. Since this variable is constructed by rescaling percentiles on a scale from 0 to 1, these coefficients reflect the impact of moving from the bottom to the top of the earnings distribution; it is striking that the changes in school reopening probability are so small even when considering this maximum possible change in socio-economic status.

We also find that school reopenings were not significantly predicted by a wide range of characteristics. We include in our specification in Column 3 a range of other school characteristics: indicators for the school's region and whether or not it offered certain learning resources at wave 1. We omit the coefficients from Table 1 (they are reported in full in Appendix Table A2). However, we find that none of these coefficients is significant at the 5% level, except for the coefficient on online platform for secondary pupils. The bottom rows of Table 1 report the p-values of joint significance tests; these school characteristics are also not jointly significant.

Finally, we turn to the characteristics of the family and the child attending the school. We would not necessarily expect the characteristics of an individual child to influence the reopening decisions of schools; however, it is possible that the overall characteristics of the student body would affect this choice. Without information about the wider population of students at each school, these individual child-level variables are the closest we can come to exploring this margin.

[20] Specifically, we include a set of indicators for the week of response. We issued surveys from Tuesday to Saturday so that families filling out the time diaries in regard to the day before were responding about a weekday. We therefore construct the week of response variable for 'weeks' running from Tuesday to Monday.

Table 1: Predictors of school reopening (school open to child's year group)

	(1) All	(2) All	(3) All	(4) All	(5) Primary	(6) Secondary	(7) Priority	(8) Other
Year 1	–0.015	–0.015	0.007	0.007	–0.028		0.011	
	(0.068)	(0.068)	(0.070)	(0.072)	(0.073)		(0.080)	
Year 4	–0.691***	–0.691***	–0.674***	–0.652***	–0.687***			
	(0.073)	(0.073)	(0.076)	(0.080)	(0.081)			
Year 5	–0.574***	–0.574***	–0.564***	–0.544***	–0.562***			0.129*
	(0.071)	(0.071)	(0.072)	(0.076)	(0.074)			(0.076)
Year 8	–0.679***	–0.678***	–0.685***	–0.672***				–0.003
	(0.079)	(0.080)	(0.084)	(0.086)				(0.093)
Year 9	–0.712***	–0.712***	–0.713***	–0.688***		–0.046		–0.000
	(0.070)	(0.070)	(0.073)	(0.078)		(0.092)		(0.090)
Year 10	–0.158**	–0.158**	–0.163**	–0.142**		0.539***	–0.140*	
	(0.066)	(0.066)	(0.069)	(0.071)		(0.073)	(0.081)	
Earnings rank		0.004	0.023	0.056	0.074	0.022	0.024	0.124
		(0.071)	(0.074)	(0.081)	(0.107)	(0.116)	(0.115)	(0.108)
Constant	0.820***	0.818***	0.799***	0.806***	0.756***	0.194	0.794***	0.091
	(0.066)	(0.076)	(0.104)	(0.125)	(0.161)	(0.161)	(0.159)	(0.179)
Observations	653	653	653	653	337	316	353	300
R-squared	0.252	0.252	0.270	0.280	0.369	0.254	0.128	0.130
p-values								
School year	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.048**	0.154
Date	0.068*	0.068*	0.057*	0.080*	0.103	0.709	0.756	0.099*
Region			0.848	0.830	0.542	0.602	0.331	0.841
School resources			0.345	0.363	0.977	0.163	0.250	0.734
Home resources				0.648	0.864	0.269	0.736	0.978
Demographics				0.906	0.651	0.592	0.677	0.448
Labour market				0.313	0.168	0.224	0.078*	0.465

Note: Priority years in our sample are Reception, Year 1 and Year 10. Other year groups are Years 4, 5, 8 and 9. Earnings rank is based on pre-COVID equivalised household earnings; we compute percentiles of the distribution in our sample and rescale to run from 0 to 1, so the coefficient reflects the impact of moving from the bottom to the top of the equivalised earnings distribution. All regressions control for a set of indicators for the week in which the survey was completed. Regressions with 'region' controls include indicators for each region. Regressions with 'school resources' include indicators for whether, at wave 1, schools offered online classes; videoconferencing; online chat; online platforms to set and collect work; physical home learning packs; or emails with information. Regressions with 'home resources' include indicators for whether children always had access to a computer/tablet to do their work, whether they had their own or a shared study space, and how hard the parents found it to support home learning, all at wave 1. 'Demographics' include whether the child was the eldest and the number of siblings. Regressions with 'labour market' include indicators for whether the main respondent was furloughed or unemployed, and the same for the partner respondent (with a missing category for single parents, which is omitted from the joint significance test). The rows at the bottom of the table show the p-value of a joint F-test of the regressors in each category. Full results are shown in Appendix Table A2.

We find that school reopening decisions are not related to the home resources (measured by access to technology, study space, and parents' difficulty of supporting home learning) or the demographics (whether a child is the eldest and the number of siblings in the family). However, we do find a weak association with parental employment at wave 1. In particular, among priority year groups, families where the main respondent was furloughed at wave 1 are more likely to report that their child's school reopened (Column 7, Appendix Table A2). Also, among primary year groups, families where the main respondent's partner was unemployed or furloughed at wave 1 are also more likely to report that their child's school reopened (Column 5, Table A2). Given the number of coefficients that we are testing, though, we do not put substantial weight on the significance of these predictors.

While the return to school was highly decentralised, therefore, we find evidence that national guidelines carried quite a bit of weight and that the share of schools open was increasing over time. However, there was not systematic selection into schools returning based on a range of school and student characteristics. Importantly, this includes student socio-economic status and home learning resources; we find no evidence that the schools of disadvantaged students or those who struggled more with home learning during the first part of the lockdown were more likely to reopen.

3.3 Selection into returning to school

While the option of returning to school does not seem to have been driven by the characteristics of the school or the families attending it, take-up of this opportunity was far from universal. To understand children's learning experiences during June/July and how those were shaped by possible returns to school, it is important to also consider the predictors of whether a family chose for their child to return to in-person schooling.

Overall, in our sample just over half of children had the chance to return to school in wave 2; of those, 65% took up that offer. In Table 2, we analyse this half of children who were given the option to return to in-person schooling, at least part-time. We find strong evidence that the child's demographics matter: girls and children in smaller families were more likely to return to school, even conditional on their school year group and the date the survey was completed. On the other hand, we find little evidence of differences by ethnicity (though our sample is not large enough to explore results for individual minority ethnicities).

We also find that choosing to return to school was strongly correlated with the survey response date, with parents responding in the week beginning 30 June much more likely to send their child back than either those responding one week before or those responding in the two following weeks. (See full results in Appendix Table A4.)

