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Parents Working from Home and their Children's Education

Dominique Goux and Eric Maurin[1]

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Abstract:

This article assesses the impact of parents working from home on children's academic performance in high school. Using French data, we draw on the fact that, within each major social group, not all families have been equally exposed to the recent rise in work from home (WFH), depending on the specific occupations of the parents. Among lower-SES groups, we detect a significant deterioration in educational outcomes of adolescents whose parents are particularly exposed to the rise in WFH. Among higher-SES groups, we find no significant variation. The rise in WFH exposes parents and adolescents to more interaction, at an age when conflicts are frequent, and our findings suggest that this can contribute to worsening school problems in the least advantaged social environments.

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Introduction

The shock caused by the 2020 pandemic led to a sharp increase in work from home (WFH), which has since stabilized at unprecedented levels in most developed countries.[2] This unexpected development has met the aspirations of many workers, who were looking for a better work-life balance and wanted to spend more time with their families.[3] However, the real consequences for other family members, especially children, remain largely unknown. In this paper, we focus on the children of the families concerned and develop one of the very first assessments of the impact of their parents' WFH on their schooling, at the time they reach high school age.

Parents who work from home gain the opportunity to interact more with their children and, consequently, to be more involved in their schooling, with all the virtuous consequences that this can have (e.g., Bergman, 2021; Kalil and Ryan, 2020; Avvisati et al., 2010). On the other hand, parents who work from home contribute to reducing the space available to each person in the home, particularly in less affluent social backgrounds, with potentially negative consequences for children (e.g., Lopoo and London, 2016; Solari and Mare, 2012). By working from home, parents may also be tempted to supervise their children's lives more closely, which can be a source of conflict, particularly during adolescence. There is a long-standing social sciences literature showing that parent-child conflicts become more frequent and intense during adolescence, at a time when children's demand for autonomy increases and parental control must adapt (e.g., Branje, 2018; Laursens and Collins, 2009). The challenge of successfully adapting parental control is all the more important since parent-adolescent conflicts have often been associated with serious behavioral problems in adolescents (e.g., Weymouth et al., 2016; Timmons and Margolin, 2015; De Goede al., 2009; Bradford et al., 2008).

In this context, it is difficult to predict the effect that an increase in parents' work from home may have on children's educational paths, particularly in adolescence, at the end of middle school and in high school. In this article, our purpose is to shed light on this still largely unexplored question by using the post-pandemic rise in WFH as a natural experiment and drawing on the quality of the data available in France, which allows us to link changes in the educational outcomes of large representative samples of high school-aged children to their parents' exposure to working from home.

Our research strategy is based on the fact that in France, as in most other countries, the pandemic shock did not catalyze the same increase in WFH in all families and for all parents. Among lower-SES groups, most parents work in occupations that cannot be done from home, but not all; there are important exceptions. Parents with lower-level jobs in the administrative departments of companies, for example, largely benefited from the increase in WFH that followed the pandemic shock. Among intermediate and higher SES groups, most parents work in occupations that can be done from home and have also largely benefited from the post-pandemic increase in WFH, but again there are some exceptions. For example, healthcare professionals, such as nurses and doctors working in hospitals, do not work from home more in the years following the pandemic shock than in the years preceding it. During the pandemic, they were among those working in jobs deemed essential and were spared the obligation to stay at home.

In such a context, the question arises as to how the evolution of the school outcomes of the group of children who were exposed to an increase in parental WFH (our treatment group) compares with that of the group of children who belong to the same SES group, but were not exposed to this post-pandemic trend. The available data allows us to compare the two groups from the point of view of the

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[2]See e.g., Eurofound (2022) for European countries or Pabilonia and Redmond (2024) for the US.
[3] For evidence on workers' willingness to pay for WFH, see, e.g., Mas and Palais (2017), He et al. (2021), Maestas et al. (2023). The pandemic seems to have even increased employees' preference for WFH (Chen et al., 2023).

probability of reaching the final year of high school (grade 12) without repeating a year or being forced to leave the general track (the most selective) for a vocational track. This is a key outcome, as it directly determines the chances of accessing and succeeding in higher education.

