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Remote schooling during the pandemic: A double burden for working parents in Sweden?

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CINCH competence in competition + health series

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Remote Schooling during the Pandemic: A Double Burden for Working Parents in Sweden?*

Abstract

The COVID-19 pandemic was a major shock for working parents, who faced sudden disruptions in both their work environment and their children's schooling. We study the effect of remote schooling on parental labor market outcomes in Sweden, a setting characterized by minimal COVID-related containment measures, a robust social safety net and a well-established digital education infrastructure. For parents of teenagers, we find no evidence that remote schooling affected employment status, with some short-lived earnings increases that vary by the age of the child. We find neither systematic maternal–paternal differences nor variation by occupational remote-workability.

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1. Introduction

Family-friendly policies that enable both parents to work have been a cornerstone in advancing gender equality in many countries over the past several decades (Olivetti and Petrongolo 2017; Blau and Kahn 2017; Humphries et al. 2024; Hermes et al. 2024). However, schooling disruptions, whether caused by labor disputes, weather events, or pandemics, represent a threat to the achievements of policies attempting to support dual-earner households, to the extent that shock is absorbed disproportionately by mothers. Indeed, scholars have noted that the situation and policies enacted during the COVID-19 pandemic confronted families with situations that led some to choose to revert to more traditional household roles (Alon et al. 2020; Hupkau and Petrongolo 2020).

Building on this discussion, we explore whether remote schooling during the COVID-19 pandemic in Sweden affected parental labor supply. We focus on two distinct remote schooling disruptions. The first disruption is based on an abrupt national recommendation universally adopted in the spring of 2020, affecting children typically aged 16-18. We compare this group with children aged 13-15, suggesting that the immediate need for childcare could have been of secondary importance for any effect. However, this case remains important, as it represents the largest remote schooling shock in Sweden.

The second disruption occurred simultaneously but on a smaller scale and was shaped by the significant autonomy Swedish municipalities have with respect to schooling. To investigate this, we explore remote schooling for children in grades 1 through 3, typically aged 7-9, compared to children in the three years prior to the compulsory pre-school year, typically aged 3-5. This second analysis is based on remote schooling decisions from 204 out of 290 Swedish municipalities that we collected.[1]

Using Swedish register data, we compare parents within the same municipality with similar-aged children attending adjacent grades, where some children experienced remote schooling due to federal recommendations or municipal decisions.

The literature on pandemic-induced changes in schooling and their consequences for parental earnings has evolved rapidly. Early studies on school closures during the pandemic described patterns without ascertaining causal claims (Albanesi and Kim 2021; Immel, Neumeier, and Peichl 2022; Goodman et al. 2024). The next phase included papers from the United States that compared parents to nonparents (Russell and Sun 2020; Furman, Kearney, and Powell 2021; Atalay, Kobler, and Michaels 2023; Lim and Zabek 2023). However, we argue that nonparents are not a suitable control group due to selection into parenthood and its related labor market decisions (Adda, Dustmann, and Stevens 2017). More recent studies have used arguably exogenous changes in school closures such as grade-specific closures (Garcia and Cowan 2022; Beauregard et al. 2022; Lim and Zabek 2023). Yet, this literature is still focused on North America. Overall, these studies find that women are more affected than men, often attributed to a

[1] We drop grade 0 since it was sometimes unclear to what extent remote schooling decisions applied to these children. Note that 26 municipalities have no upper secondary schools and that 14 municipalities reported to not have records or their records weren't detailed enough for us to be able to implement them, see the appendix for details. Thus, for the older kids there are less than 64 municipalities missing, for younger kids 72 municipalities are missing. These municipalities are usually sparsely populated. Thus, this dataset covers the vast majority of affected families in Sweden.

mix of mothers substituting for the lack of schooling and the pandemic-induced recession affecting female-dominated occupations[2]. The ability to work from home has been found to mitigate the impact caused by school closures (Garcia and Cowan 2022; Beauregard et al. 2022). For an in-depth overview of this literature, we refer to Lillard et al. (2025).

Our study makes several contributions to the existing literature. First, we compare the labor supply of parents with similarly aged children who reside in the same municipality within a country that implemented relatively few nonpharmaceutical interventions (NPIs). These parents differ in one key aspect: some children are taught in person, while others receive remote instructions.

This approach has been used to estimate the direct and indirect effects of COVID vaccines on infection rates in the US (Freedman et al. 2022) and the impact of remote schooling on infection rates and mental health of Sweden (Vlachos, Hertegård, and B. Svaleryd 2021; Björkegren, Svaleryd, and Vlachos 2024). Freedman et al. (2022) find that vaccines reduce infection rates but do not spill over to peers. Studies using Swedish data have shown that remote schooling improved the mental health of affected students and had a small reduction in COVID infections among teachers and their partners, with an even smaller reduction observed among parents (Vlachos, Hertegård, and B. Svaleryd 2021; Björkegren, Svaleryd, and Vlachos 2024).

This study makes an additional contribution through its estimation of the effects of remote schooling in Sweden, where the pre-existing high-quality digital schooling infrastructure provides a 'best-case experiment' for remote schooling (Siljebo 2023). Given that remote schooling still provides some form of education compared to complete school closures, it should lead to smaller reductions in the effective amount of schooling. However, remote schooling is generally assumed to worsen the quality of instruction (Cortés-Albornoz et al. 2023). Qualitative studies from Sweden demonstrate that there is heterogeneity in how upper secondary students perceive remote instruction, with some students expressing appreciation for the increased independence, while others do not. Yet, challenges in group work and learning from peers are pervasive among these students (Ringer and Kreitz-Sandberg 2022; Nøkleby et al. 2024). We acknowledge these challenges, but also note that in Sweden a robust educational IT infrastructure, high-speed Internet, and previous experience with digital tools enabled a smooth transition for students and teachers (Engzell, Frey, and Verhagen 2021; Skolverket 2022a). At the same time, we also acknowledge that the general IT infrastructure in Sweden is among the best in the world and remote work was already more common than in other countries prior to the COVID-19 outbreak (Gill, Hensvik, and Skans 2025). This might counteract the labor market effects of remote schooling for some parents.

Thus, our study contributes in a third important way. Like previous studies, we explore the heterogeneity of the disruption considering occupational flexibility, ranging from remote-capable work to occupations most impacted by the pandemic, whether due to the nature of the pandemic or restrictions such as curfews and social distancing. In addition, we improve existing work by collecting detailed municipal-level data on remote schooling. This data set provides the most comprehensive overview of remote instruction

[2] In the USA a general trend was observed that some parents who could afford it moved their kids into private schools, which had lower rates of closures and remote schooling (Garcia and Cowan 2022). In the appendix we show that there was no such trend in Sweden.

in Sweden during the pandemic. Contrary to assumptions in much of the literature, that upper secondary schools were closed (Lindblad et al. 2021a), lower-secondary schools had no remote instruction in 2020 (Björkegren, Svaleryd, and Vlachos 2024), or that primary schools never offered remote instruction (Lindblad et al. 2021b), our data confirms that remote instruction occurred at all grade levels, though to varying extents. Figure 1 in section 2.b illustrates this variation. A broader issue in the literature is the lack of a standardized definition of what constitutes 'closure'. As Lillard et al. (2025) show, educational disruption varied dramatically worldwide, from seamless transitions to remote learning, as in Sweden, to extended periods without any instruction in countries like Mexico or India.

The importance of our data lies not only in documenting these changes, but also in its capacity to improve causal identification. For example, we can exclude municipalities that implemented remote schooling at the lower secondary level following federal recommendations, thereby strengthening internal validity. Our data also allows us to study younger children, a group previously unexamined in the Swedish context. Finally, because our dataset includes longitudinal observations, we can investigate whether pre-COVID-19 spousal earnings differences influenced which partner faced earnings losses. We also explore variation in outcomes across the earnings distribution.

Overall, we do not find employment effects among Swedish working parents and only short-lived earnings effects. The effects do not vary with gender or how easy it is to perform the job remotely. We also find rather little subgroup heterogeneity. Thus, it appears that the Swedish context was able to buffer against any potential negative labor market effects among parents of children who faced remote schooling during the pandemic vs. parents in the same municipality with children who did not face remote schooling.

2. COVID mitigation policies in Sweden

a. Overall mitigation policies

COVID-19 arrived in Sweden about the same time as in the US and most European countries. Swedish public health authorities confirmed the first case of COVID-19 in January 2020.[3] During the first two years of the pandemic, COVID infections and deaths per capita in Sweden and the U.S. were remarkably similar (see Appendix Figure B1 and B2). While other similar countries imposed and enforced strict mandates to affect the rapid spread of COVID, Swedish authorities **recommended** that its residents voluntarily change specific behaviors (Cho 2020; Juranek and Zoutman 2021). Evidence suggests that most Swedish residents complied and voluntarily moved around less and met others less often face-to-face; often due to increased remote working. An exception is that Swedes rarely wore masks, a behavior some scholars suggest could have emerged because government authorities initially questioned the ef-

[3] See https://www.krisinformation.se/nyheter/2020/januari/forsta-bekraftade-fallet-av-coronavirus-i-sverige (in Swedish) last accessed 27th of Feb. 2024

ficacy of masks in slowing COVID spread and only later recommended that Swedes use them (Johansson et al. 2021). Evidence also suggests that, across socioeconomic and demographic distributions, Swedes largely complied in similar ways (Dahlberg et al. 2020).

b. Mitigation policies in the school system

The Swedish government recommended that pupils and school staff regularly wash their hands, disinfect exposed surfaces (e.g. keyboards and tables), maintain a safe distance from others when possible, avoid large gatherings, engage in outdoor activities, and try to minimize the frequency of events where people come into contact with each other. For example, school administrators should try to minimize open houses and parent-teacher meetings at schools. Note that the government did not issue a recommendation about mask use nor did the government recommend that people quarantine if exposed to people infected with COVID. The government also did not require schools to limit the number of students per classroom. Most importantly, outside of regularly scheduled holidays, schools continued to provide instruction without interruption.

The compulsory education system starts when children aged six must attend preschool (*förskoleklass*) (Year 0). This takes place in the primary school building under the supervision of the primary school staff. Parents may voluntarily enroll their child in daycare once their child turns one. Daycare is heavily subsidized[4] and gives preferential treatment to working parents. Parents must keep their child enrolled in school from grade zero to nine. The Swedish system divides compulsory schooling into pre-school followed by three stages: a lower stage (*lågstadiet* – school years one to three), a middle stage (*mellanstadiet* – school years four to six) and a higher stage called lower secondary school (*högstadiet* – school years seven to nine). After completing nine years of compulsory schooling, students may choose to complete up to three more years of voluntary schooling. This latter voluntary school stage is upper secondary school (*gymnasium* – school years ten to twelve). In contrast to many other countries, virtually all Swedish children advance to the next grade in each year of compulsory schooling. Furthermore, nearly all Swedish children move from compulsory schooling in year nine to voluntary schooling in year ten (the first grade of upper secondary schooling). Appendix Table B1 shows, for the school years 2018-19 to 2020/21, the fraction of Swedish students who advance to the next grade, drop out, and repeat a grade.[5]

The Swedish government requires schools to instruct for a minimum of six hours each day for students in the first two grades and for eight hours each day for students in grades three through nine. A typical school day starts around 8 am. The government does not regulate the maximum number instructional hours for upper secondary schools. During the pandemic, the Swedish government granted municipal

[4] In Sweden daycare is entirely free of charge for 525hrs per year from the fall-term of the year the child turns three until the child attends preschool. Parents only pay for additional hours conditional on their income and number of children between 1-3%, but these amounts are also capped for example in Skellefteå to $184/month for parents of one child attending daycare (utbildningsguiden.skolverket.se/forskolan/om-forskolan/about-preschool-om-forskolan-pa-engelska & https://skelleftea.se/en/invanare/startpage/children-and-education/preschool/rules-and-fees/preschool-fees last accessed 3rd of April 2025).

[5] Some of the data underlying those numbers are available at www.skolverket.se/skolutveckling/statistik/sok-statistik-om-forskola-skola-och-vuxenutbildning (last accessed 7th of March 2024). We thank the Swedish National Education Agency (*Skolverket*) for kindly providing us with the rest of the data necessary to create this table.

school administrators the flexibility to adjust the date on which the school year started and ended, allow schools to teach on public holidays or weekends, and adjust how many hours per day schools taught with the proviso that schools taught the legally mandated hours over the course of the school year. The government did not allow school administrators to shift instruction hours from grade nine to the next school year since the tenth grade onward is voluntary schooling (Skolverket 2022a, 2024a; b). After the school day there are two types of youth centres available for children ages 7-13 (Fritidshem) and age 13 and above (Fritidsgård). Fritidshem and Fritidsgård continue to provide their services, but depending on local guidance provided them remotely. Furthermore, it is unlikely that they have played a major role, as the Swedish Agency for Youth and Civil Society reports that Fritidsgård utilization for 16-25 year olds was low pre-pandemic (2019- 8.4% for boys and 4.3% for girls) and reduced further during the pandemic (2020- 5% for boys and 3% for girls)[6].