In Column 2 of Table 2, we add earnings rank as a potential predictor of the decision to return to school. We find that disadvantage is a very strong predictor of the return to school; among children who had the option to go back for in-person learning, a child in the top percentile of the pre-COVID earnings distribution was more than 25 percentage points more likely to take up that offer than his or her peer in the bottom percentile. This is also in line with the socio-economic gradient in the *prospective* likeliness to send children back to school documented in Andrew et al. (2020b).

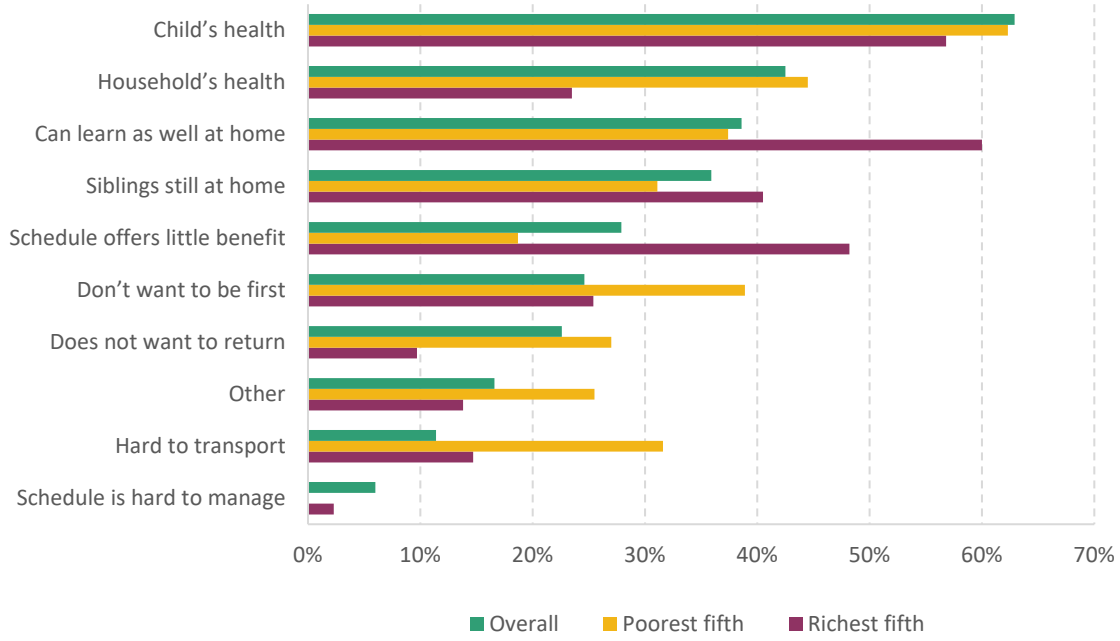
There are a number of potential mechanisms that could underpin this socio-economic gap. For instance, families from better-off households might be more likely to have parents who are trying to work from home while managing home learning. Indeed, in Column 4, we show that the relationship between pre-pandemic earnings and the likelihood of returning to school weakens by around a third once parents' wave 1 labour market experiences are accounted for.

Table 2: Predictors of children returning to school, conditional on having the option

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	All	All	All	Primary	Secondary	Priority
Child male	–0.132**	–0.140**	–0.149**	–0.135**	–0.091	–0.134	–0.135**
	(0.064)	(0.062)	(0.061)	(0.063)	(0.097)	(0.088)	(0.068)
Child not White British	0.074	0.086	0.064	0.062	0.092	0.078	0.054
	(0.080)	(0.076)	(0.075)	(0.081)	(0.111)	(0.115)	(0.087)
No. of siblings	–0.068**	–0.054	–0.060*	–0.053	–0.091	–0.004	–0.019
	(0.034)	(0.034)	(0.034)	(0.035)	(0.055)	(0.045)	(0.036)
Earnings rank		0.277**	0.265**	0.185*	0.206	0.222*	0.191
		(0.108)	(0.113)	(0.111)	(0.183)	(0.132)	(0.124)
Constant	0.556***	0.389***	0.308**	0.337*	0.610***	0.180	0.318*
	(0.111)	(0.130)	(0.153)	(0.172)	(0.229)	(0.269)	(0.185)
Observations	319	319	318	317	170	147	249
R-squared	0.090	0.116	0.157	0.181	0.188	0.268	0.215
p-values							
Demographics	0.040**	0.036**	0.018**	0.051*	0.212	0.467	0.216
School year	0.107	0.041**	0.167	0.151	0.721	0.738	0.011**
Date	0.137	0.087*	0.079*	0.057*	0.566	0.095*	0.063*
School resources			0.788	0.759	0.550	0.578	0.518
Home resources			0.193	0.315	0.225	0.180	0.120
Labour market				0.300	0.632	0.354	0.321

Note: Priority years in our sample are Reception, Year 1 and Year 10. Other year groups are Years 4, 5, 8 and 9. Earnings rank is based on pre-COVID equivalised household earnings; we compute percentiles of the distribution in our sample and rescale to run from 0 to 1, so the coefficient reflects the impact of moving from the bottom to the top of the equivalised earnings distribution. All regressions control for a set of indicators for the week in which the survey was completed. Regressions with 'school resources' include indicators for whether, at wave 1, schools offered online classes; videoconferencing; online chat; online platforms to set and collect work; physical home learning packs; or emails with information. Regressions with 'home resources' include indicators for whether children always had access to a computer/tablet to do their work, whether they had their own or a shared study space and how hard the parents found it to support home learning, all at wave 1. 'Demographics' include whether the child was the eldest and the number of siblings. Regressions with 'labour market' include indicators for whether the main respondent was furloughed or unemployed, and the same for the partner respondent (with a missing category for single parents, which is omitted from the joint significance test). The rows at the bottom of the table show the p-value of a joint F-test of the regressors in each category. Full results are shown in Appendix Table A4.

Figure 3: Reasons for not sending children back to school in June/July



Note: Parents were able to choose more than one response.

There are several reasons why parents from poorer socio-economic backgrounds might be more reluctant to send their children back to school. Most obviously, they suffer from disproportionate health risks from COVID-19, which is likely to incentivise them to minimise their family's contact with others. For example, people in disadvantaged families are less likely to be able to work from home; more likely to live in multi-generational houses, where elderly members are more vulnerable; and more likely to have pre-existing health conditions such as diabetes, which increases the chances of COVID-19 causing severe health issues.

Disadvantaged families also may have lived in areas where COVID case rates were higher over this period (though case rates were low nationally when our data were collected in late June/July). Indeed, in Figure 3, we show that health reasons (the health of the child and of other family members) were by far the most likely reasons given by families, and especially disadvantaged families, for choosing not to send their children back to school. Disadvantaged families in particular were cautious about the return to school, with almost four in ten of those who chose not to take up in-person schooling saying they did not want their child to be among the first back.