When we focus on intermediate and higher SES families, we detect neither an increase nor a decrease in the academic performance of children in the treatment group compared to those in the control group. In these families, children in the treatment group experience a very significant increase in parental WFH without this translating into a change in their academic performance. Conversely, when we focus on lower-SES families, we detect a significant decrease in the academic performance of adolescents in the treatment group compared to those in the control group. In these families, as in wealthier families, adolescents experience a very significant increase in parental WFH, but for them, this translates into a significant decrease in the probability of completing the most selective high school program without repeating a grade. Further analyses suggest that this effect primarily reflects a decline in the ability to persist in the most selective track (even with a delay of one year or more). In these same lower-SES families, the rise of parental WFH is also accompanied by an increase in grade repetition rates during the middle school years (i.e., before grade 10), even if this effect is less significant than that on high school performance.

In the end, given that only approximately one-third of lower-SES children manage to complete the most selective high school program on time, our results suggest that lower-SES children who were most exposed to the rise in parental WFH experienced a very significant decline in the probability of finishing high school among the top tercile of students with the same social background as them. The fact that the rise of WFH may have different consequences for lower-SES and higher-SES children echoes a rich literature in social science that has long demonstrated that higher-SES parents are on average better at adapting their parenting practices to their children's developmental level (e.g., Kalil and Ryan, 2020).

This paper contributes to the burgeoning literature exploring the consequences of the dramatic expansion of WFH catalyzed by the 2020 pandemic. This literature has primarily focused on the impact of the rise of WFH on the employees concerned, first and foremost their productivity (e.g., Emanuel and Harrington, 2024; Atkin et al., 2023; Barrero et al., 2023; Gibbs et al., 2023), but also their time use, health and, well-being (e.g., Goux and Maurin, 2025; Angelici and Profeta, 2024; Aksoy et al., 2023). To our knowledge, our contribution is one of the very first to address the question of the effects on the families of the employees concerned, and in particular their children as they reach adolescence and aspire to greater independence. In a recent contribution, Achard et al. (2025) provide evidence that teleworking agreements have positive effects on the primary school performance of children of employees covered by these agreements, using pre-pandemic data collected from some large Dutch companies. Their analyses concern children who have not yet entered adolescence and who come from relatively affluent families, which makes their results difficult to compare with ours, particularly those relating to adolescents from lower SES families.

We also contribute to the large and long-standing literature that explores the consequences for children of increased interaction with their parents. This literature has focused extensively on interactions occurring at younger ages, particularly exploring the consequences of reforms modifying the duration of parental leave, generally concluding that these policies have little effect on children's later life trajectories (e.g., Danzer and Lavy, 2018; Dustmann and Schönberg, 2012; Baker and Milligan, 2010). Our work highlights the specific impact that family interactions occurring later, in adolescence, can have, at a time when children seek more independence. By demonstrating the high sensitivity of adolescents, especially those from the most disadvantaged socioeconomic group, to changes in their family environment, we contribute to the literature showing that adolescence is one the key stages for

human development and a priority target for public policies (e.g., Guryan et al., 2023; Bergman et al., 2019; Goux et al., 2017; Del Boca et al., 2017).

The article is organized as follows. We begin by presenting the institutional context (section 1) as well as the data and variables used (section 2). We then analyze the effect of increased exposure to parental WFH on the family environment of adolescents (section 3), before moving on to the analysis of the effect on their academic performance (section 4) and then concluding (section 5).

I.   Institutional context

In this section, we first describe the main characteristics of the French secondary education system and some basic indicators of academic success in such an environment. We then describe how WFH is regulated in France and how the 2020 pandemic shock was managed, particularly by educational authorities.