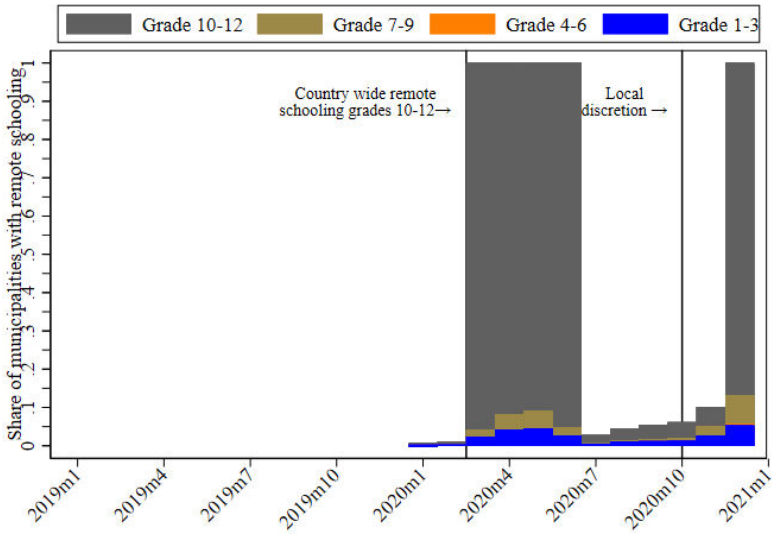
Most of the schools in Sweden are organized by the local government, but there are independent schools ('Friskolor'). For the voluntary part of education, upper secondary schools, independent schools are more common with a market share of about 36% compared to 15-20% among compulsory schools (Swedish Association of Independent Schools 2022). However, these schools, while run by independent organizations such as religious or cultural groups, are mostly funded via taxes and are not allowed to charge families. Though, they are allowed to take donations and have other income sources. They further need to be open to all, in the case of oversubscription the schools are allowed to select based on a combination of incumbent siblings, first-come-first-serve, and distance. Both independent and regular public schools follow the same curriculum. Independent schools can, within the fixed curriculum, emphasize certain aspects by teaching them with a different pedagogical style or by investing more time on certain subjects. Thus, independent schools did not differ in their COVID mitigation policies. Although independent schools have received increased interest in the years prior to the pandemic, there is no evidence that the pandemic accelerated that trend, see Figure B3 (Lindblad et al. 2021a; Swedish Association of Independent Schools 2022).

Although the government did not interrupt instruction during the pandemic, it recommended that upper secondary schools teach remotely for some time and granted municipalities large discretion beyond the already large autonomy they enjoy. Figure 1 summarizes how schools delivered instruction during the course of the pandemic. The first phase of remote schooling began in mid-March 2020 when the government **recommended** that upper secondary schools (grades 10-12; ages 15-18) teach remotely. The government maintained that recommendation until mid-June 2020 and reinstated it in December 2020 for the remainder of the calendar year. Upper secondary schools universally adopted the government recommendation (Skolverket 2022a). Also in March 2020, the Swedish government granted municipal school administrators discretion to decide whether and when to implement remote teaching (Ordinance 2020:115). Initially, this was meant for upper secondary schools (grades 10-12; ages 15-18). However, starting in January 2021, the government expanded this discretion to include all secondary schools. In

[6] See https://ungidag.se/indikator/kultur_och_fritid/besoker-fritidsgard-ungdomens-hus (last accessed 27th of September 2024).

April 2022, this discretion was rescinded with a recommendation for all schools to resume face-to-face teaching. Although the decentralization of schooling in the 1990s had already made municipalities the key decision-makers with respect to schooling (Ahlin and Mörk 2008), this autonomy was further highlighted during the pandemic. For instance, even primary schools implemented remote schooling before the expansion of Ordinance 2020:115 in 2021. The literature so far was based on a survey on principals, which indicates that in the Spring of 2020 there was roughly 5% of remote instruction in lower secondary schools, while our data collection implies roughly double that (Skolverket 2022b; Björkegren, Svaleryd, and Vlachos 2024).

Figure 1 –Remote schooling in Sweden during the pandemic



Note: We wrote to all 290 municipalities in Sweden and requested daily information on remote schooling following Ordinance 2020:115 per calendar day and school. We received information from 204 municipalities. Given that the country-wide recommendation was not part of Ordinance 2020:115 and was universally adopted following Skolverket in this figure, we hard-coded it. The vertical lines show the onsets of municipality discretion. Beyond the discretion arising from Ordinance 2020:115 schools could, under special circumstances, teach remotely in any grade and at time before, during or after the pandemic. For further information regarding the data collection and description of policy data, see the appendix.

The local discretion of the schools meant that the municipalities also decided how to implement remote schooling. Thus, some municipalities made decisions by school or via rotating schemes, where pupils in the same grade both had remote and face-to-face instruction in the same week. Thus, we surveyed all 290 municipalities about the decisions they made in Sweden regarding Ordinance 2020:115. We aggregate this information into the number of remote schooling days per grade and year-month value netting out weekends. We cannot identify schools or classes within grades in our data. Thus, in cases where municipalities had a rolling system in which some share of a grade was remote and the remainder in face-to-face instruction, we multiply the number of remote schooling days by the share of classes exposed to it. However, in the majority of cases remote instruction was municipality-wide for one or multiple grades, which we can identify.

Online Appendix C provides a more detailed overview of the remote schooling data we collected. In this appendix we also analyze whether remote schooling is associated with local COVID cases. We show that current infections increase the chance of remote instruction, whereas infections in the last

months reduce the chance. We further describe the municipalities that provided us with data and compare these with the universe of municipalities.[7] Responding municipalities tend to have larger populations by about 5 thousand people on average, parents are 0.27 year younger in responding municipalities and earn $18/month more. Though, none of these differences are statistically significant. The only borderline significant difference is that responding municipalities have a smaller share of males, but the difference is not economically meaningful. These differences are likely to be driven by larger municipalities having more administrative staff that respond to data requests and our requests starting with the largest municipalities.

A key question, especially for parents, is whether children actively participated in remote schooling, while potentially unsupervised. While we cannot fully answer this question, we draw inspiration from Bacher-Hicks (2021) and present suggestive evidence in the Appendix. Specifically, we show that for a mathematical concept commonly taught in upper secondary schools (exponential functions), there is an uptick in Google searches and Wikipedia page views during the remote schooling period in spring 2020, compared to the same period in 2019, as well as compared to concepts commonly taught in secondary schools (linear and quadratic equations) in both 2019 and 2020. These patterns suggest that, at least in mathematics, adolescents (or their parents) made active efforts to support continued learning when schooling transitioned abruptly from the classroom to the home.

c. Mitigation policies in the labor market

Sweden has a comprehensive social safety net, including benefits designed to support parents. In general, the Swedish benefit system is complex. During the COVID-19 pandemic, the government mostly extended existing programs by loosening restrictions, deadlines, etc. instead of introducing new programs specific to COVID-19. In general, the benefits are meant to encourage people with contagious diseases such as COVID-19 to stay home and thus reduce the spread, while preventing infected individuals from experiencing financial hardship. For an introduction to the relevant aspects of the Swedish social safety net, please consult Online Appendix A; for a through overview see Baptista et al. (2021).

3. Data

a. Swedish Register data

We draw our primary data from several Statistics Sweden registers that cover nearly all Swedish residents. We add, using information on each individual's place of residence, data from the public health agency on monthly cases of COVID in the region, and municipal unemployment rates from the Swedish public employment service. Finally, we use the remote-working index by Montenovo (2022) to measure the degree to which each individual's job can be done remotely. Finally, we add the dataset we created on municipal remote schooling decisions; please see the Online Appendix for further information.

[7] Sweden has 290 municipalities while Gothenburg replied, we treat it as missing data, because Gothenburg reported that remote schooling took place, but that there is no record for which grades were affected. Thus, we cannot assign remote schooling to the affected families.

Our research design compares the outcomes of treated and untreated parents, we use data on monthly gross labor earnings for 2019-2020.[8] Employment is recorded annually in Swedish register data, so we use earnings data to define unemployment as having zero or missing monthly earnings.The first analysis sample, which compares parents of children in grades 10-12 with parents of children in grades 7-9, includes 129 municipalities with 81 thousand unique families and about 1.9 million observations. The number of municipalities is reduced, as we have excluded municipalities where remote schooling took place in grades 7-9 in 2020. The second analysis sample, comparing parents of children in grades 1-3 with parents of younger children not yet in school, utilizes data from all 204 municipalities. The second analysis sample, comparing parents of children in grades 1-3 with parents of children in grades -3 to -1, utilizes data from all 204 municipalities. This sample includes about 1.9 million observations from 78 thousand families. From both samples, we have excluded families with self-employed parents because the literature suggests that self-employed are likely to misreport their earnings (Henrik Jacobsen Kleven et al. 2011; Bosch, Dekker, and Strohmaier 2020). The variable definitions are provided in Appendix Table B2.

b. COVID policies

The Swedish government implemented the COVID-19 intervention policies differently from many other countries. The government rarely recommended that teachers switch to remote teaching (see Section 2) and mandated few NPIs. Instead, it mainly issued recommendations, such as advising COVID-19 testing for symptomatic individuals and encouraging restaurants to reduce the number of patrons at any given time. Sweden's policies also differed from those of other countries because, with a few exceptions, most Swedish NPIs were applied to the whole country. To capture all available temporal and local variation in NPIs, we coded eight municipal-specific NPIs: four related to schooling and four related to work; see Table B3 for definitions.

4. Empirical strategy

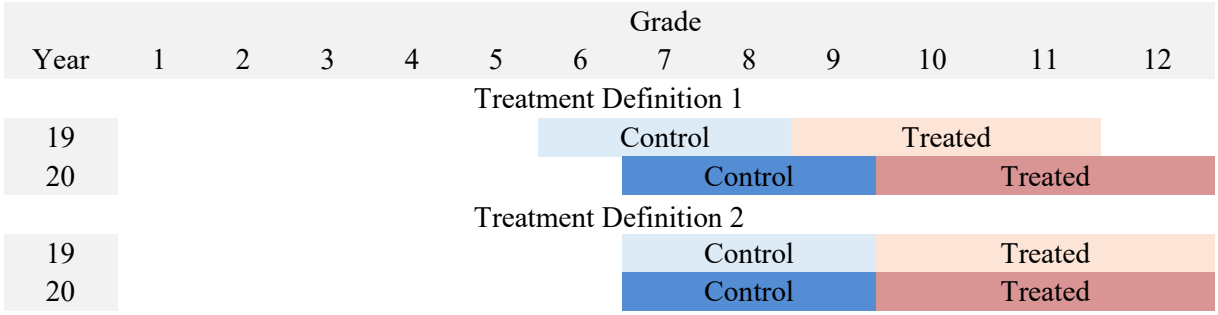
As noted in Section 2, we identify whether and how parents adjust their labor supply when schools switch to remote teaching by comparing the earnings and employment status of parents with children in adjacent grades within the same municipality. This approach leverages variation in whether their child's school implemented remote teaching or whether there was a grade-specific municipality-wide remote schooling decision. The treatment groups consist of parents in 2020 with children in grades 10-12 and 1-3, respectively, while the control groups include parents with children in grades 7-9 and grades -1 to -3, respectively.

This treatment definition allows two possible operationalizations, which are the same in 2020, but when expanding it to 2019 there are two options. One option is to follow the 2020 cohorts into 2019, while the other option is to follow the grades into 2019, see Figure 2 for a visualization for the older children.

[8] The earnings data do not include transfers. The data provider rounds earnings to the closest 100 SEK (approximately $9).

The approach is identical for the younger kids. We prefer the first option, as this means that we are analyzing the same families over time, but the main results for the second definition are in the appendix and they are nearly identical to the first definition.

Figure 2 – Sample definitions



Note: This figure shows the two ways in which treatment and control groups can be defined. The definitions are the same in 2020, but differ in 2019 depending on whether the school grade or the birth cohort gets fixed.

Another aspect of the operationalization is who is included in the control group. Since all Swedish upper secondary schools followed the government's recommendation, all parents with a child in grade ten or higher in the spring of 2020 were treated when their child's school began to teach remotely. Previous work has assumed that students in grade 9 and below were not treated at this time. However, our municipality survey shows otherwise (see Figure 1; Vlachos, Hertegård, and B. Svaleryd 2021; Svaleryd, Björkegren, and Vlachos 2024). To address this, we restrict our analysis of parents with older children, to municipalities that provided us with data that confirm that no remote schooling occurred in lower secondary schools during 2020. This reduced the sample from 204 to 129 municipalities. We also restrict our analysis to 2019-2020, because earnings data are available from 2019 and including 2021 would drastically reduce the sample size, as many municipalities introduced remote schooling in 2021 for grades 7-9.

For our analysis of young children, previous research has suggested that primary schools did not implement remote schooling. However, the responses to our municipality survey show that some children in grades 1 through 3 (aged around 7-9) and above experienced remote schooling in certain municipalities (see Figure 1 and Hall et al. (2022)). There is no evidence that daycares were closed or provided remote care. We thus use kids who are aged 3-5 as the control group, which makes them grades -1 to -3; these grades do not exist as they represent day care aged children and are purely used for demonstration of who is included in the sample. Here, we can use data from all 204 municipalities that provided us with remote schooling responses.