On the other hand, parents also needed to balance these risks against the benefits of sending children back to school. This calculation would have been informed by the relative attractiveness of the school's in-person learning offer, as well as parental beliefs about the education production function. For example, if schools serving more disadvantaged communities faced tighter resource constraints, they may not have been able to deliver as full an in-person learning offer as those in better-off neighbourhoods; by contrast, where schools were delivering a full online learning experience, parents might have seen less added benefit to being in the classroom. Figure 3 shows that parents took this cost–benefit analysis seriously; 39% believed that their children could learn just as well or better at home, at least during the partial reopenings in June and July.

4. Effect of school reopenings on learning time

We now turn to analysing how learning time changed between the period of nationwide school closures (April/May) and partial reopenings (June/July). We look at how both total and compositional learning time were affected, accounting for the fact that school reopenings enabled some children to transition to very different learning activities. We also explore what these changes to learning time implied for inequalities, both between more and less disadvantaged students and between those who did and did not go back to in-person schooling.

4.1 Changes in total learning time

We first look at how learning time changed overall between waves 1 and 2 of our survey. To calculate total learning time, we use data collected from the school module of the survey, which asks parents to report the amount of time their child spent on different educational activities.

In Table 3, we first report the average change in learning time between wave 1 and wave 2 for primary school students (Column 1) and secondary students (Column 5). Among primary school students, Column 1 shows that average daily learning time fell by around 0.16 hours between April/May and June/July, or around 10 minutes. As the bottom of the table shows, average learning time in wave 1 was around 4.1 hours a day, so this represents a fall from just over to just under 4 hours a day. These amounts of learning time are strikingly less than before the pandemic, when primary school children were estimated to be learning for around 6 hours a day (see Andrew et al. (2020a)).

At the secondary school level, students spent around 4.6 hours a day on learning time at wave 1. This then fell by about 20 minutes (0.34 hours) in wave 2, to 4 hours 15 minutes per day. Again, both periods saw a marked decline from the pre-pandemic level of around 6½ hours (Andrew et al., 2020a).

However, this overall finding masks substantial variation based on whether or not students returned to school at wave 2. In Columns 2 and 6, we consider how three different groups saw their wave 2 learning time change relative to the overall average learning time among all students in primary/secondary school at wave 1. Specifically, we consider children who were never offered the chance to go back to school; children who were offered the chance but whose parents decided not to send them back; and children who did at least some in-person learning at wave 2.

We find that learning time at both primary and secondary school fell sharply among children who were not offered the chance to return to school, compared with the wave 1 average for all students. Average learning time among group (a) was around 35 minutes lower in wave 2 than the overall wave 1 average for primary school students (Column 2), and more than 50 minutes lower at secondary school (Column 6).

By contrast, primary school children who returned to school saw their learning time rise by over an hour a day. This group was already spending the most time on learning in wave 1, with 4.4 hours a day; even so, this represents a more than 20% increase over wave 1 levels of learning time.

Table 3: Changes in hours per day spent learning over the first lockdown

	(1) Primary	(2) Primary	(3) Primary	(4) Primary	(5) Secondary	(6) Secondary	(7) Secondary	(8) Secondary
Wave 2	–0.160				–0.339			
	(0.212)				(0.271)			
(a) Wave 2: Out of school and not offered		–0.611***	–0.688***	–0.594***		–0.855***	–0.830***	–0.748***
		(0.235)	(0.231)	(0.203)		(0.327)	(0.312)	(0.265)
(b) Wave 2: Out of school but offered		–0.389	–0.177	–0.0159		–0.690	–0.447	0.0965
		(0.342)	(0.375)	(0.341)		(0.454)	(0.446)	(0.377)
(c) Wave 2: In school		1.005***	1.000***	0.666**		0.232	0.119	–0.155
		(0.365)	(0.354)	(0.294)		(0.368)	(0.345)	(0.256)
Constant	3.998***	3.998***	2.403***	3.998***	4.559***	4.559***	5.307***	4.559***
	(0.157)	(0.157)	(0.418)	(0.0751)	(0.196)	(0.196)	(0.587)	(0.0830)
Observations	658	658	658	658	630	630	630	630
R-squared	0.001	0.043	0.135	0.053	0.004	0.022	0.115	0.036
Basic controls			YES				YES	
Child fixed effects				YES				YES
Number of children			329				315	
p-value difference (a)–(b)		0.527	0.208	0.146		0.734	0.428	0.068
p-value difference (b)–(c)		0.002	0.011	0.131		0.074	0.265	0.581
Wave 1 mean			4.127				4.575	
W1 mean, group (a)			4.147				4.499	
W1 mean, group (b)			3.678				3.930	
W1 mean, group (c)			4.441				4.926	

Note: In each column, the omitted category is learning time in wave 1. Wave 1 means at the bottom of the table show the average learning time of children in wave 1 based on their wave 2 return to school type.

Of course, these different effects on learning time at wave 2 could reflect differences between which students are offered the chance to go back to school, and which students chose to take up that place (this is discussed in Section 3). It is clear that there were already differences between these three groups at wave 1, when all students were out of school; students who would go on to return to school did the most learning at wave 1 (4.4 hours at primary school, 4.9 hours at secondary school), while those who chose not to go back did the least (3.7 and 3.9 hours, respectively). We therefore add in a range of individual controls to account for some of the differences between the students in these three groups, and get closer to understanding the impact that the return to school itself had on learning time.

We start by controlling for a range of individual characteristics; specifically, we consider demographic controls (whether the child is male; whether the child is from a non-White-British background; the number of siblings; whether it is a single-parent family; and indicators for the child's school year) and socio-economic status controls (maternal education and earnings rank). These results are shown in Columns 3 and 7. These results look broadly similar to the results without controls, suggesting that these observable differences between who did and did not go back to school are not driving the differences in learning time.

In Columns 4 and 8, we instead include child fixed effects. These control for both observable and unobservable characteristics of children in each group. This allows the learning time of each child to be compared with his own wave 1 learning time, rather than the average across all groups. We find a similar pattern of results in these two specifications, but the effects – especially at primary school – are much smaller. This means that these unobservable differences between students in each group contribute to some of the different experiences of learning that they had in June/July. Importantly, however, there remains a clear pattern of the children who were not offered the chance to return to school substantially reducing the amount of time they spend learning. At primary school, the benefits for learning time of returning to school are considerable. While the beneficial effect of returning to school is no longer evident at secondary school, this might be related to the relatively light-touch in-person provision that secondary school pupils received (as shown in Figure 2).