Secondary school system

In France, middle school lasts four years, from grade 6 to grade 9. Normal-age students enter grade 6 in September of the year they turn 11, and they enter grade 9 in September of the year they turn 15. At the end of middle school (grade 9), the curriculum ceases to be the same for all students and only a selection of students is allowed to pursue a general education. More specifically, only about two-thirds of grade 9 students are allowed to enter high school to begin a general education program in grade 10, while the others enter more vocational programs (in specific high school programs or specialized training centers) or remain in middle school and repeat grade 9. Subsequently, at the end of their first year in the general high school program, a further selection takes place: again, only about two-thirds are allowed to continue in the general program in grade 11, while the others are again directed to a more vocational program or repeat their grade 10 in high school (*Ministère de l'Éducation Nationale et de la Jeunesse*, 2022). Finally, at the end of grade 11, a small fraction repeat the year, usually to switch to a more vocational track.

At the end of each academic year, families express their preferences for their child's future academic path, but ultimately, it is the pedagogical team who decide which students must repeat and which can continue in the general education track, the most selective one, based on students' academic results.[4] Succeeding in the general high school track is essential for gaining access to and succeeding in higher education. In 2023, according to the French Ministry of Higher Education, nearly 93% of graduates from the general education track continue in higher education compared to about 60% of those from the more vocational tracks (*Ministère de l'Enseignement Supérieur et de la Recherche*, 2025). At university, a majority of students from the general education track succeed in obtaining a bachelor's degree in 3 or 4 years compared to a very small minority of students from more vocational tracks. Graduates from the general education track are notably very largely over-represented among those admitted to the most selective higher education institutions, such as preparatory classes for engineering schools or medical schools. In this context, our main indicator of educational success will be the ability to reach the final year of the general education program on time. As discussed below, according to our LFS data, only about 44% of children in a cohort achieve this.

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[4]In a study of the cohort entering middle school in 2011, the French statistical office (INSEE) analyzed the tracks in which students were after grade 9 based on the students' academic level measured at middle school entry: 98% of top-decile students are in the academic track compared to barely 20% of bottom-decile students (and 68% on average, see INSEE, 2023). Conversely, less than 1% of top-decile students are in a 2-year vocational program (or drop out of school), compared to more than 40% of bottom-decile students (11% on average).

In addition, we will use an indicator of failure in middle school, namely the inability to finish the middle school years without repeating a grade. Grade repetition has decreased over the past few decades in France, but has stabilized since 2017 and remains significant, particularly in pivotal grades where important track choices are made. According to our LFS data, about 16% of children in a cohort repeat a grade before the end of middle school.

Lockdowns and school closure

Following the 2020 pandemic shock, there were three periods of national lockdown in France, the first between March 7 and May 11, 2020, the second between October 30 and December 5, 2020, and the last between April 3 and May 3, 2021, or about 4 months in total. Working from home was only mandatory (for those who could) during these specific periods. During these periods, the French government took charge of most of the remuneration of employees forced to stop working, under an exceptional technical unemployment scheme (state support ranging from 100% for the lowest net salaries to 84% for the highest net salaries, with the possibility for the employer to supplement in the latter case). The vast majority of the adult population was vaccinated by the last months of 2021 (Costemalle et al., 2021).

Importantly, schools closed very little in France during the pandemic period, much less than in most other developed countries (Huillery, 2025). To be more specific, schools closed for the first time for about six weeks during the first lockdown, namely around the spring break in early April 2020 (about three weeks before and three weeks after the break), then for two weeks around the spring break in April 2021 (one week before, one week after). As we will discuss in the next section, the authorities ensured that teaching professions were considered essential during the pandemic and all students were able to attend school almost normally during this period, with the periods during which teaching time was delegated to parents being very limited.

Work from home

In France, an employee can only work from home if the employer agrees and the employee volunteers. To be specific, the law stipulates that remote work cannot be imposed by the employer (an employee's refusal to telework is not grounds for dismissal), except in special cases such as periods of confinement. Parents who began working more from home after the pandemic shock could not have been forced to do so. Conversely, an employer is not obliged to accept an employee's request to telework, although s/he must give reasons if s/he refuses. The situation reverts to one without teleworking as soon as either the employee or the employer expresses the wish to do so. Within a company, remote workers have the same rights and enjoy the same benefits as employees working on site.