However, there are two ways to make these comparisons that are identical in 2020, but differ in 2019. We can either fix the grade a child is in in 2020 and thus compared in 2019 also look at grades 10-12, or we can fix the families and follow those families into the past, when their children were in a lower grade, e.g. 9-11. Figure 2 exhibits these two options. We follow the families to compare the same individuals over time, but show in the appendix that this choice is inconsequential. Table 1 compares parental characteristics of the average treated and untreated parents in 2019 and 2020. The age gap is driven

by the differential age of their kids and completely disappears when taking the difference of the differences.

Table 1 – Balance Table

Panel A – Families with children in grade 10-12 vs. grades 7-9

Variable	Untreated before	Untreated after	Treated before	Treated after	DiD
Age father	46.070	46.911	48.669	49.519	0.009
Age mother	43.671	44.517	46.365	47.214	0.003
Year father finished school	1,997.432	1,997.426	1,994.644	1,994.643	0.005
Year mother finished school	2,001.981	2,001.981	1,999.502	1,999.495	-0.007
N	40,843	40,596	40,172	39,913	

Panel B – Parents of children in grade 1-3 vs. grade -3 to -1

Variable	Untreated before	Untreated after	Treated before	Treated after	DiD
Age father	36.331	37.176	40.710	41.556	0.001
Age mother	34.087	34.931	38.267	39.112	0.001
Year father finished school	2,006.663	2,006.657	2,002.543	2,002.542	0.005
Year mother finished school	2,010.046	2,010.047	2,006.573	2,006.572	-0.002
N	36.331	37.176	40.710	41.556	0.001

Note: Unemployment rate and is per month and municipality. The remote working index ranges from 1 to 5 increasing in remote workability.

To test whether treated parents altered their labor supply, we specify the following Two-way fixed effect model:

$$y_{itm} = \alpha_m + \beta_t + \delta Remote_{tm} + \theta' X_{itm} + \varepsilon_{itm} \quad (1)$$

where y_{itm} measures parental earnings or employment status of parent i, in municipality m at time t, where time is measured in months. The municipality (α_m) and time fixed effects (β_t) capture time-invariant differences across municipalities (e.g. persistent labor market or demographic structures) and aggregate shocks common to all municipalities (e.g. federal policy changes, like most COVID policies in Sweden). $Remote_{tm}$ represents the number of days in a given month and municipality that a parent's child attended school where teachers taught remotely. Hence, δ captures the marginal effect of an additional day of remote schooling on parental earnings or employment.

We estimate all models separately for mothers and fathers, always with municipality and time fixed effects, and run specifications both with and without additional controls (X_{itm}). Some models also control for other COVID-policies (see section 3.b). The error term is always clustered at municipality level, following (Abadie et al. 2022; De Chaisemartin and D'Haultfœuille 2024). Our identification relies on the generalized parallel-trends assumption: in the absence of remote schooling, outcomes across municipalities with different remote schooling levels would have evolved similarly.

The so-called "forbidden comparison" in classical two-way fixed effects model with a binary treatment arise soley from treatment timing, which is unlikely to be an issue for the remote schooling of the older children experiencing remote schooling in Sweden(Goodman-Bacon 2021; Borusyak, Jaravel, and Spiess 2023). It might be an issue for the younger children experience remote schooling, see Figure 1, C2 and C2. However, our variable of interest is continuous. In this case. if the effect of going from a day of remote schooling to two days differs from two days to two days, comparing those already at with

a day of remote schooling with those moving to three days conflates two distinct marginal effects, biasing the estimate (Callaway, Goodman-Bacon, and Sant'Anna 2024). Finally, given that remote is always 0 in pre-treatment periods it is collinear with the fixed effects and we cannot estimate pre-trends in an event study to investigate the parallel trends assumptions.

Thus, we also estimate baseline coefficients and event study models following de Chaisemartin & D'Haultfœuille (2024). This approach addresses the outlined challenges by comparing group specific contrasts (De Chaisemartin and D'Haultfœuille 2024). The intuition is that for each treatment-changing "switcher" group g with first change at F_g (March 2020), the non-normalized event-study coefficient at relative period ℓ compares g's outcome evolution around its own switch to that of the control group $c(g)$ that share the same pre-switch treatment but have not yet switched, averaged across all switchers, see equation (2).

$$\widehat{DID_\ell} = \frac{1}{g}\sum_{g=1}^{G}\left[\left(Y_{g,F_g+\ell} - Y_{g,F_g-1+\ell}\right) - \left(Y_{c(g),F_g+\ell} - Y_{c(g),F_g-1+\ell}\right)\right] \tag{2}$$

Yet, to get a marginal dose interpretation, this needs to be normalized by weighting each swichter's outcome contrast by its incremental dose (D). This ensures that $\widehat{DID_\ell^n}$ can be interpreted as per-unit effect of remote schooling at period ℓ.

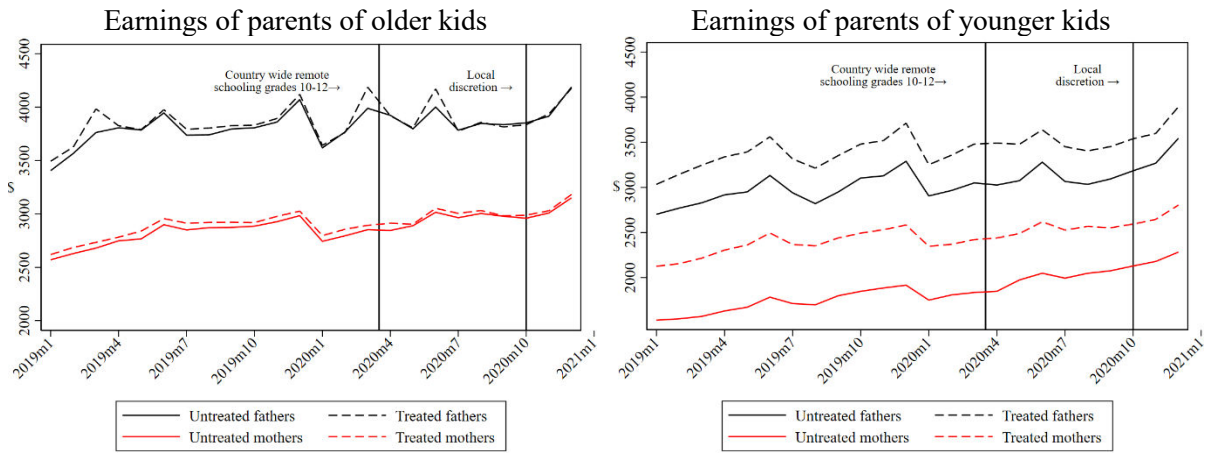
$$\widehat{DID_\ell^n} = \frac{\widehat{DID_\ell}}{\frac{1}{G}\sum_{g=1}^{G}(D_{g,F_g+\ell} - D_{g,F_g-1+\ell})} \tag{3}$$

Aside from parallel trends assumption, this approach relies on a no-anticipation assumption: future exposure to remote schooling should not affect current outcomes. This condition is clearly satisfied at the beginning of the pandemic, when remote schooling was announced with little notice, see section 2.b. However, it becomes harder to justify over time. To address this, we restrict our event-study to end in October 2020, covering six post-treatment periods. After October 2020, local discretion was expanded, see Figure 1 in section 2.b. Though, given that virtually all our event-study coefficients are tightly estimated around zero, this does not appear to pose a practical issue. Given that we are comparing parents of similarly aged children in the same municipality it is possible they were not able to anticipate future remote schooling better than their counterparts and that most of the remote schooling was announced with so little notice that, foreseeing the next month was challenging.

5. Results

Figure 3 shows the average monthly earnings of treated and untreated parents in 2019-2020. Given how little change there is between the black and red lines, respectively, between after and before March 2020 the figure indicates that the difference-in-differences estimate is small.

Figure 3 – Parental earnings by treated and untreated parents over time



Note: The dashed lines indicate treated mothers (red) and fathers (black), while the solid lines indicate treated fathers (black) and mothers (red). The first vertical line indicates the start of the first remote schooling spell in Sweden based on federal recommendation. The second vertical line indicates the start of municipality discretion on remote schooling policy.

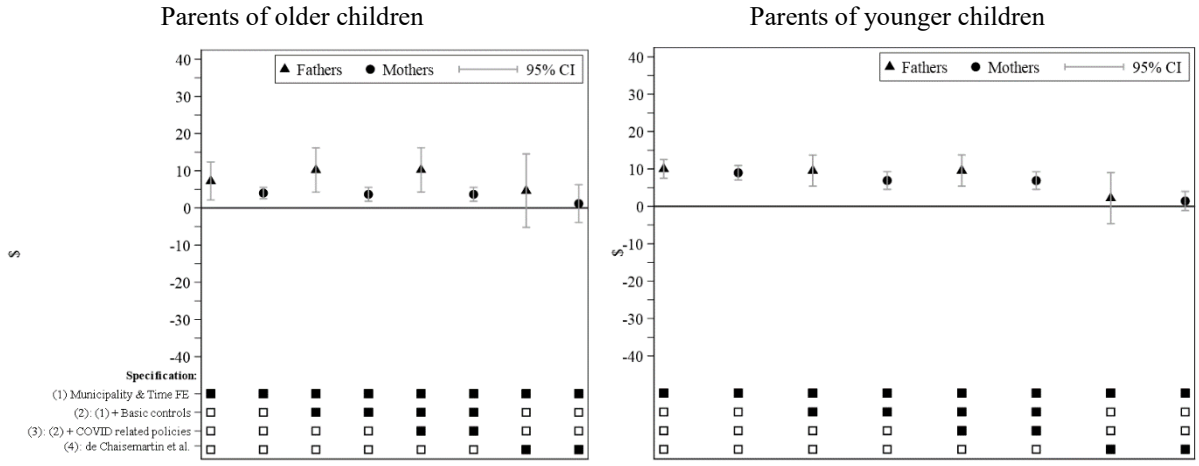
Figure 4 shows the parental earnings consequences of remote schooling. For older children, the effect is an increase of about $4 per day of remote schooling for mothers and about $8 per day of remote schooling for fathers of older children[9]. For parents of younger children, the effect fluctuates around $10 for both mothers and fathers. To contextualize this, the federal remote schooling recommendation lasted the entire months of April and May and hence 20 and 19 school days respectively and maternal earnings in Sweden are about $2500, which implies on average an 8% salary increase for mothers of younger children. Figure 5 shows statistically significant disemployment effects for mothers of younger children, but these are not economically meaningful. Thus, there appears to be no change in employment.

In the Appendix we also explore heterogeneity among parents by estimating models for specific sub-groups: migrant parents, dual-earner households, single parents and households where one or both parents work in healthcare. Overall, the results are similar to Figure 4. Though, for older children they became mostly statistically insignificant, likely due to the smaller sample size.

Given these results, we further investigate whether remote schooling affected the difference in earnings between the father and the mother (Kleven, Landais, and Søgaard 2019, 2021; Andresen and Nix 2022; Kleven, Landais, and Leite-Mariante 2023).

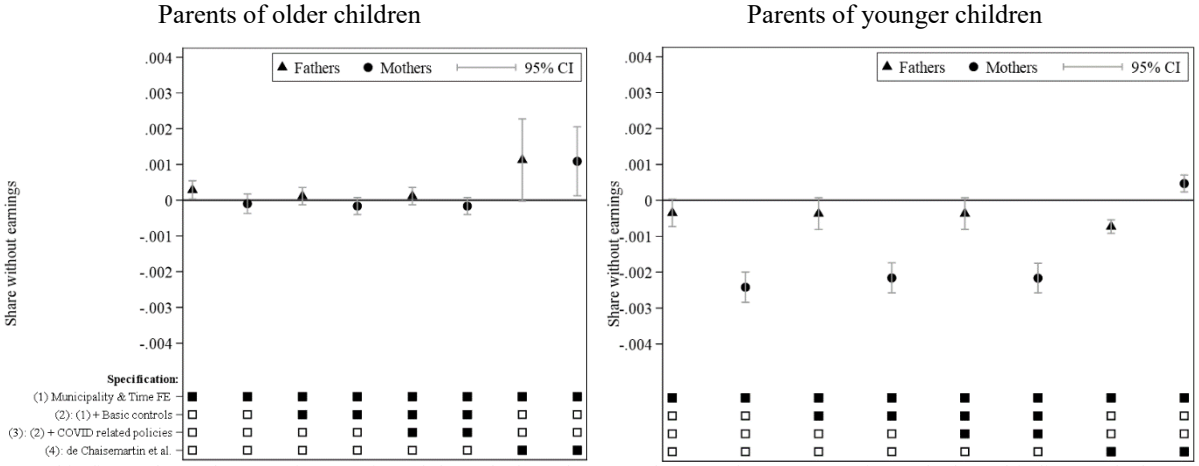
[9] We aggregate the number of remote schooling days per grade and year-month, but exclude weekends as there is no instruction on weekends, see Online Appendix C for details about the remote schooling changes and our coding of them.