Overall, these results suggest that learning time fell over the course of the first lockdown. However, this was driven by large falls in learning time among children who were not offered the chance to return to school; children who returned to in-person learning saw their learning time increase substantially, at least at primary school. Perhaps surprisingly, we find evidence of benefits of being offered a place in school even for children who did not take it up; their learning time remained essentially unchanged between April/May and June/July, substantially better than the large fall in learning time among those not offered the chance to go back.

While there are differences between the students in each of these groups, our analysis finds that these effects largely hold up even when we account for the observable and unobservable differences between children in each group. This suggests that at least part of these different effects on learning time is likely to be driven by the return to school itself.

4.2 Composition of learning time

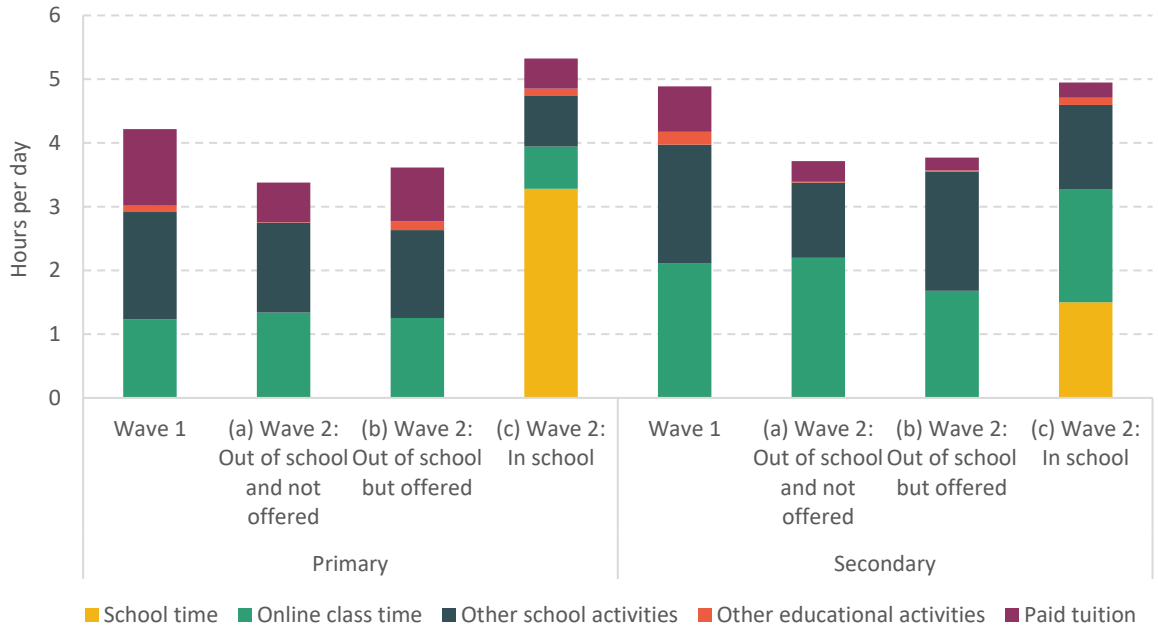
We can also investigate the types of learning activities that students were doing, to better understand what drove the differences in total learning time across different groups. Figure 4 plots the composition of learning time amongst the four categories of children captured in Table 3: children in wave 1 (the omitted category), children in wave 2 who were not offered the chance to go back to school (group (a)), children in wave 2 who were offered the chance to go back but chose not

to (group (b)) and children who were in school in wave 2 (group (c)). As before, we split this by students at primary and secondary school level. These results are unconditional, and so comparable to the results in Columns 2 and 6 of Table 3.

We find that, across both groups of children who stayed home in wave 2, time spent on online classes mostly held up between waves 1 and 2. This is somewhat surprising, since we might have expected school schedules and rotas to have adjusted during this period. However, these children spent somewhat less time on other school work than the overall wave 1 average, and considerably less time on paid private tutoring.

The starkest difference concerns children in group (c): those who returned to school in wave 2. At the primary school level, we see that, unsurprisingly, in-school learning became their most substantial learning activity in wave 2, more than enough to offset the decline in time spent on the other categories of educational activities. These children spent an average of 3.3 hours in school – only around 20 minutes less than the total learning time of their peers who remained at home. At the secondary school level, school time was a less substantial component of the total learning time of the children who returned to school. This is broadly what we would expect, since secondary schools tended to be open less intensively during this period (i.e. only 1 or 2 days a week), consistent with government guidance to provide 'some contact' to students in exam years.

Figure 4: Composition of learning time, by age, wave and in-person schooling status



4.3 Changes in learning time socio-economic inequalities

While there have been substantial falls in learning time relative to before the pandemic for all groups, previous research has suggested that the lockdown had disproportionate effects on the learning time of children from more disadvantaged backgrounds (Andrew et al., 2020a). In this section, we consider how learning inequalities evolved over the course of the first lockdown, as well as how these interacted with the effects of school reopenings, given we know there was a socio-economic gradient in the parents who chose to send their children back.

Table 4: Changes in hours per day spent learning over the first lockdown

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Group (a)	Group (b)	Group (c)	Primary	Secondary
Earnings rank	1.802***	1.310**	1.866*	1.965***	2.151***	1.538***
	(0.415)	(0.639)	(0.995)	(0.665)	(0.575)	(0.585)
Wave 2	0.100	–0.045	0.429	0.151	0.262	–0.024
	(0.307)	(0.431)	(0.662)	(0.574)	(0.380)	(0.458)
Wave 2 × Earnings rank	–0.784	–1.359*	–1.019	–0.074	–0.938	–0.681
	(0.538)	(0.764)	(1.313)	(0.918)	(0.726)	(0.769)
Constant	2.752***	2.102***	2.140***	3.157***	2.539***	3.987***
	(0.338)	(0.523)	(0.687)	(0.536)	(0.387)	(0.484)
Observations	1,306	646	236	424	672	634
No. of families	653	323	118	212	336	317
R-squared	0.043	0.044	0.050	0.058	0.051	0.027

Note: In each column, the omitted category is learning time in wave 1. All regressions control for indicators of the child's school year. Group (a) = children who were not offered a return to school at wave 2. Group (b) = children who were offered but did not take up a return to school. Group (c) = children who returned to school in wave 2.

To see how inequalities evolved between waves 1 and 2, we again use a linear regression to compare average changes in learning time between the two waves, taking into account a range of individual characteristics as well as the family's socio-economic status (SES). We measure SES based on pre-COVID equivalised earnings. We rank each family in our data set on this measure and construct a scale running from 0 to 1 with their rank. This means that the coefficient of this variable can be interpreted as the difference between the children at the very top and very bottom of the pre-COVID earnings distribution.