Many employers have signed collective agreements with employee representatives that define the eligibility conditions for working from home (in terms of the type of job performed or seniority in the company) as well as how the costs incurred by working from home are compensated by the employer. When such a collective agreement is in place, employees can switch (or abandon) working from home by simply exchanging emails with their management, without the need to renegotiate the employment contract. As shown in Goux and Maurin (2025) or Feuillade et al. (2025), this aspect of French regulations is one of the reasons explaining the abrupt and persistent rise of working from home in the years following the pandemic shock.

II.   Data and variables

We use the French *Enquêtes Emploi en Continu* (Labour Force Surveys, hereafter LFS) conducted each year by the French statistical office between 2013 and 2024. The information is collected continuously throughout the year from a large representative sample of households that is renewed by one-sixth each quarter. We know the composition and size of each household surveyed, as well as the type of urban area in which it is located.

The survey provides the main socio-demographic characteristics of all individuals aged 15 or more living in the household, including their date of birth, gender, and the occupations of their father and mother. We also know whether individuals are still in education at the time of the interview and, if so, whether they are still in middle school or not. For those who are in high school, we know the type of program they are in (general vs vocational) as well as the grade they are attending (from grade 10 to 12).

For individuals who are employed at the time of the interview, the survey also provides information on the proportion of working time spent at home in the four weeks preceding the interview (0%, more than 0% but less than 50%, between 50% (included) and 100% (excluded), 100%). Between 2013 and 2020, this information is collected for one-third of the sample. From 2021, this information is collected for one-sixth of the sample. In the following, children's exposure to parental home work will be measured by a variable indicating whether at least one parent has worked from home at least part of the time during the last four weeks.

Samples and educational outcomes

For each of the 12 years between t=2013 and t=2024, the LFS surveys enable us to construct a representative sample of individuals of the age to be in grade 12 (the final year of high school) as well as a representative sample of individuals of the age to be in grade 10 (the first year of high school). Specifically, for surveys conducted during quarter q of year t, individuals of the age to be in grade 12 correspond to respondents born in t-19 when q=1 or 2 and to respondents born in t-18 when q=4. Individuals of the age to be in grade 10 correspond to respondents born in t-17 when q=1 or 2 and to respondents born in t-16 when q=4.[5]

When an individual is interviewed twice in the year in which they are of age to be in a given grade, we only keep the observation corresponding to the interviewer's first visit so that our samples are made up of independent observations each year. With these specifications, the LFS surveys conducted between 2013 and 2024 taken together provide us with a working sample of approximately 29,000 individuals of age to be in grade 10 and a working sample of approximately 31,000 individuals of age to be in grade 12. Online appendix Table A1 provides descriptive statistics.

For individuals of age to be in grade 12, our indicator of educational achievement will be a variable indicating that they are attending grade 12 in the general education track (or even already in higher education, for the small fraction who have skipped a grade) at the time of the survey, i.e., a variable indicating that they not only never repeated a grade but have also never been forced to leave the most selective high school program. Over the period studied, on average 43% of individuals in a birth cohort achieve this performance. For individuals of age to be in grade 10, our indicator of educational achievement will be a variable indicating whether or not they are still in middle school (i.e., grade 9 or below) at the time of the survey, i.e. indicating that they have been held back a grade before the end of middle school. Over the period studied, on average 16% of children were held back a grade before the end of middle school.

To illustrate the relevance of our two indicators of academic performance, Table A2 in the online appendix describes their variations across gender and SES groups, as captured by father's SES.[6] As

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[5]For surveys conducted during q=3 of year t (from July to September, during the summer vacation between two school years), it is unclear whether individuals' responses refer to the school year that has just ended or the one that is about to begin. Therefore, we have not included these observations and are focusing on data collected in the first, second, and fourth quarters.