Figure 4 – Days of remote schooling and parental earnings



Note: This figure shows the intensive margin and thus only those with above zero earnings. The legend indicates whether we control for municipality, a predetermined set of control variables or other COVID policies. The diamonds indicate fathers, the circle mothers.

Figure 5 – Days of remote schooling and parental employment

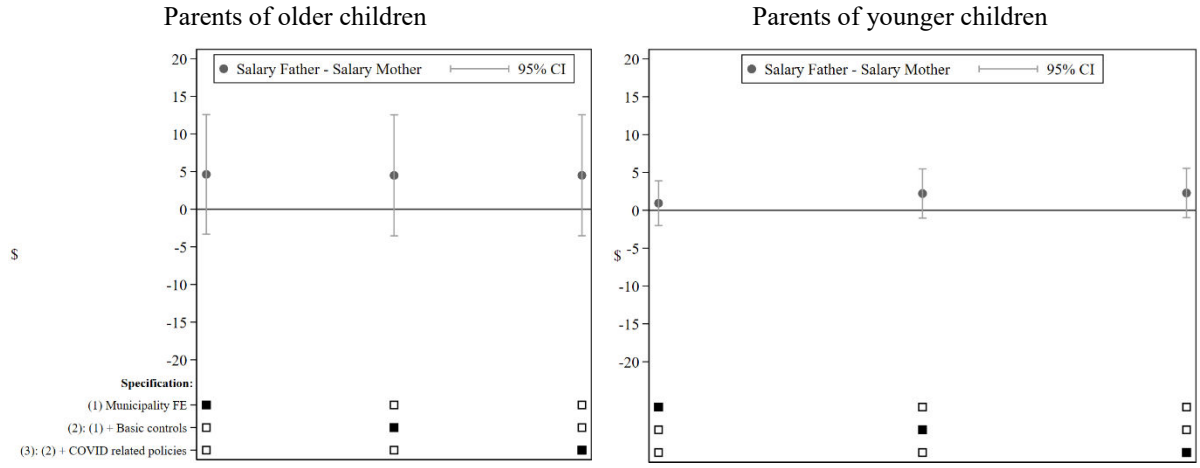


Note: This figure shows the extensive margin and thus whethere the parent has any above zero earnings. The legend indicates whether we control for municipality, a predetermined set of control variables or other COVID policies. The diamonds indicate fathers, the circle mothers.

Figure 6 reports results from a model that estimates the difference in earnings of partnered parents with treated and untreated children. For this analysis, we restrict the sample to couples where both partners are employed. This yields null results, but the results in Figure 6 match the differences between parents from Figure 4, potentially because of the high share of dual-earners among Swedish parents.

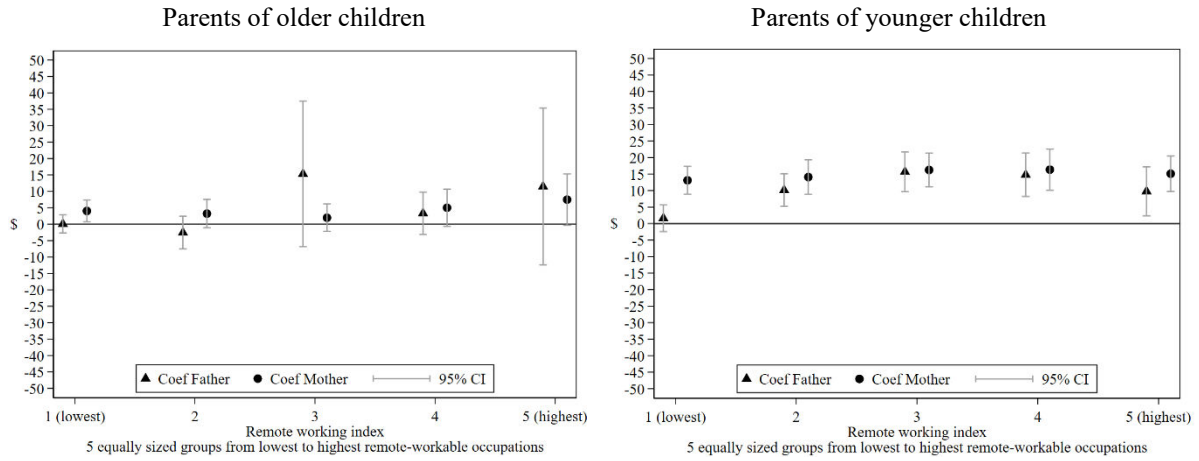
In Figure **7** we report results from models estimated on five equally sized samples, defined by the remote working index of Montenovo et al. (2022). We do not observe a gradient by the remote working index, but fathers of younger children do not benefit, while all other combinations of parent and remote working index quintile combination for younger children indicates a benefit similar to Figure 4. For parents of older children, the results become statistically insignificant likely due to smaller sample size. Though, compared to fathers in Figure 4, fathers in the middle and highest quintile show larger increases around $15. Thus, there might be heterogeneity, which is not capture by these approaches.

Figure 6 – Parental earnings gap and remote schooling



Note: The outcome in this figure is the difference between the earnings of the father and the mother. Thus, this figure refers only to dual-earner couples. The diamonds indicate the coefficients and the bars the 95% confidence interval. The legend indicates whether we control for a municipality fixed effect, a predetermined set of control variables or other COVID.

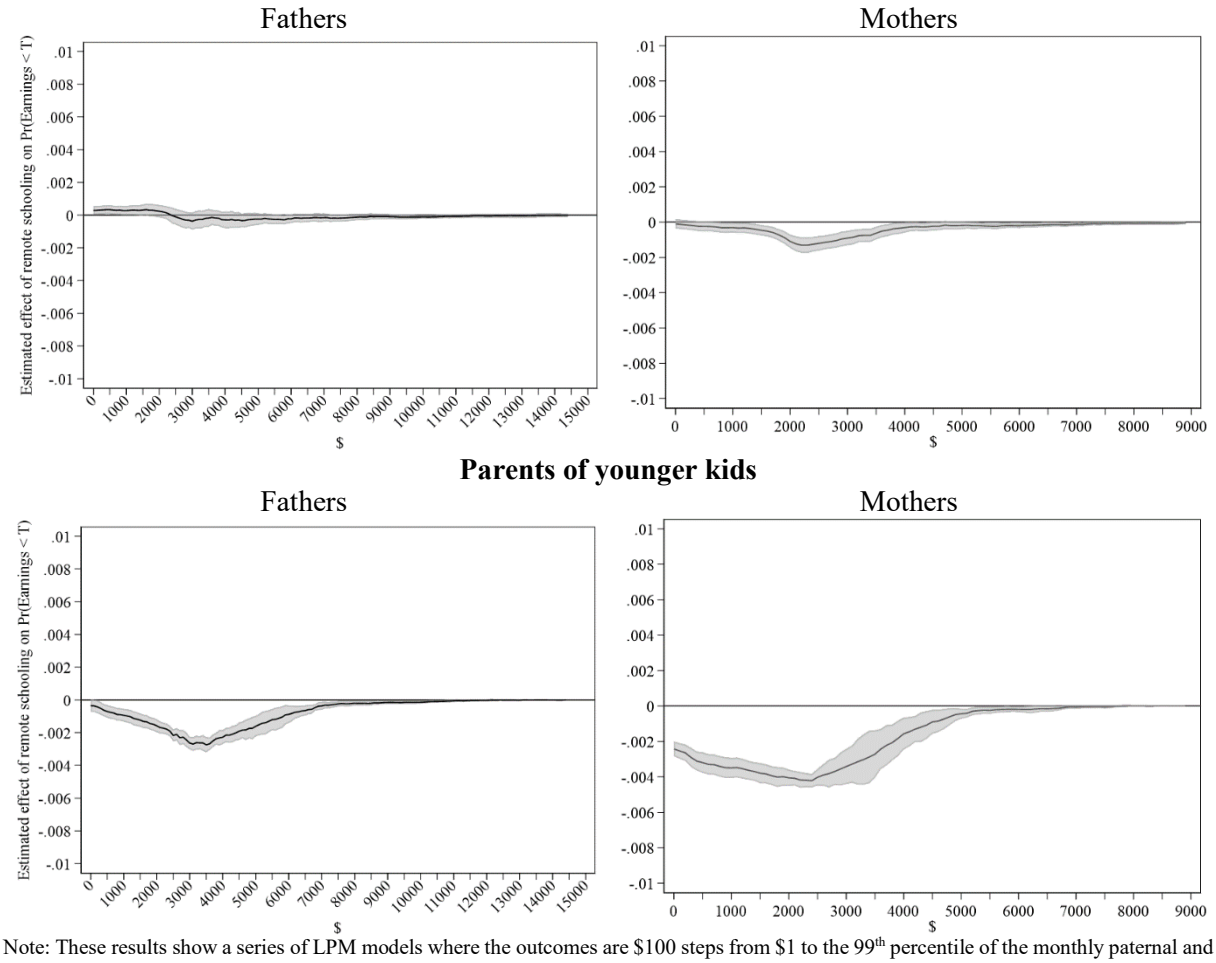
Figure 7 – Remote working heterogeneity



Note: The remote working index was split into five equally sized groups. The main model underlying Figure 4 was estimated for each quintile-parent combination. Diamonds indicate fathers, circles mothers and bars the 95% confidence interval.

Thus, to explore the potential heterogeneity in more detail we explore distributional changes. To do this, we use a procedure proposed by Chernozhukov et al. (2013), which estimates effects at different parts of the distribution using a series of linear probability models. Specifically, we estimate the specification with municipality fixed effects repeatedly changing the outcome variable to a series of binary indicators such that $\Pr(Y_i \leq \gamma) \forall \gamma \in T$ where in our case T are \$100 steps from \$1 to the 99th percentile of monthly earnings, for mothers this is \$9,000 and for fathers \$14,500. Using \$100 increments provides a granular yet tractable way to capture shifts in the earnings distribution, ensuring that we can detect meaningful differences across the earnings spectrum. Results, in Figure 8, indicate economically insignificant changes across the earnings distribution. Though, it indicates that the disemployment effects among mothers of younger children likely affect those at the lower end of the income distribution.

Figure 8 – Distribution Regression Plot

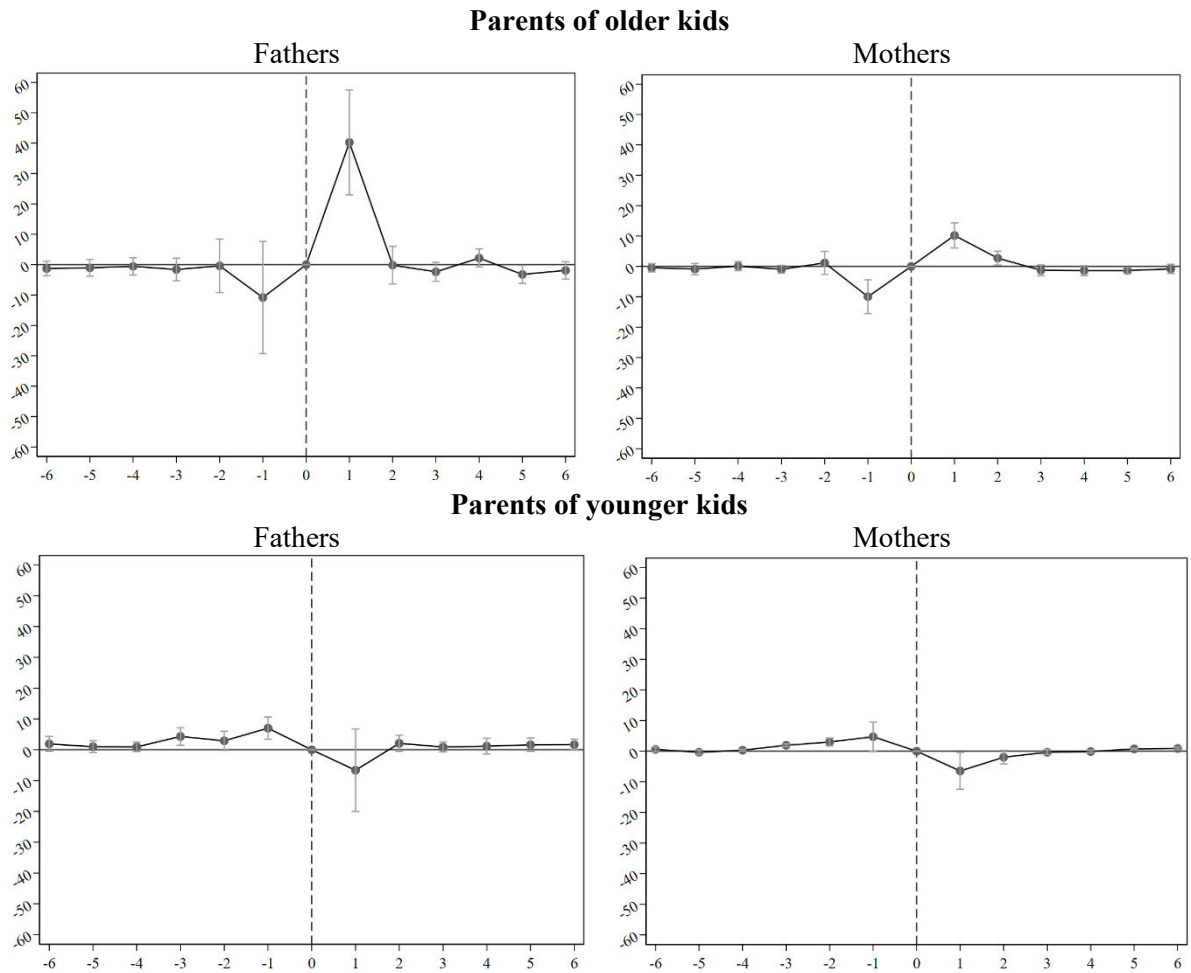


Note: These results show a series of LPM models where the outcomes are \$100 steps from \$1 to the 99th percentile of the monthly paternal and maternal, respectively, earnings distribution.