Equation 1 summarises this regression framework:

$$(1) \qquad Y_{it} = \alpha + \beta Earnings_i + \gamma Wave_t + \tau Earnings_i \times Wave_t + \delta X_i + \varepsilon_{it}$$

where Y_{it} is the (total) learning time of child i at wave t, and X_i is a vector of dummy variables denoting different school year groups. $Earnings_i$ denotes the family's rank in the distribution of equivalised gross parental earnings, so the coefficient β measures the extent of inequalities at wave 1. The coefficient on the interaction term, τ, indicates how much inequalities widened or shrank between waves 1 and 2.

Confirming previous work, we find evidence of large inequalities in learning time at the start of lockdown, with 'earnings rank' always strongly statistically significant in Table 4. In Column 1, for example, we find that the child at the very top of the earnings distribution did around 1.8 hours more learning *every day* than the child at the very bottom of the distribution.

If these inequalities worsened over the course of the first lockdown, we would expect to see a positive and statistically significant coefficient on the interaction term, 'Wave 2 × Earnings rank' (which measures the change in inequalities between waves 1 and 2). However, this coefficient is negative (though not statistically significant), suggesting that – if anything – the gaps in learning time closed somewhat between April/May and June/July. This effect is large (suggesting that around half of the wave 1 inequality closed by wave 2), but very imprecisely estimated.

In Columns 2–4, we explore whether the change in inequalities was influenced by the student's return to school at wave 2. Strikingly, among students who were not offered the chance to go back (Column 2), learning time inequalities essentially disappeared at wave 2, with the 'Wave 2 × Earnings

rank' coefficient almost perfectly offsetting the initial inequality. This suggests that better-off students who were not prioritised to return to school reduced their learning time to the level of students in the lowest income groups.

By contrast, in Column 3 we find a large but non-significant reduction in inequalities among those who chose not to return to school, while among children who returned to school (Column 4) there was essentially no change in inequalities between waves 1 and 2. This latter finding is especially concerning, since it implies that – while partial school reopenings increased learning time in aggregate – they did little to reduce the large inequalities between children from different backgrounds.

4.4 Summary and policy implications of changes in learning time

Taken together, the results in this section suggest that children did not 'settle in' to home learning as the lockdown progressed; rather, there is evidence that – among those who did not return to school – learning time decreased over the course of the lockdown. This result is potentially surprising, as we might expect teachers and parents to have adapted their provisions as home learning became more institutionalised. In Section 5, we probe some potential explanations for this result, by looking at how school and home learning resources changed between waves 1 and 2 of our survey.

However, school reopenings increased learning time among children who returned to the classroom, and protected it even among their classmates who remained at home. This latter group may have increased their learning time as a way to help keep up with their peers learning in the classroom. These students, or their parents, might also have taken the prioritisation of their class as a signal that their education was particularly important. These students could also have benefited in more direct ways; for example, if livestreaming an in-school lecture is less costly than creating content for an online class from scratch, schools might have improved learning resources in these year groups. We return to this last explanation in Section 5.

On the other hand, school reopenings did little to reduce the inequalities between poorer and richer students from their wave 1 levels. By contrast, richer students who were not prioritised to return to school saw learning time fall to levels similar to those of their poorer peers.

Whatever the mechanisms, these findings have important implications for managing the return to school from subsequent rounds of school closures (such as in Spring 2021). Our results suggest that policymakers should be aware both of who they are prioritising (since these students are likely to benefit both directly and indirectly) and of how much freedom these students have to opt out of returning (since, on average, those who choose to stay at home are likely to fall behind their classmates).

This latter point is particularly important since children from better-off backgrounds were more likely to return to school if given the chance; this suggests that allowing students to opt out of returning to school is likely to widen inequalities within cohorts. Policymakers also need to be wary of treating the return to school as a panacea to address inequalities; our results suggest that, while the return to school boosts learning time overall, being in the classroom does not necessarily close the gaps between students from different backgrounds. Further, a partial and optional return to school opens up new inequalities between students who return to the classroom, those who choose not to and those who are not given the choice at all.

5. Resources available to students

This section documents how learning resources at home and provided by schools changed between waves 1 and 2 of our survey. Again, this is interesting in its own right, as it gives an indication of the extent to which schools and parents adapted as the lockdown continues. Furthermore, seeing how resource provision changed amongst children with different school reopening experiences also sheds light on a potential mechanism through which school reopenings helped to protect or boost total learning time.

5.1 Home learning resources

A wide range of surveys have highlighted three types of particularly important home learning resources: access to technology; a good internet connection; and a quiet space at home to study (Lucas et al., 2020). Because our data were collected through an online survey, we are not well placed to consider students' internet access. However, our survey did collect information on the type of technology that children had access to, as well as whether they had access to their own space to study.

Figure 5 shows the share of students who always have either a computer or a tablet available for their schoolwork, and those who have access to a quiet space to study at home (either their own or shared). As documented in Andrew et al. (2020a), older students were more likely to have each type of home resource. Strikingly, even with an online survey of parents, we find that fewer than two-thirds of students had access to a computer or tablet whenever they needed it for their schoolwork. Access to a study space was more common, but even so almost 20% of primary school students did not have a quiet place to study.

Figure 5 shows that these figures remained relatively similar over the course of the first lockdown. The exception to this is the share of secondary students with access to a computer or tablet whenever needed for their schoolwork, which rose by 10 percentage points. This coincided with a push by the government and schools to distribute devices to students over the course of the first lockdown so that they were able to access online learning. The government delivered around 200,000 laptops by the end of June, and some schools and academy chains were able to provide devices to a large share of their pupils (Department for Education, 2020).

However, the relatively constant share of children with each resource hides changes within families over time. Figure 6 divides children into four groups based on whether they had each resource at wave 1 and at wave 2. Consistent with Figure 5, we find that the majority of children had the same access to home learning resources in June/July as they had in April/May. This is particularly true when looking at the share of children with access to their own study space; intuitively, there are more barriers to families adapting to provide study spaces (for example, by moving house or reallocating space in the home) than there are to providing access to technology.

Even so, over this period, around 13% of students gained access to a computer or tablet, and 9% gained access to their own quiet study space. Both the government and many schools had programmes to improve access to technology by providing laptops to disadvantaged children over this period. The share of students gaining access to a study space suggests that families were also adjusting their decisions at home. However, these adjustments did not go only in one direction. A similar share of students in our sample lost access to these resources between waves 1 and 2.