[6]In the remainder of this article, we distinguish three main SES groups. The lower-SES group corresponds to manual workers, farmers, and lower-level non-manual employees (codes 1, 6, and 5 of the French 1-digit classification, i.e., *agriculteurs*, *ouvriers* et *employés*). The higher-SES group corresponds to managers, executives, and other upper-level occupations (code

expected, lower-SES children are much less likely to complete general education without repeating a grade. The proportion who complete general education on time is 29.7% among lower-SES children compared to 67.6% among higher-SES ones and to 47.0% among intermediate-SES ones. Lower-SES children are also much more likely than higher-SES children to repeat a grade before the end of middle school. The proportion of repeaters is 22.2% among lower-SES children compared to only 7.2% among higher-SES ones and 13.3% among intermediate-SES ones. Similarly, boys are less likely to complete general education without repeating a grade and more likely than girls to repeat a grade before the end of middle school. These results are consistent with existing evidence on the French school system (see e.g., Barasz and Furic, 2023).

Control and treatment groups

The French LFS provide detailed information on the occupations of each respondent's mother and father, using a (2-digit) classification into 29 occupational groups. This information makes it possible to distinguish, within each major socio-economic group, the parents who (due to their specific occupations) were directly exposed to the increase in WFH after the pandemic and those who were virtually excluded from this development.

If we start by considering lower-SES employees, the majority have occupations that are very difficult to perform from home and have, by definition, been very little affected by the post-pandemic rise in WFH. As already shown in Goux and Maurin (2025), there is, however, one important exception: lower-level administrative employees (i.e., code 54 of the 2-digit classification}. At the time of the lockdowns in 2020 and 2021, when the rule was that everyone who could work from home had to, lower-level administrative employees were indeed the only category of lower-level employees for whom a significant proportion of WFH was observed. During these particular periods, all other categories of lower-SES employees remained at residual levels of homeworking, confirming that their jobs cannot really be performed from home.

Conversely, if we consider the groups of higher-SES and intermediate-SES employees, the vast majority have occupations that can be performed from home, as discussed again in Goux and Maurin (2025). However, some of these highly skilled occupations were deemed essential during the pandemic, most notably in the education and health sectors. At the height of the pandemic crisis, during the lockdowns, local authorities were officially instructed to do everything possible to ensure that these highly qualified staff could continue to work on site, including by setting up exceptional childcare facilities for their children.[7] Within the intermediate-SES group, these health and education occupations essentially correspond to primary school teachers (group 42 of the 2-digit classification) and to nurses (group 43). Within the higher-SES group, they essentially correspond to secondary school teachers, doctors and pharmacists employed in a hospital or in other medical organizations (group 34) as well as to private medical doctors, dentists, pharmacists (group 31).

Ultimately, to measure the exposure of parents to the rise in WFH, we will consider a treatment variable (denoted *Treatment*) which takes the value 1 when at least one of the parents is an employee with a lower-level administrative occupation or an employee with an intermediate-level or higher-level occupation outside of those of teaching or health. We also exclude farmers from the treatment group, as well as other self-employed workers, since the opportunities for self-employed workers to work

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3 of the classification, i.e., *cadres et professions intellectuelles supérieures*). The intermediate-SES group corresponds to middle-level employees as well as self-employed (codes 2 and 4 of the classification, i.e., *professions intermédiaires* and *artisans commerçants*).

[7]An official list of the occupations affected by these exceptional support measures was produced by the French Ministry of Health in April 2021. It can be found at the following: address:https://sante.gouv.fr/archives/archives-presse/archives-breves/article/covid-19-liste-des-professionnels-indispensables-a-la-gestion-de-l-epidemie. Skilled occupations in the health and education sectors were considered key occupations for the continuity of life in the country even before the epidemic began (see e.g. Arènes and Virot, 2014).

from home have not been particularly affected by the pandemic shock.[8] With this definition, approximately 47% of high-school age individuals belong to the treatment group.