The results so far focus on contemporaneous effects. However, it is possible that, when schools teach remotely, it takes some time for parents, their employers, and the environment to adjust. This delay may result because it takes time for firms to lay off or fire workers or manage remote work. It may also take time to evaluate and decide whether and how to respond when schools begin to teach remotely. In such cases, changes in parental earnings may manifest themselves only after some time. To explore whether changes manifest themselves only after a time, we specify and estimate event-study models.

Figure 9 plots coefficient estimates on treatments that would occur up to six months in the future. The plots indicate that the results presented so far were likely short-lived. The plots further suggest that there is no evidence that parallel trends or no anticipations are violated.

Figure 9 – The effect of remote schooling on monthly earnings over time



Note: Month 0 is March 2020 when the remote schooling recommendation was initially implemented. The bars indicate 95% confidence intervals.

6. Discussion

We analyze how Swedish parents' earnings are affected when their children were unexpectedly shifted to remotely schooling. Since these changes occurred only in certain parts of the Swedish school system, we can compare the earnings outcomes of parents whose children switched to remote instruction with those whose children continued in-person.

Our findings suggest that remote schooling had no economically meaningful employment effects and short-lived earnings increases that differ by age of the children. We do not find that our results differ between genders in terms of occupations most affected by the pandemic or occupations which can be performed remotely. There is some indication that any results we find are concentrated in the lower half of the earnings distribution. Potential explanations include that parents could work longer by reallocating "sprints" of caregiving into their workdays, while their child received remote instruction (Gill, Hensvik, and Skans 2025). This can be amplified by saving the time that would have been spent bringing or picking up (at least the younger) children from school. Yet, working hours are not part of the Swedish register data, so we cannot test this. However, evidence from Switzerland shows that parents reduce

their working hours less than similar childless adults and thus relatively increased their working hours (Schroeter, Lalive, and Karunanethy 2024).

Our earnings measure captures income from primary work activities, excluding transfers. However, some transfers, such as relaxed sick pay and short-time work support, were paid through employers and may partly be included, potentially affecting our results (Adermon et al. 2024). Details about the benefit system are provided in the Online Appendix A.

Previous work by Vlachos et al. (2021) shows that remote schooling modestly reduced COVID-19 infections among teachers, their partners, and parents. It also improved children's mental health (Björkegren, Svaleryd, and Vlachos 2024). Our results show that these benefits came without significant costs in terms of parental employment or earnings. In sum, remote schooling had modest and relatively even economic effects on both mothers and fathers.

References

Abadie, Alberto, Susan Athey, Guido W Imbens, and Jeffrey M Wooldridge, "When Should You Adjust Standard Errors for Clustering?," *The Quarterly Journal of Economics*, 138 (2022), 1–35.

Adda, Jérôme, Christian Dustmann, and Katrien Stevens, "The Career Costs of Children," *Journal of Political Economy*, 125 (2017), 293–337.

Adermon, Adrian, Lisa Laun, Patrik Lind, Martin Olsson, Jan Sauermann, and Anna Sjögren, "Earnings Losses and the Role of the Welfare State During the COVID -19 Pandemic: Evidence from Sweden," *Review of Income and Wealth*, 70 (2024), 981–1010.

Ahlin, Åsa, and Eva Mörk, "Effects of decentralization on school resources," *Economics of Education Review*, 27 (2008), 276–284.

Albanesi, Stefania, and Jiyeon Kim, "Effects of the COVID-19 Recession on the US Labor Market: Occupation, Family, and Gender," *Journal of Economic Perspectives*, 35 (2021), 3–24.

Alon, Titan, Matthias Doepke, Jane Olmstead-Rumsey, and Michèle Tertilt, "The Impact of COVID-19 on Gender Equality," 2020 (Cambridge, MA, National Bureau of Economic Research).

Andresen, Martin Eckhoff, and Emily Nix, "What Causes the Child Penalty? Evidence from Adopting and Same-Sex Couples," *Journal of Labor Economics*, 40 (2022), 971–1004 (The University of Chicago Press).

Atalay, Enghin, Ryan Kobler, and Ryan Michaels, "TIME USE," (2023).

Bacher-Hicks, Andrew, Joshua Goodman, and Christine Mulhern, "Inequality in household adaptation to schooling shocks: Covid-induced online learning engagement in real time," *Journal of Public Economics*, 193 (2021), 104345.

Baptista, Isabel, Eric Marlier, Slavina Spasova, Ramón Peña-Casas, Boris Fronteddu, Dalila Ghailani, Sebastiano Sabato, and Pietro Regazzoni, "Social protection and inclusion policy responses to the COVID-19 crisis," *An analysis of policies in*, 35 (2021).

Beauregard, Pierre-Loup, Marie Connolly, Catherine Haeck, and Tímea Laura Molnár, "Primary school reopenings and parental work," *Canadian Journal of Economics/Revue canadienne d'économique*, 55 (2022), 248–281.

Björkegren, Evelina, Helena Svaleryd, and Jonas Vlachos, "The impact of the COVID-19 school closure on adolescents' use of mental healthcare services in Sweden," *American Economic Journal: Economic Policy*, (2024) (Cold Spring Harbor Laboratory Press).

Blau, Francine D., and Lawrence M. Kahn, "The Gender Wage Gap: Extent, Trends, and Explanations," *Journal of Economic Literature*, 55 (2017), 789–865.

Borusyak, K., X. Jaravel, and J. Spiess, "Revisiting Event Study Designs: Robust and Efficient Estimation," *Review of Economic Studies*, (2023) (arXiv).

Bosch, Nicole, Vincent Dekker, and Kristina Strohmaier, "A data-driven procedure to determine the bunching window: an application to the Netherlands," *International Tax and Public Finance*, 27 (2020), 951–979.

Callaway, Brantly, Andrew Goodman-Bacon, and Pedro H. Sant'Anna, "Difference-in-differences with a Continuous Treatment," 2024 (Cambridge, MA, National Bureau of Economic Research).

Cho, Sang-Wook (Stanley), "Quantifying the impact of nonpharmaceutical interventions during the COVID-19 outbreak: The case of Sweden," *The Econometrics Journal*, 23 (2020), 323–344.

Cortés-Albornoz, María C., Sofía Ramírez-Guerrero, Danna P. García-Guáqueta, Alberto Vélez-Van-Meerbeke, and Claudia Talero-Gutiérrez, "Effects of remote learning during COVID-19 lockdown on children's learning abilities and school performance: A systematic review," *International Journal of Educational Development*, 101 (2023), 102835.

Dahlberg, Matz, Per-Anders Edin, Erik Grönqvist, Johan Lyhagen, John Östh, Alexey Siretskiy, and Marina Toger, "Effects of the COVID-19 Pandemic on Population Mobility under Mild Policies: Causal Evidence from Sweden," (2020) (arXiv).

De Chaisemartin, Clément, and Xavier D'Haultfœuille, "Difference-in-Differences Estimators of Intertemporal Treatment Effects," *Review of Economics and Statistics*, (2024), 1–45.

Dean Lillard, Christoph Kronenberg, and Mark Wooden, "School Disruptions, Parental Employment, and Household Earnings: a literature review," (2025).

Engzell, Per, Arun Frey, and Mark D. Verhagen, "Learning loss due to school closures during the COVID-19 pandemic," *Proceedings of the National Academy of Sciences*, 118 (2021), e2022376118.

Freedman, Seth, Daniel Sacks, Kosali Simon, and Coady Wing, "Direct and indirect effects of vaccines: Evidence from COVID-19," 2022 (Cambridge, MA, National Bureau of Economic Research).

Furman, Jason, Melissa Schettini Kearney, and Wilson Powell, "The Role of Childcare Challenges in the US Jobs Market Recovery During the COVID-19 Pandemic," 2021 (Cambridge, MA, National Bureau of Economic Research).

Garcia, Kairon Shayne, and Benjamin Cowan, "The Impact of U.S. School Closures on Labor Market Outcomes during the COVID-19 Pandemic," 2022 (Cambridge, MA, National Bureau of Economic Research).

Gill, Adam, Lena Hensvik, and Oskar Nordström Skans, "Why Are Nordic Workers so Remote?: Potential Causes and (Some) Indirect Labor Market Consequences," 2025 (Cambridge, MA, National Bureau of Economic Research).

Goodman, Sarena, Gina Li, Kevin Moore, and Alice Henriques Volz, "The COVID-19 Pandemic and Family Economic Well-being: Evidence from the Survey of Consumer Finances," *Finance and Economics Discussion Series*, (2024), 1–28.

Goodman-Bacon, Andrew, "Difference-in-differences with variation in treatment timing," *Journal of Econometrics*, 225 (2021), 254–277.

Hall, Caroline, Inés Hardoy, and Martin Lundin, "Schooling in the Nordic countries during the COVID-19 pandemic," 2022 (IFAU-Institute for Evaluation of Labour Market and Education Policy).

Henrik Jacobsen Kleven, Martin B. Knudsen, Claus Thustrup Kreiner, Søren Pedersen, and Emmanuel Saez, "Unwilling or Unable to Cheat? Evidence From a Tax Audit Experiment in Denmark," *Econometrica*, 79 (2011), 651–692.

Hermes, Henning, Marina Krauß, Philipp Lergetporer, Frauke Peter, and Simon Wiederhold, "The Causal Impact of Gender Norms on Mothers' Employment Attitudes and Expectations," *IWH Discussion Papers*, (2024).

Humphries, John Eric, Christopher Neilson, Xiaoyang Ye, and Seth Zimmerman, "Parents' Earnings and the Returns to Universal Pre-Kindergarten," 2024 (Cambridge, MA, National Bureau of Economic Research).

Hupkau, Claudia, and Barbara Petrongolo, "Work, Care and Gender during the COVID-19 Crisis*," *Fiscal Studies*, 41 (2020), 623–651.

Immel, Lea, Florian Neumeier, and Andreas Peichl, "The Unequal Consequences of the Covid-19 Pandemic: Evidence from a Large Representative German Population Survey," *Review of Income and Wealth*, 68 (2022), 471–496.

Johansson, Bengt, Jacob Sohlberg, Peter Esaiasson, and Marina Ghersetti, "Why swedes don't wear face masks during the pandemic-a consequence of blindly trusting the government," *Journal of International Crisis and Risk Communication Research*, 4 (2021), 335–358 (Orlando, Florida, Nicholson School of Communication and Media).

Juranek, Steffen, and Floris T. Zoutman, "The effect of non-pharmaceutical interventions on the demand for health care and on mortality: evidence from COVID-19 in Scandinavia," *Journal of Population Economics*, 34 (2021), 1299–1320.

Kleven, Henrik, Camille Landais, and Gabriel Leite-Mariante, "The Child Penalty Atlas," 2023 (Cambridge, MA, National Bureau of Economic Research).

Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaard, "Children and Gender Inequality: Evidence from Denmark," *American Economic Journal: Applied Economics*, 11 (2019), 181–209.

——, "Does Biology Drive Child Penalties? Evidence from Biological and Adoptive Families," *American Economic Review: Insights*, 3 (2021), 183–198.

Lim, Katherine, and Mike Zabek, "Women's Labor Force Exits During COVID-19: Differences by Motherhood, Race, and Ethnicity," *Journal of Family and Economic Issues*, (2023).

Lindblad, Sverker, Anders Lindqvist, Caroline Runesdotter, and Gun-Britt Wärvik, "In education we trust: on handling the COVID-19 Pandemic in the Swedish welfare state," *Zeitschrift für Erziehungswissenschaft*, 24 (2021a), 503–519.

Lindblad, Sverker, Gun-Britt Wärvik, Inger Berndtsson, Elsi-Brith Jodal, Anders Lindqvist, Giulia Messina Dahlberg, Dimitrios Papadopoulos, Caroline Runesdotter, Katarina Samuelsson, Jonas Udd, and Martina Wyszynska Johansson, "School lockdown? Comparative analyses of responses to the COVID-19 pandemic in European countries," *European Educational Research Journal*, 20 (2021b), 564–583.

Montenovo, Laura, Xuan Jiang, Felipe Lozano-Rojas, Ian Schmutte, Kosali Simon, Bruce A. Weinberg, and Coady Wing, "Determinants of Disparities in Early COVID-19 Job Losses," *Demography*, 59 (2022), 827–855.