Figure 5: Home learning resources in wave 1 and wave 2

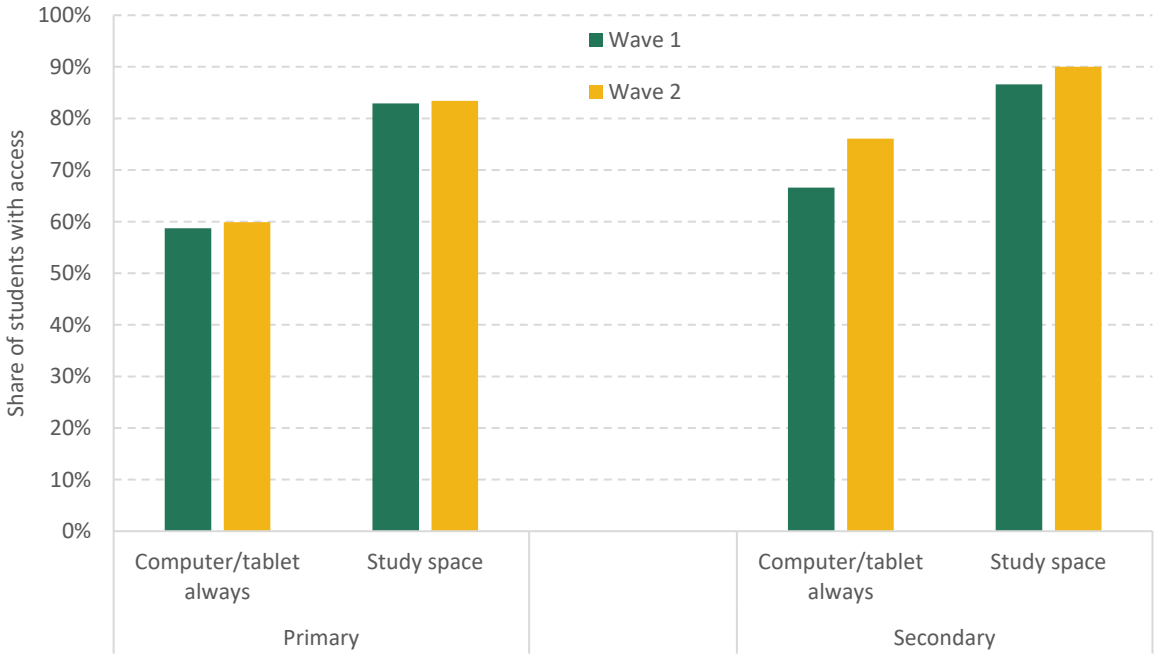
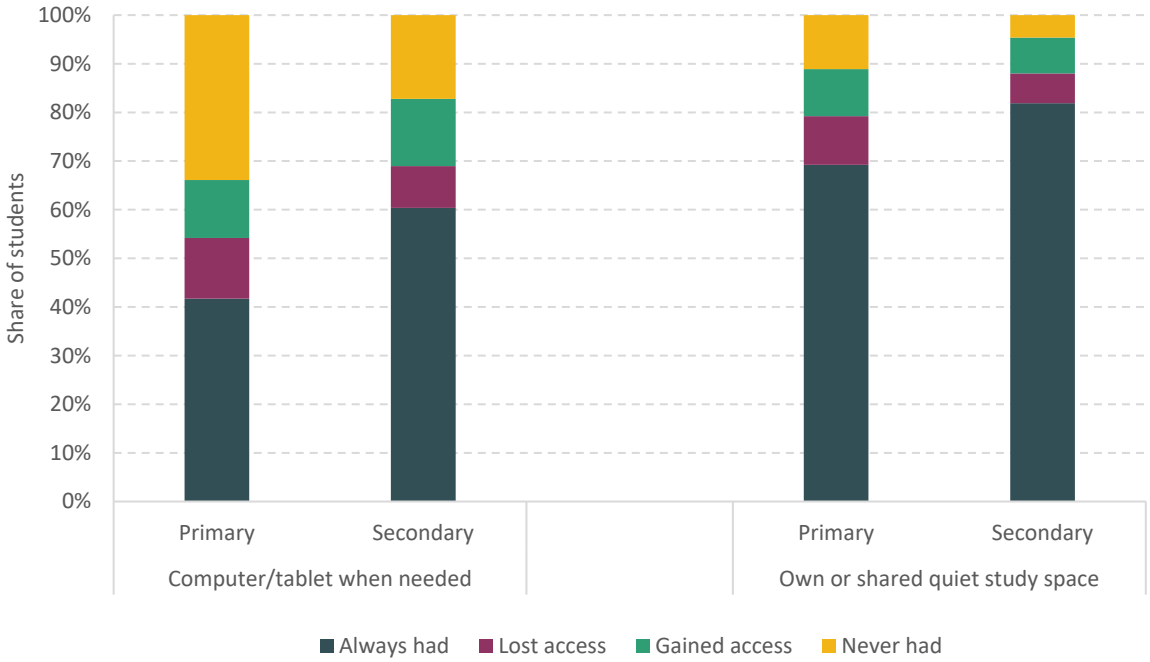


Figure 6: Transitions between wave 1 and wave 2 access to home resources



To test the drivers of these transitions, we analyse the transitions in a regression framework, controlling for whether the student had access to each resource at wave 1. We test whether other characteristics such as income and school reopening experiences affect changes in home resources. We show full results in Appendix Table A5.

Unsurprisingly, and in keeping with Figure 6, we find that availability of resources was highly persistent over time. We also find that children who went back to school were more likely to lose access to quiet study spaces at home. Since they were partially back in school, their parents may