To test the relevance of this approach, Figure 1a focuses on the full sample of respondents of age to be in grade 12 and plots the evolution of the probability that they live with at least one WFH parent separately for respondents in the treatment group (i.e., *Treatment*=1) and for those in the control group (*Treatment*=0). Figure 1b focuses on the same sample and plots the evolution of the gap between the two previous curves, taking as a reference the initial gap observed in 2013. Reassuringly, these figures show that the two groups evolve in a similar way throughout the years preceding the pandemic shock, before we observe a significant increase for the treatment group while the control group does not undergo any notable inflection. The WFH parental gap between the treatment group and the control group is on average about 20 percentage points higher in the post-2020 period than in the preceding period. For the sake of completeness, Table A3 in the online appendix provides details of parental WFH rates for the treatment and control groups, separately for the pre- and post-pandemic periods and for the three SES groups. It confirms that the gap in parental WFH between the treatment and control groups did indeed increase significantly in the post-pandemic period for each of the three SES groups, whether focusing on children of grade 10 age or those of grade 12 age. From one group of children to another (as defined by age and SES), the estimated increase in the gap fluctuates around an average value of approximately 18 percentage points, in line with the graphical analysis above. In the remainder of this article, our research strategy will consist of testing whether this strongly divergent evolution of the exposure to parental WFH is followed by a divergent evolution of the academic situation of the adolescents concerned.

III.   Parental exposition to work from home and family environment

Before moving on to the analysis of children's educational outcomes, we first ask whether the post pandemic period coincided with differential changes in the family environment of high school age respondents in the treatment and control groups. To explore this question, we consider a set of dependent variables describing the family situation of the respondents and we show the difference-in-differences estimates obtained by regressing these dependent variables on the (*Treatment* x *Post*) interaction between the dummy variable (*Treatment*) indicating that the respondent belongs to the treatment group and the dummy variable (*Post*) indicating that the observation date *t* is after the 2020 shock, as well as on a set of control variables including a full set of year of observation dummies and the treatment dummy. To be more specific, Table 1 shows the estimated coefficient of the (*Treatment* x *Post*) dummy variable when the dependent variable is in turn a variable indicating whether the respondent lives with at least one of his or her parents, a variable indicating whether the respondent lives in a single-parent family, a variable indicating the number of children in the household of the respondent, two variables indicating whether the respondent lives in a rural area or, on the contrary, in a metropolitan area (200,000 inhabitants or more), three variables indicating the child's SES group (as measured by father's SES), and finally a variable indicating whether at least one of the parents in the household works from home.[9] We consider in turn the sample of respondents of age to be in grade 10 (column 1) and the sample of individuals of age to be in grade 12 (column 2). The Table shows no significant differential post-pandemic changes in the type and size of the families in which

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[8]To sum up, among higher-SES occupations (i.e., group 3 of the 1-digit classification), the control group corresponds to groups 34 and 31. Among the intermediate-SES occupations (i.e., groups 2 and 4 of the 1-digit classification), the control group corresponds to groups 2 (self-employed workers), 42 and 43. Finally, among lower-SES occupations (groups 1, 5 and 6), everyone is in the control group except for subgroup 54 (lower-level administrative staff).

[9] As mentioned above, this last variable is only available for part of the sample (one-third for the period 2013-2021, one-sixth for the period after 2021).

high school-aged respondents live. About 99% of respondents live with at least one of their parents, in both the treatment and control groups, whether we consider cohorts who reached high school age before or after the 2020 shock. There are also little differential changes in places of residence. In particular, the pandemic shock did not induce any significant decrease in the proportion living in large cities for children most exposed to the increase in parental WFH. Similarly, we do not detect any differential changes in the proportions of lower-SES, intermediate-SES or higher-SES children. As expected, the main post-pandemic change is in the likelihood of living with a parent who works from home. Specifically, our regression results confirm that the probability of living with at least one parent who work from home increases much more sharply after the pandemic shock for respondents in the treatment group than for those in the control group. The estimated gap between the treatment and control groups in exposure to living with a parent who works from home increases by approximately 20 percentage points, consistent with our previous first-stage analyses.