Nøkleby, Heid, Lars Jørun Langøien, Tiril Cecilie Borge, and Trine Bjerke Johansen, "Experiences and consequences of remote schooling during the Covid-19 pandemic for children and youth in the Nordic countries: a scoping review," *London Review of Education*, 22 (2024).

Olivetti, Claudia, and Barbara Petrongolo, "The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries," *Journal of Economic Perspectives*, 31 (2017), 205–230.

Ringer, Noam, and Susanne Kreitz-Sandberg, "Swedish Pupils' Perspectives on Emergency Remote Teaching during COVID-19 - A Qualitative Study," *International Journal of Educational Research Open*, 3 (2022), 100167.

Russell, Lauren, and Chuxuan Sun, "The effect of mandatory child care center closures on women's labor market outcomes during the COVID-19 pandemic," *Covid Economics*, 62 (2020), 124–154.

Schroeter, Sofia, Rafael Lalive, and Kalaivani Karunanethy, "School Closures and Parental Labor Supply: Differential Effects of Anticipated and Unanticipated Closures," 2024 (IZA Discussion Papers).

Siljebo, Josef, "Leading learning through digitalization in Swedish schools: beyond school leaders?," (2023) (Umeå universitet).

Skolverket, "Covid-19-pandemins konsekvenser för skolväsendet – slutredovisning," 2022a.

——, "Kunskapstapp och betyg i gymnasieskolan under covid-19-pandemin," 2022b.

——, “Undervisningstid, lärotider och schema,” 2024a.
——, “Distansundervisning,” 2024b.
Swedish Association of Independent Schools, “About independent schools,” 2022.
Swedish Social Insurance Agency, “Coronaviruset – det här gäller,” 2022.
Victor Chernozhukov, Iván Fernández-Val, and Blaise Melly, “Inference on Counterfactual Distributions,” *Econometrica*, 81 (2013), 2205–2268.
Vlachos, Jonas, Edvin Hertegård, and Helena B. Svaleryd, “The effects of school closures on SARS-CoV-2 among parents and teachers,” *Proceedings of the National Academy of Sciences*, 118 (2021), e2020834118.

Online Appendix A

This appendix provides a brief overview of the aspects of the social safety net most relevant to working parents within our treatment and control groups. For a more detailed overview of the social safety net, we refer to Bapista et al. (2021)

"Care of children" benefits

In a system called VAB ('vård av barn'), which translates to 'care *of children*', parents of children under the age of 12 can receive compensation if they stay home to take care of a sick child, accompany the child to a healthcare appointment or stay home because the regular caregiver is sick. [10] A certificate from a medical doctor is usually required after an absence of seven days or more. In cases where the child is between 12 and 16 the same rules apply with the caveat that a certificate from a medical doctor is required from the first day the parent stays home. The days can be shared by multiple people caring for one sick child. Parents can also transfer the days to a third person. VAB days usually are compensated at 80% of the usual earnings. For children under the age of 18 years, parents can receive compensation for an unlimited amount of time if there is a threat to the child's life or if the child is going to, is currently, or has received care for a life-threatening condition. In these cases, both parents can receive compensation for the same child at the same time without a legal limit. A medical doctor must confirm these cases via a statement[11]. In general, these benefits can be claimed within 90 days after the first day of absence from work and can be done by phone, online, or through an app.

Both pre-pandemic and since October 2024 these VAB days for children under 16 were limited to 120 days per year. The last 60 days can only be taken if the child is sick or has a medical appointment, not if the regular caregiver is sick. During the pandemic, the VAB benefit was relaxed. The number of VAB days was unlimited. The days could also be used in case the school was closed due to a high number of COVID cases. In this context, school closure means the building was closed. Thus, remote schooling could be understood to be covered by this benefit. However, the Swedish Social Insurance Agency (Försäkringskassan) reports that, as of April 2022, under 300 children had received VAB days due to closures of schools or pre-schools (Swedish Social Insurance Agency 2022). Thus, it appears that VAB days were rarely used to stay home with children taught via remote schooling. This specific waiver ended on the 31 March 2022. The requirement of a doctor's certificate after seven days of absence was waived. However, in one aspect, the system was tightened during the pandemic. Pre-pandemic children were supposed to return to school as soon as they were capable of attending their classes. During the pandemic, children were supposed to stay home even with mild symptoms and return only after having

[10] More information on VAB is available at https://www.forsakringskassan.se/english/parents/care-of-a-sick-child-vab (last accessed 15th of October 2024)

[11] These are the rules for healthy children, for children with higher need due to severe or chronic illness, these rules are relaxed e.g. no certificate from a medical doctor is required.

had no symptoms for two days. Further VAB could be used if the child needs to be protected from contracting COVID, e.g. due to recent serious illness, and the parents could not work from home.

Benefits in case of own asymptomatic infection or sickness

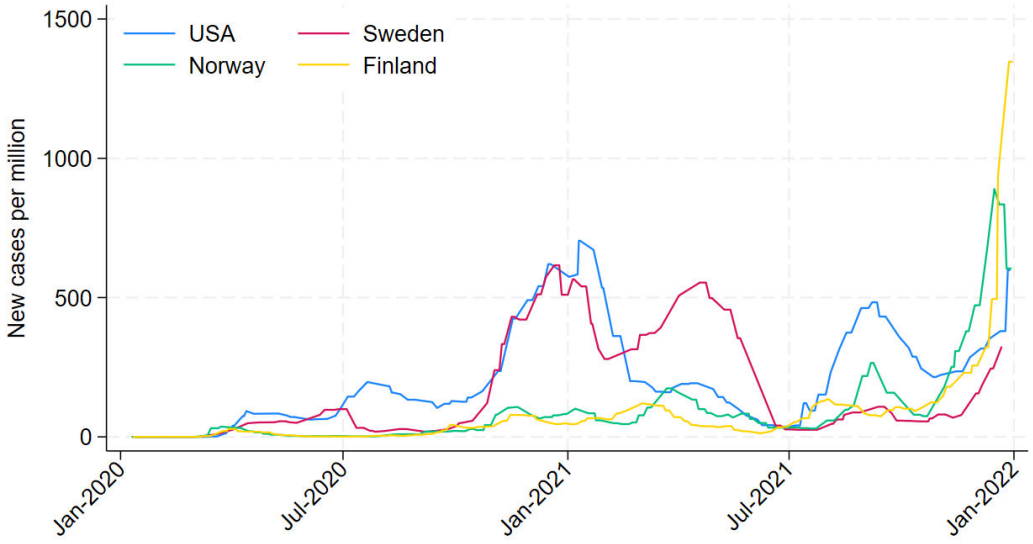
Sweden has a benefit system for individuals who are disease carriers.[12] Although this benefit existed before the COVID-19 pandemic, it was rarely used. In 2019, there were 337 instances of this benefit being paid out compared to 29,955 in 2020 (Baptista et al. 2021). To be eligible for this benefit, a person must have a contagious disease classified as socially dangerous. COVID-19 had this designation from February 2020 until April 2022. From October 2020 the allowance was extended to household members of the disease carrier. Initially, a doctor's certificate was required to receive the allowance. This rule was withdrawn in February 2021.

This disease carrier allowance is paid if the person is infected but capable of work at 80% of income up to a maximum of $78 (SEK 810) per day. Therefore, their infection status is the only thing stopping them from working. If the person is incapable of working, because of the symptoms of COVID-19 or some other disease, independently of the disease carrier allowance, then they receive sickness benefits and not the disease carrier allowance. Sickness benefits can be applied once capacity to work is reduced by at least 25% due to illness or the person needs to be away from work for treatment or rehabilitation. Partial incapacitation is possible at 25%, 50%, 75% or 100% incapacitation. Though, the first day of sickness is not paid. After seven days of illness, a medical doctor's certificate is required. For the first 14 days, the employer pays sick pay instead of regular earnings. After 14 days, sickness benefits can be claimed from the Swedish Social Insurance Agency (Försäkringskassan). Both sick pay and sickness benefits correspond to 80% of the earnings of the person receiving sickness benefits up to a ceiling. In 2023 the ceiling was $50,690 (SEK 525,000). After a year, the benefit is reduced to 75% of the earnings. During the COVID-19 pandemic, the Swedish Social Insurance Agency reimbursed 20% of the earnings in the first week of sick pay and did not enforce the waiting day. Therefore, the pay was refunded at the full rate from the first day and thus the entire first week of sickness. From 2021 this reimbursement for the 20% deduction was fixed at $73 (SEK 810) per day. Furthermore, a medical doctor was only required after three weeks of illness instead of one week until April 2021.

[12] More information on the disease carrier allowance is available at https://www.forsakringskassan.se/english/sick/employee/disease-carriers-benefit (last accessed 15th of October 2023)

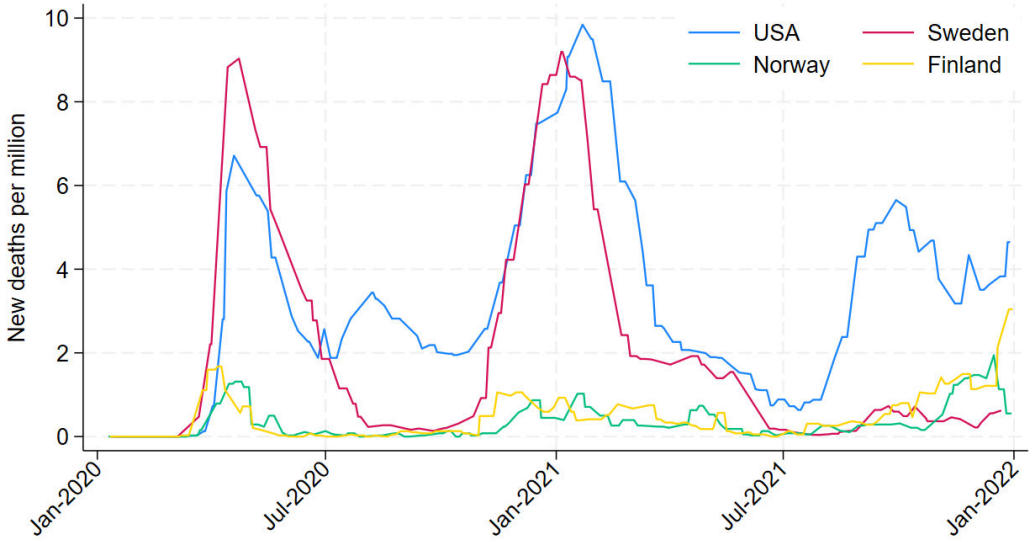
Online Appendix B

Figure B1 – Daily COVID cases during 2020-2021 in the four Scandinavian countries and the US.



Note: The data was downloaded from the GitHub page of Our World In Data who received the data from the WHO. The data is freely available at https://github.com/owid/covid-19-data/tree/master/public/data.

Figure B2 – COVID deaths during 2020-2021 in the four Scandinavian countries and the US.



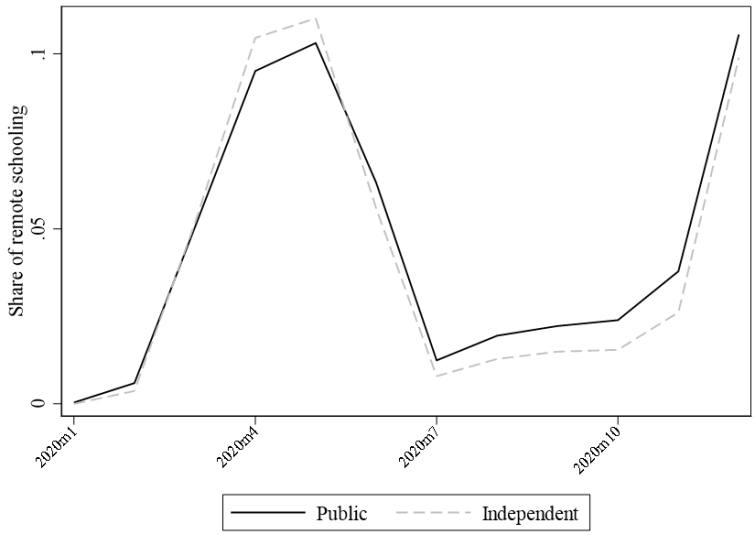
Note: The data was downloaded from the GitHub page of Our World In Data who received the data from the WHO. The data is freely available at https://github.com/owid/covid-19-data/tree/master/public/data.