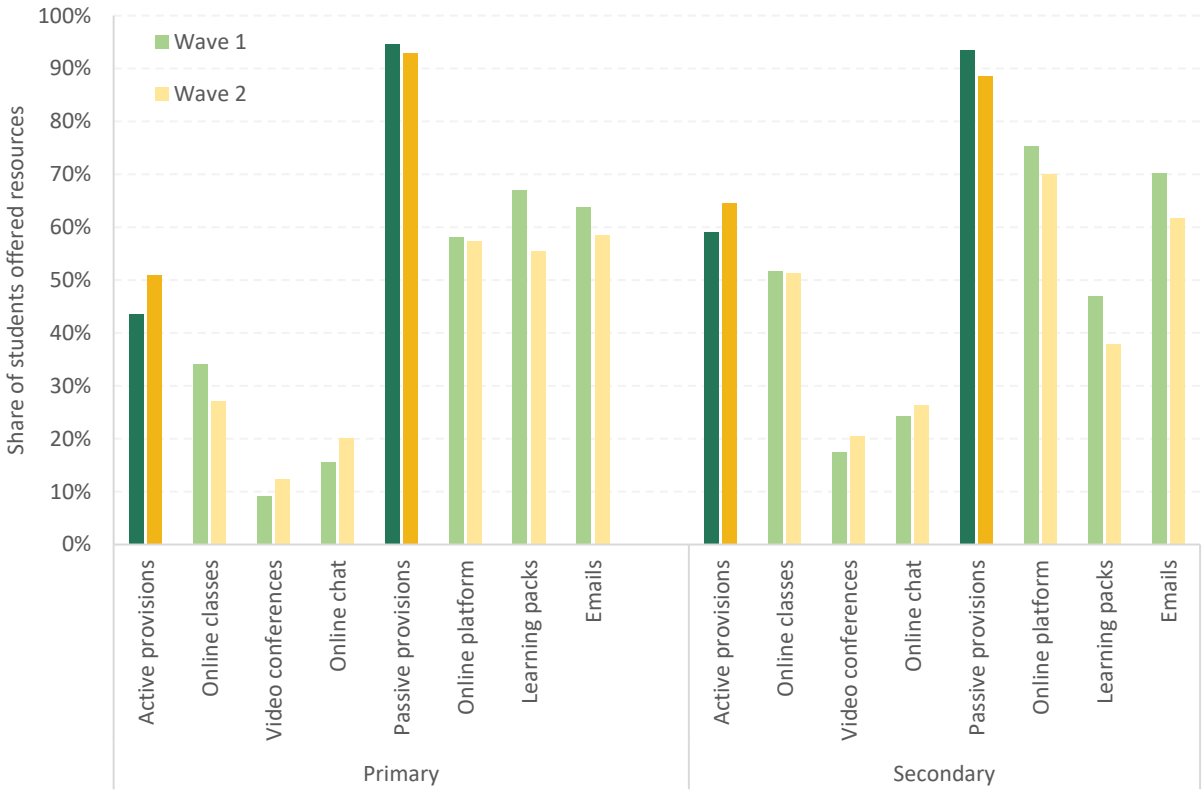
have repurposed their previous study space to assist with home working or other tasks. However, we find few other predictors of a change in home resources; notably, there is no evidence that better-off families were more likely to improve home learning resources as the lockdown progressed. This could reflect the better access to home learning resources that children in better-off families had at the start of the lockdown. Based on our data, among the richest fifth of students, 90% had access to a study space and 72% had access to a computer or tablet at the start of lockdown, compared with 86% and 62% among the poorest fifth. It could also reflect the impact of targeted interventions by government and schools to support disadvantaged students by, for example, providing them with laptops.

5.2 School learning resources

In addition to home learning resources, school resources are also likely to be a significant determinant of the success of home learning. In our survey, we ask respondents whether their child's school was providing a variety of provisions, including online classes, videoconferences, online chats, online platforms, learning packs and emails. We categorise the first three provisions as 'active provisions', since they involve interaction with a teacher. We categorise the final three provisions as 'passive provisions', since they typically involve less hands-on support.

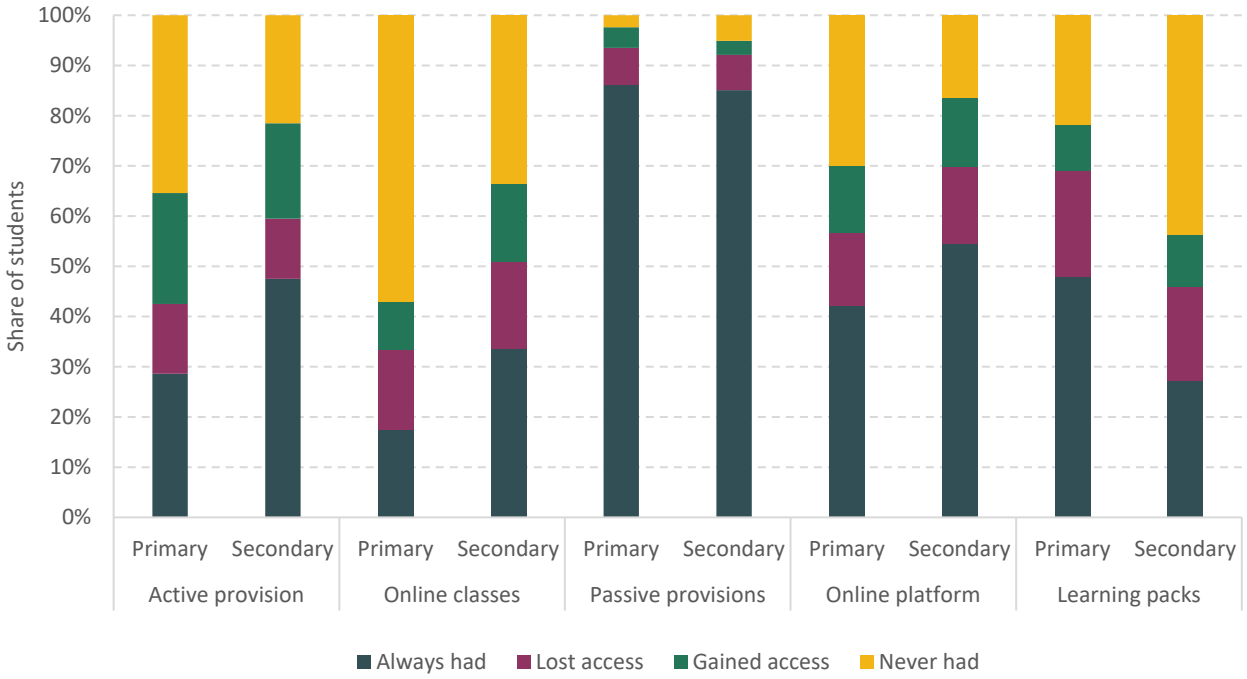
Figure 7 describes how these provisions changed between wave 1 and wave 2. The proportion of primary and secondary school children with access to active provisions increased slightly between waves 1 and 2, rising from 44% to 51% and from 59% to 65%, respectively. However, these aggregate increases obscure the fact that the proportion of primary school children with access to online classes actually fell between waves 1 and 2, from 34% to 27%.

Figure 7: School learning resources in wave 1 and wave 2



Note: Aggregated categories shown in bold colours.

Figure 8: Transitions between wave 1 and wave 2 access to school resources



The proportion of children with access to passive learning resources remained broadly the same between wave 1 and wave 2, hovering around 90% for both primary and secondary school children. Amongst the sub-categories, it is interesting to note that both primary and secondary schools appeared to shift away from providing physical learning packs, as the proportion of children with access to them fell from 67% to 56% and from 47% to 38%, respectively.

All in all, school provisions did not change substantially between waves 1 and 2, especially once the quality of provisions such as online classes is accounted for. This may go some way in explaining our previous finding that learning time for children who stayed at home did not increase between wave 1 and wave 2 (see Table 3).