IV.   Parental exposition to WFH and children's educational outcomes

To explore the effect of parental WFH on children's education, we are going to use the same basic model as in the previous section to test whether the pandemic shock was followed by differential changes in the probability of being held back a grade in middle school or in the probability of completing the most selective high school program on time. Building on the fact that the pandemic shock did not differentially impact the distribution of social backgrounds in the treatment and control groups, we will conduct this analysis separately on the lower-SES group (panel A of Table 2), intermediate-SES group (panel B) and the higher-SES group (panel C). In addition, Panel D in Table 2 considers the full sample and explicitly tests whether the differential effect of the pandemic shock on the treatment group vary significantly across SES groups.

Regarding lower-SES individuals of the age to be in grade 10, the first column of panel A shows a post-pandemic increase of 4.3 percentage points (significant at the 7% level) in the probability of still being in grade 9 (or below) for individuals in the treatment group compared to those in control group. With regards to lower-SES individuals of the age to be in grade 12, the second column of panel A shows a statistically significant decrease of 9.6 percentage points in the probability of having completed the most selective high school program without repeating a grade. These initial results suggest that exposure to parental WFH contributes to a significant decline in academic performance in middle and high school for lower-SES students.

Panels B and C replicate this analysis separately on the subsamples corresponding to the intermediate-SES and higher-SES individuals. They do not show any significant effects. In both types of families, the post-pandemic evolution of academic performance does not appear to be significantly different for students in the treatment group. The negative effects on academic performance are essentially detected for the lower-SES group.

Finally, in Panel D, we consider the full sample and shows the results when we augment our basic regression model with a full set of interactions between the dummy indicating the treatment status (*Treatment*), the dummy indicating the post-pandemic period (*Post*) and the three dummies indicating respondents' SES group (the higher-SES group being used as a reference). Whether we are interested in children of grade 10 age or those of grade 12 age, the results confirm that post-pandemic exposure to the rise in WFH has a significantly more depressing effect on children in the lower-SES group than on those in other groups. In the post-pandemic period, the gap between lower and higher SES children in the probability of completing the general education track without repeating a grade increases by 14.6 percentage points in the treatment group compared to the control group. The gap in the probability of repeating a grade during middle school years increases by 7.3 percentage points.

Table A4 in the online appendix shows that the results in Table 2 are almost unchanged when we add as control variables the full set of variables characterizing the family environment, namely the number of children in the household, a dummy indicating whether at least one parent is present in the household, a dummy indicating whether the family is single-parent as well as two dummies indicating whether the dwelling is located in a rural area or in a large urban area. Table A5 replicates this reduced-form analysis separately for lower-SES girls and boys, without detecting any significant heterogeneity across gender groups. The decline in academic performance is noticeable for both groups of lower-SES adolescents. Finally, Table A6 shows that the results in Table 2 are almost unchanged when the years 2020 and 2021 are removed from the analysis. As our graphical analyses clearly suggest, our main results are not driven by cohorts that experienced only the very first phase of the rise of WFH.

The results in Table 2 suggest that parental WFH has a significant negative effect on children of grade 12 age from the least advantaged backgrounds, i.e. in families where parents are least equipped to help their children with their schooling and where problems of cramped living conditions are most common. As in any DiD analysis, it must emphasized that these interpretations are based on a parallel trends hypothesis, according to which the gap in educational outcomes between the treatment and control groups would have remained constant in the absence of a post-pandemic increase in parental WFH. To test the credibility of this hypothesis, Figure 2a focuses on the same sample of lower-SES children of grade 12 age as Table 2 and plots the detailed evolution of the probability of completing the most selective high school program on time separately for children in the treatment group and those in the control group. Figure 2b shows the evolution of the gap between the two curves, with 2013 being taken as the reference year. These graphs show that the probability gap between the two groups fluctuates around approximately 15 percentage points in the years preceding the pandemic shock, with no upward or downward trend, in line with the parallel trends hypothesis. After 2020, the probability of completing the most selective high school program on time decreases sharply for the treatment group and the gap is reduced by more than half, in line with the econometric estimate given in Table 2. It should be emphasized that, reassuringly, the decline in performance in the treatment group only begins to be noticeable from 2021 (and not from 2020), i.e., from the cohorts that were not yet old enough to be in grade 12 at the time of the differential increase in WFH.