Table B1 – % grade to grade transitions in Sweden from 2018/19-2020/21

	School year 2018-19			School year 2019-20			School year 2020-21		
Grade	next grade	Repeat	dropout	next grade	repeat	dropout	next grade	repeat	dropout
1		0.37			0.27			0.30	
2	96.03	0.24		96.80	0.24		96.64	0.21	
3	96.04	0.28		97.22	0.27		97.95	0.24	
4	96.04	0.24		97.08	0.23		98.15	0.17	
5	96.18	0.32		97.10	0.21		98.02	0.18	
6	96.45	0.24		97.40	0.24		98.13	0.24	
7	96.21	0.24	0.01	97.40	0.26	0.01	98.25	0.21	0.03
8	96.30	0.34	0.02	97.34	0.30	0.02	99.18	0.26	0.03
9	95.78	0.71	1.43	97.42	0.62	1.50	98.54	0.53	1.38
10		3.20	2.40		3.44	2.00		3.12	2.00
11	83.80	1.15	3.70	85.18	1.01	2.70	86.45	0.95	2.50
12	87.88	1.03		88.78	0.84		89.63	0.84	

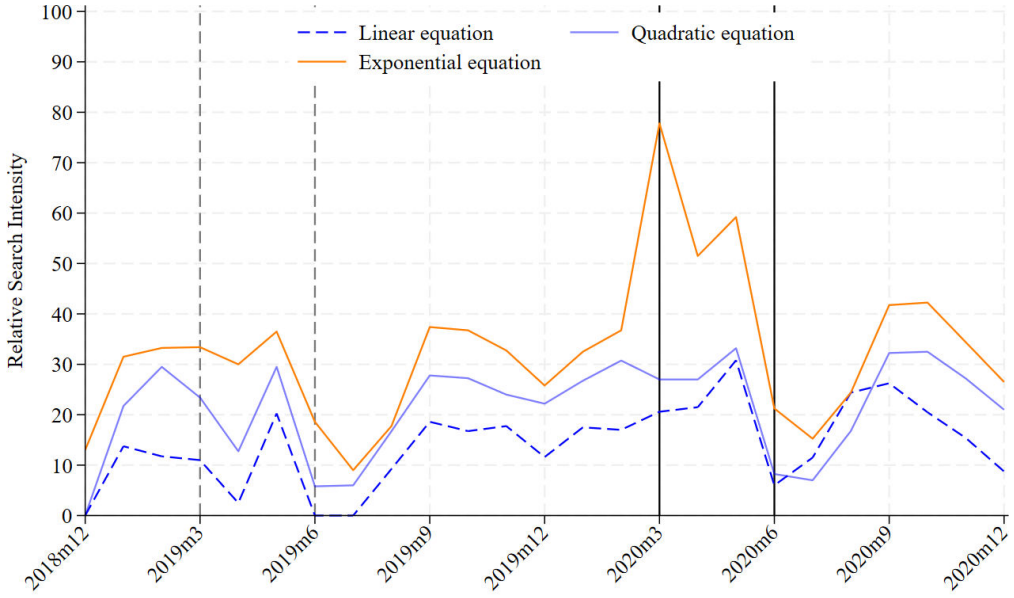
Note: The first nine years of schooling are compulsory. The data have been collected from several official statistics provided by the Swedish National Education Agency (Skolverket) as well as data requested from the Agency by us. The missing values are not calculated by the Swedish National Agency for Education. It is unfortunately not possible to impute these values as aside from the three options in the table, students can die, emigrate, and some students cannot be identified or move to special schools where the Swedish National Agency for Education cannot track them.

Figure B3 – Share of remote schooling days by independent vs public schools over time



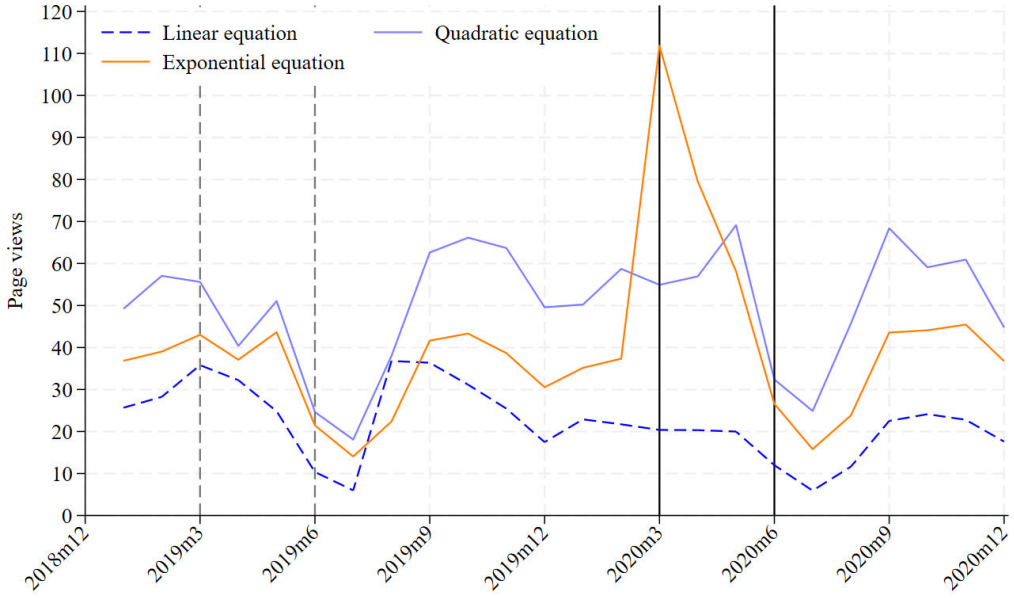
Note: Independent schools are identified as those who are not supervised by the municipality.

Figure B4 – Search intensityon Google for content of upper and lower secondary school



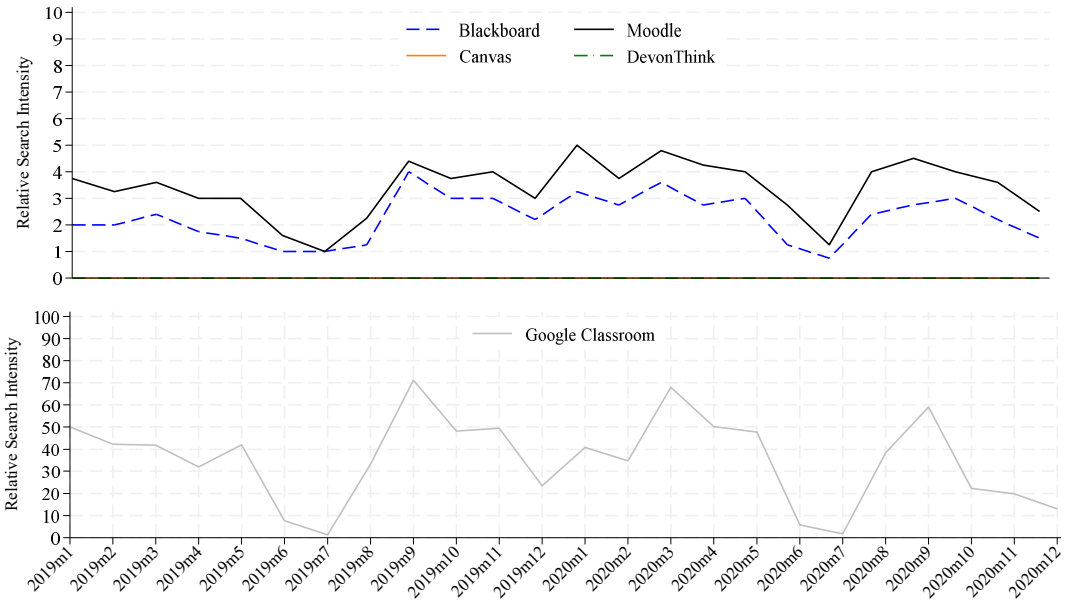
Note: The figure shows the relative search intensity on Google from Sweden for the topics 'Linear equation' and 'Quadratic equation' as blue lines. These topics are lower secondary school math topics. The orange line represents the relative search intensity on Google for the upper secondary school topic 'Exponential function'. Solid vertical lines mark the remote schooling period for upper secondary schools in 2020. Vertical dashed lines mark the same period in 2019. There is a visually higher level for searches for 'Exponential function' during the remote schooling period in 2020 compared to both 2019 and searches related to lower secondar school math topics.
These are topics, thus Google automatically includes other spellings and closely related search in the topic. Thus, the results do not rely on our spelling of words. Plus, Google recognizes these as math topics, thus anything else e.g. businesses, bands, etc. are excluded from these results.

Figure B5 – Page view on Wikipedia for content of upper and lower secondary school



Note: The figure shows the number of page views for the Swedish Wikipedia pages 'Linear equation'('linjär ekvation') and 'Quadratic equation'('andragradsekvation') as blue lines. These topics are lower secondary school math topics. The orange line represents the number of page views for the Wikipedia page 'exponential function' ('exponentialfunktion'). Solid vertical lines mark the remote schooling period for upper secondary schools in 2020. Vertical dashed lines mark the same period in 2019. There is a visually higher page view level for 'Exponential function' during the remote schooling period in 2020 compared to both 2019 and page views of lower secondary school math topics.

Figure B6 – Search intensityon Google for e-learning platforms



Note: The figure shows the relative search intensity on Google from Sweden for the topics relating to various e-learning platforms. Google Classroom has been separated out in the bottom panel to ensure the variation in the other platforms remains visible. These are topics, thus Google automatically includes other spellings and closely related search in the topic. Thus, the results do not rely on our spelling of words. Plus, Google recognizes these as math topics, thus anything else e.g. businesses, bands, etc. are excluded from these results.

Table B2 – Variable definitions

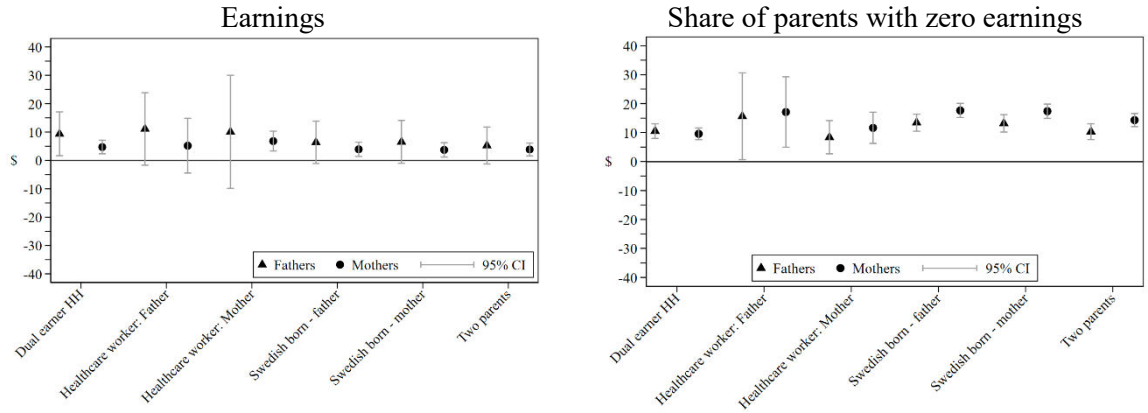
Variable(s)	**Definition**
Parental labor force attachment	Earnings are 0
Parental earnings	Monthly gross earnings from 2019- in Swedish Krona converted to $ at the rate of SEK 1 = $0.09.
Municipality	Unique ID for each of the 290 municipalities in Sweden.
Age parent left school	Separately for mothers and fathers the age they left school
COVID cases	Registered COVID cases per million residents in the 21 Swedish regions
Unemployment rate	Unemployment rate per month and municipality.
Remote Working Index	Remote working index from Montenovo (2022) which we linked to the Swedish register data via the Standard for Swedish occupational classification (*Standard för svensk yrkesklassificering*)

Table B3 – COVID policies

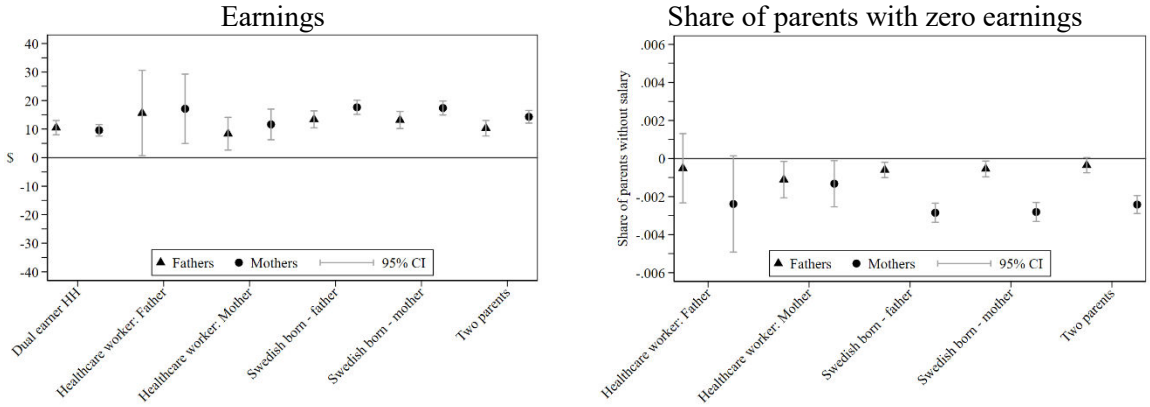
School related NPIs		
Variable	**Coding**	**Region**
Any attendance limitations in daycare	0 – No recommendation 1 – Recommended without exceptions 2 – Recommended with exceptions	First national, later local variation
School activities restricted		General recommendations given to reduce the spread also applied to schools.
COVID test required to attend daycare when symptomatic	0 – No 1 – Yes	First national, later local variation
COVID test required to attend school when symptomatic		First national, later local variation
Work related NPIs		
Restriction restaurants	0 – No 1 - Yes	National – Summarizes several restrictions (seated patrons only, alcohol bans)
Financial support for firms (*Företagsakuten*)		National - Credit guarantees for lending primarily to small and medium-sized enterprises in Sweden that were financially affected by the pandemic.
Restrictions operating hours		Limited opening hours for restaurants and catering establishments, after 20:30 only take-out/pick-up.
Face masks required		Recommendations to wear mask in public transport from 7–9AM and 4–6PM
Office staff recommended to work from home		Recommendation for employers to encourage their employees to work from home if possible
Social distancing		People aged over 70 are recommended to reduce their contacts.