Once we look at movements within individual families (shown in Figure 8), we find that changes in active school provisions were 'noisier' than changes in home provision: children were more likely to gain or lose them over the course of the lockdown. For example, while on aggregate, access to online classes remained unchanged for secondary school children between waves 1 and 2, this obscures the fact that 16% of children gained access to them, while a compensatory 17% of children lost access to them. This greater degree of change is unsurprising, since it likely reflects the fact that schools frequently adjusted their home learning strategies during the lockdown, changing their provisions in light of feedback from parents and students and available teacher capacity.

We can examine the characteristics that predict a change in school learning resources. As before, we consider both the characteristics of schools themselves (such as the region they are located in and whether they reopened to the child's year group[21]) and the characteristics of the focal child, which are the best information we have about the characteristics of the wider student body.

[21] In this specification, we consider only whether the school reopened to the child's year group, not whether the child chose to attend. We use this more aggregated measure because whether an individual family chose to take up the school's offer to send their child back presumably did not make a difference to the provisions the school was providing.

Table 5: Predictors of wave 2 school learning resources

	(1) Active provision	(2) Online classes	(3) Passive provision	(4) Online platform	(5) Learning packs
Lagged provision	0.183**	0.216***	0.283***	0.355***	0.372***
	(0.077)	(0.052)	(0.095)	(0.049)	(0.047)
Earnings rank	0.193***	0.217***	–0.072*	–0.022	0.096
	(0.074)	(0.073)	(0.038)	(0.070)	(0.079)
School reopening	–0.032	–0.038	0.078**	0.003	0.060
	(0.051)	(0.053)	(0.033)	(0.050)	(0.051)
Constant	0.099	0.005	0.364***	0.095	–0.000
	(0.122)	(0.111)	(0.112)	(0.126)	(0.131)
Observations	642	642	642	642	642
R-squared	0.257	0.322	0.206	0.202	0.222
p-values					
Region	0.026**	0.014**	0.068*	0.246	0.403
Wave 1 learning	0.001***	0.007***	0.762	0.236	0.206

Note: 'Wave 1 learning' includes total learning time in wave 1 and how difficult the parent reported it was to support home learning. 'Region' is a series of regional dummies. All regressions also control for the child's school year group and the week in which the survey was completed. The rows at the bottom of the table show the p-value of a joint F-test of the regressors in each category. Full results are available in Appendix Table A6.

The inequalities in school resource provision during the first part of the lockdown have already been extensively documented (e.g. Andrew et al., 2020a; Cullinane and Montacute, 2020). In this specification, we are particularly interested in understanding how those inequalities changed over the course of the pandemic – were schools attended by more disadvantaged students more likely to begin offering active learning resources in June/July, narrowing the gap with better-off schools? Or did the inequalities in school resources persist or even widen over the course of the first lockdown?

To analyse this, we use a lagged regression framework to analyse the predictors of changes in school resources. Our outcomes are whether the school offered various resources in June/July, controlling for the provision they offered in wave 1. To be precise, we estimate:

$$(2) \qquad SR_{it} = \alpha + \beta SR_{it-1} + \gamma Earnings_i + \delta X_i + \varepsilon_{it}$$

where SR_{it} is a dummy variable reflecting whether a particular school resource was available to child i in wave 2, SR_{it-1} is a dummy for whether this resource was available in wave 1, $Earnings_i$ is the family's equivalised earnings rank, and X_i is a vector of other potential predictors.

Due to space constraints, Table 5 focuses on active provision, passive provision, online classes, online platforms, and learning packs that schools provided. These learning provisions are the most common over the lockdown and exhibit the most variation between waves.

Unlike home resources, we document a number of factors that predict how schools changed their learning provision over time. Most notably, children in better-off families were substantially more likely to gain access to active resources (mainly online classes), over and above the inequalities in access to these resources that already existed at wave 1. This means that, in addition to being more likely to return to school given the chance, better-off students who remained at home were also more likely to see their access to learning resources improve over the course of the lockdown.

This does not seem to have been driven by school reopening decisions. Despite fears that schools would be unable to support both an in-class and a home learning offer, we find no robust evidence

that open schools reduced the provision of active resources for home learning, such as online classes (Column 2). This result suggests that schools were broadly able to balance the simultaneous demands on in-person and remote teaching.

6. Conclusion

The school closures introduced in response to the COVID-19 emergency have reshaped the educational experiences of students. In this paper, we use panel data collected at two points during the first set of school closures to explore how learning time, home resources and school resources changed over the course of the lockdown. We find little evidence that students in aggregate adapted to the school closures; indeed, among groups that were not prioritised to return to school, learning time fell substantially as richer children reduced their time on educational activities to a similar level to that of their poorer classmates.

On the other hand, we find that the partial return to school had substantial impacts on children's experiences over this period. We document that the return to school broadly followed the government's guidelines for priority years, and that schools increased in-person provision over time. Encouragingly, we do not find that the offer of school places prioritised better-off children, who likely attended better-resourced schools. However, we do find a strong socio-economic gradient in the children who opted to return to school. We find that better-off children – who, on average, enjoyed better resources and spent more time on learning at wave 1 – were far more likely than their poorer classmates to return to school. Even more concerning, among children who chose to return, better-off students continued to spend more time on learning than their peers from poorer families.

In contrast to the substantial changes in learning time among these different groups, families' adaptation to home learning (as measured by changes in home resources) appears to have been relatively modest. Schools were much more likely to change their provision over this period, with around a fifth of pupils reporting their school started to offer active learning resources such as online classes or videoconferencing.

Importantly, our results pertain only to changes over the first period of school closures; we cannot say how the home learning experience has changed during the current set of school closures. For example, there is already emerging evidence that schools are more likely to be offering live online classes during the current period of closures than they were during the first lockdown (Montacute and Cullinane, 2021). Our results are also estimated on a relatively small sample, limiting our ability to detect smaller changes over the course of the first lockdown.

Even so, our results shed light on the challenging decisions facing policymakers as they seek to navigate the second return to school when the public health situation allows. Reopening schools benefits all children who are offered a place in the classroom, not just those who take it up. On the other hand, it seems to come at a cost to children who are not prioritised. While policymakers need to consider factors such as parents' ability to support home learning and children's social and emotional development when choosing how to prioritise students, our results suggest that they should also send a message to children in other year groups that their education matters too – and they should ensure that this is backed up by school resources.

Equally, policymakers and schools should strive to encourage families who are offered the chance to return to school to take it up. This might be more challenging this time around than it was in June and July: families are particularly sensitive to health concerns, and high current case rates and new

variants suggest that the public health situation when schools are reopened could well be worse than it was in June and July 2020. However, if families are allowed to choose entirely on their own whether to return, their choices will likely widen inequalities both in the quantity of learning time and in its quality.

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