Figure B7 – Subgroups

Parents of older kids

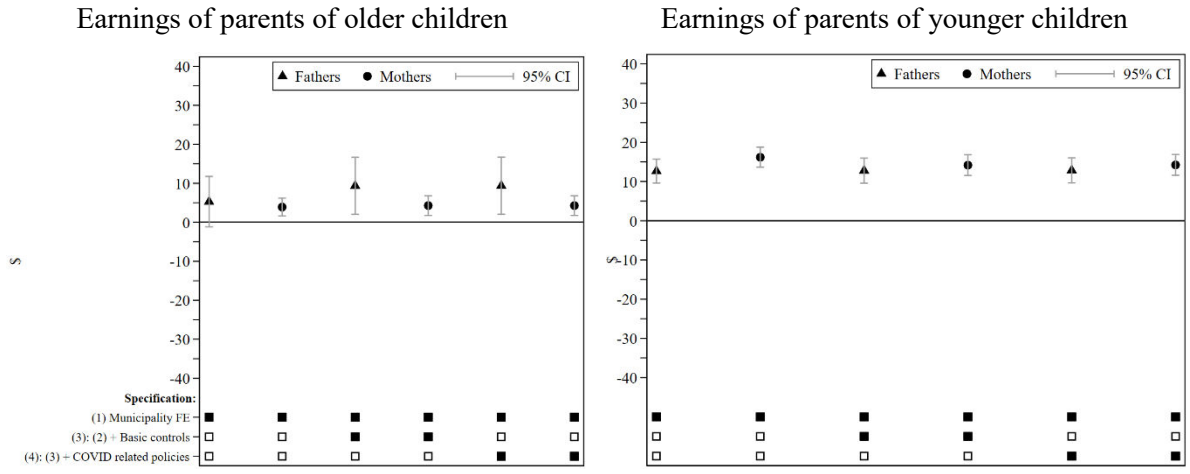


Parents of younger kids



Note: Diamonds indicate fathers, circles mothers and bars the 95% confidence interval.

Figure B8 – Alternative treatment definition



The legend indicates whether we control for municipality, a predetermined set of control variables and other COVID policies. The diamonds indicate fathers, the circle mothers.

Online Appendix C

We contacted the education authorities of all 290 Swedish municipalities and inquired about remote schooling for each day of remote schooling per school and grade following Ordinance 2020:115. This Ordinance 2020:115 explicitly gave municipalities the right to enforce remote schooling at their discretion. Yet, Swedish municipalities were already quite autonomous in their discretion as can be seen in Figure 1, some municipalities already have remote schooling prior to the issuance of Ordinance 2020:115 in March 2020 (Ahlin and Mörk 2008). We compiled a dataset covering 204 of the 290 municipalities, tracking all 12 grades and every school day from January 1, 2019 and to December 31, 2020. 14 municipalities reported being unable to deliver any data, because they either had no records or left the decision up to school principals and their decisions were not recorded. Thus, we have responses from 218 of the 290 municipalities[13].

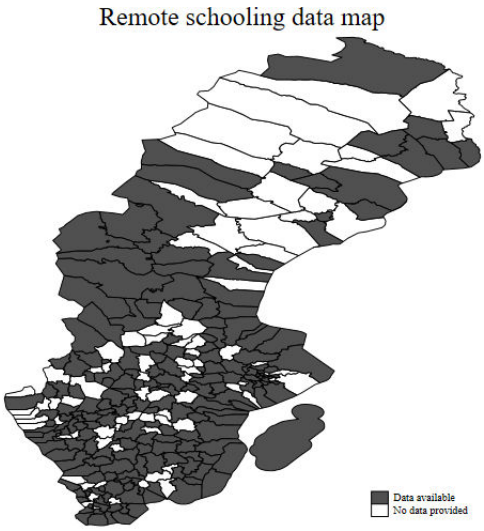
The municipality discretion was occasionally used to send only specific schools, grade cohorts within school, or grade cohorts in the entire municipality into remote schooling. Sometimes, municipalities did this in a rotating fashion. Thus, some cohorts attended school on Monday and Tuesday and other cohorts on Wednesday and Thursday; everyone had remote schooling on Friday. Given that we do not have school identifiers in our register data, we produce a dataset with the combination of municipality, grade, and date being the smallest unit. Hence, if a municipality has a policy of four days of remote instruction per week, we code each day of that week as 0.8 for students in that municipality. Weekends and school holidays are coded as missing as no instruction was provided. We had to remove Gothenburg from the data as the authority there reported that they issued remote schooling per specific grades but have no record, which grades these were. Therefore, we cannot correctly assign remote schooling to Gothenburg. Further it is unlikely that a dataset of all 290 municipalities is possible as there are municipalities, mostly in northern Sweden, that have no upper secondary schools following Statistics Sweden[14]. Yet, these municipalities are also sparsely populated.

Figure 1 in the main text shows and explains the distribution of remote schooling over time by the types of schools in Sweden. Hence, here we focus more on the spatial distribution of our data. Figure C1 shows which municipalities have provided us with data. The figure shows that there is a small bias towards southern municipalities. This is a product of our outreach approach. While we wrote all municipalities, we started with larger municipalities to establish feasibility of our data collection.

[13] These municipalities are Gothenburg, Värmdo, Uppslands-Bro, Täby, Nacka, Finspang, Mjölby, Sjöbo, Bastad, Färgelanda, Säffle, Köping, Leksand and Kiruna.

[14] The following municipalities have no upper secondary schools Torsås, Mörbylånga, Kalmar, Borgholm, Sölvesborg, Bromölla, Vänersborg, Trollhättan, Laxå, Hallsberg, Askersund, Orsa, Älvdalen, Smedjebacken, Ludvika, Nordanstig, Söderhamn, Bollnäs, Ragunda, Bräcke, Krokom, Åre, Östersund, Jokkmokk,Pajala and Gällivare. This data is publicly available at https://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__OE__OE0112/OE0112T05B/ (last accessed 19th of Dec. 2024).

Figure C1 – Map of municipalities who provided remote schooling data for their schools



The table indicates 205 instead of 204 municipalities as it counts Gothenburg, which technically provided data, but we could not use it as it is not possible to assign remote schooling to specific grades. Table C1 shows the balance between municipalities who provided data and the universe of municipalities. The differences are small and are reflective of the slight oversampling of larger municipalities. The table indicates 205 instead of 204 municipalities as it counts Gothenburg, which technically provided data, but we could not use it as it is not possible to assign remote schooling to specific grades.

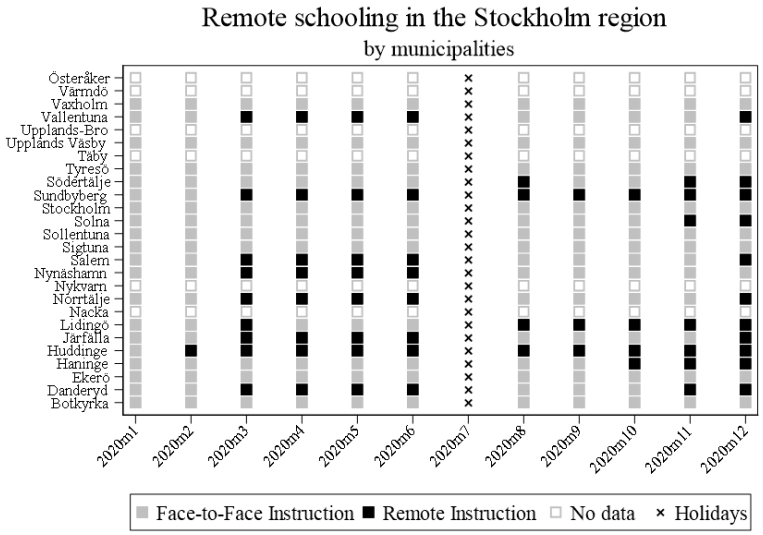
Table C1 – Comparison of non-responding and responding municipalities

Variable	All municipalities	Municipalities which provided data	Difference
Population	25,672.865	30,696.156	5,023.291
	(51,655.242)	(60,025.660)	(5,043.572)
Gender:Male	0.504	0.503	-0.001*
	(0.010)	(0.009)	(0.001)
Age	52.078	51.807	-0.271
	(2.313)	(2.316)	(0.211)
Married	0.414	0.412	-0.001
	(0.042)	(0.043)	(0.004)
Earnings	1,897.892	1,916.268	18.376
	(322.538)	(322.490)	(29.429)
Out of labor force	0.350	0.347	-0.003
	(0.042)	(0.042)	(0.004)
Observations	290	205	

Note: All variables are measured in 2019. Standard errors in parenthesis, p-values: ∗p < 0.1, ∗∗p < 0.05, ∗∗∗p < 0.01.

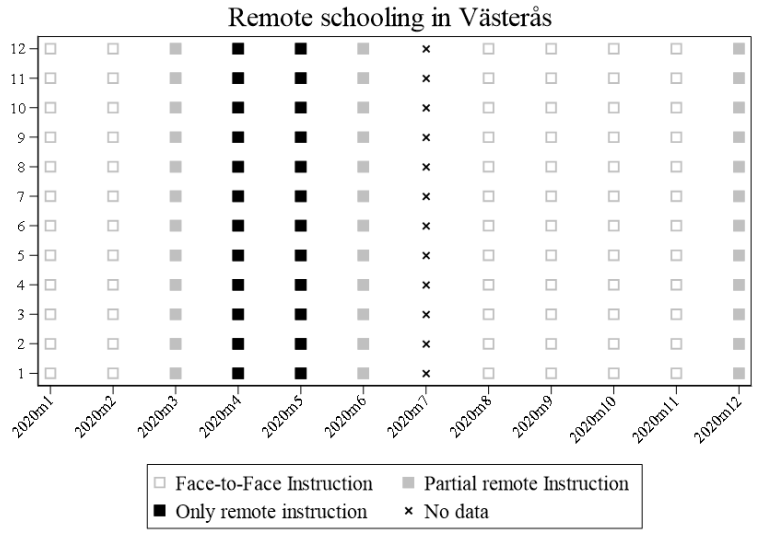
To expand on these differences, Figure C2 shows for the Stockholm region of Sweden the changes for the municipalities within the Stockholm region over time. While there is a clear uptick of remote schooling March 2020, when remote schooling was then stopped or re-implemented varies a lot. Note that this figure only shows remote schooling based on municipality discretion following Ordinance 2020:115 and not remote schooling following the federal recommendation.

Figure C2 –Overview of remote schooling for municipalities in the Stockholm region



Note: Sweden has 21 regions comparable to states in other countries these states have varying numbers of municipalities. The region Stockholm hosts the municipalities listed on the y-axis incl. the municipality Stockholm. For the purposes of this graph "Remote Instruction" means any remote schooling. No data means that this municipality has no supplied us with the data we requested. Typical summer school holidays in Sweden start around mid-June and last until mid-August.

Figure C3 –Overview of remote schooling in Västerås



Note: Västerås is a municipality 100km westof Stockholm in the region Västmanland with roughly 150 thousand inhabitants. The symbols indicate whether in a grade/month combination there has been only face to face instruction, some mix out of face to face and remote instruction or only remote instruction. The month of July is entirely covered by school holidays and thus there is no data with regards to the mode of instruction.

The patterns in Figure 1 naturally raise the concern that remote schooling was put in place when cases were particularly high or that remote schooling was eased once the vaccination rate was above a societally acceptable level. Table C2 below we show the association between both current and lagged prevalence of COVID, that is reported cases per 100,000. Further, we repeat this for the running total of

COVID cases up until that point. Overall, an increase of current cases increases the the chance of a remote schooling policy being in place, while past cases do the opposite.

Table C2 – Association between any remote schooling and COVID cases

	Contamperanous			Cumulative		
	Coef	CI - lower	CI - upper	Coef	CI - lower	CI - upper
Current cases	.047**	.019	.075	.059***	-.003	.122
Cases last month	-.082**	-.134	-.029	-.045*	-.070	-.018
Cases two months ago	-.069***	-.100	-.038	-.057***	-.084	-.030
Cases three months ago	.088***	.051	.126	-.072***	-.111	-.034
N		1725			1723	
Municipality FE		X			X	
Year FE		X			X	

Note: The CI are 95% confidence intervals. The outcome is any remote schooling in that municipality-month cell. The first three columns refer to the contamperanous cases in that municipality per 100,000. The last three columns refer to the cumulative number of cases in that municipality per 100,000.

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