For the sake of completeness, Figures A1a and A1b in the online appendix shows the corresponding first-stage analysis. Specifically, they also focus on lower-SES children of grade 12 age and compare the evolution of the probability that at least one parent works from home in the control group and the treatment group. Consistent with our initial first stage analysis, this probability remains very similar in both groups throughout the pre-pandemic period, and it is only after the pandemic shock that a gap of more than 20 percentage points emerges. Figures A2a to A2e in the appendix further show a detailed analysis of the evolution of the differences between the treatment and control groups for all other basic characteristics of the family environment and detect no significant shift. Focusing on adolescents from the least advantaged backgrounds, this analysis confirms that the only element of their family environment for which a significant differential change is detected for the treated group after the pandemic shock is indeed exposure to parental WFH.

Ultimately, both our graphical and econometric analyses suggest that an increase of approximately 20 percentage point in WFH among lower-SES parents in the treatment group is accompanied by a nearly 9 percentage point reduction in their children's advantage over those in the control group in terms of the probability of completing the most selective high school program without repeating a grade, in line with a LATE of about -0.5.[10] As is often the case when working with a binary outcome, the magnitude

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[10]When we focus on the subsample of lower-SES adolescents for which we have information on parental WFH, we obtain the same first-stage and reduced-form estimates as on the full lower-SES sample (even if they are less precisely estimated, due

of the treatment effect can be interpreted in at least two different ways. It could mean that parental WFH does indeed have a significant negative effect on the academic performance of children in the treatment group. But it could also mean that many children from low-income families are just on the edge of succeeding without repeating the selective high school program, such that even a minor negative shift in their academic performance could lead a significant number of them to fail.

To explore this issue further, we can also ask whether the decline in the probability of lower-SES students completing the most general high school program without repeating a year is due to a simple increase in their probability of repeating a year or to an increase in their probability of being relegated to a vocational track. Table A8 in the appendix replicates the analyses in Table 2, using as the dependent variable a dummy indicating that the respondent is still in the general track (even if possibly a year or more behind). It reveals a negative (marginally significant) impact of about -6 percentage points on lower-SES children. In other words, about two-third of the estimated effect on the probability of completing the most general high school program without repeating a year is an effect on the probability of persisting in that program. The main consequence of parental WFH is therefore not simply to delay students, it leads them to be unable to persevere in the general track, the only one that is really designed to prepare for higher education.

V. Discussion and conclusion

Using French data, this article suggests that the academic performance of lower-SES adolescents has declined in families that have been most affected by the increase in WFH following the 2020 pandemic. In these families, the rise in parental WFH has been accompanied by a significant decrease in the proportion of children who manage to complete the general high-school program without repeating a year. In more advantaged social environments, we detect no such trend. Children from more advantaged backgrounds perform neither better nor worse after the pandemic, regardless of whether their parents were particularly exposed to the rise in WFH.

For higher-SES parents, working from home very often goes hand in hand with employment contracts that are less restrictive in terms of working hours or days worked per week. The majority have an employment contract (called *forfait jour*) that specifies only the number of days worked per year but does not impose any restrictions on the times of the week when work must be carried out.[11] Such arrangements give them much greater latitude to reconcile work and family life when working from home. These employees have more flexibility to adapt to their children's schedules than employees in less skilled occupations, whose schedules are much more constrained and whose work is much more closely supervised. Employees in less skilled occupations also generally live in smaller homes, where it is more difficult to balance working from home and family life.[12] Furthermore, parents in less skilled occupations are generally less educated and less equipped to support their children at school, especially when they reach high school age. There is a long-standing body of social science literature demonstrating that more educated parents tend not only to devote more time to their children, but also to better adapt their parenting efforts to their children's evolving needs as they age (e.g., Guryan et al., 2008; Kalil et al., 2012). Higher SES parents are also less likely to adopt an authoritarian parenting style, which has long been identified as a source of difficulties for children, particularly during

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to the smaller size of this subsample) and we verify that we do indeed arrive at a 2SLS estimate of about -0.5 (with a P-value of 11%, see online appendix Table A7).

[11] See Letroublon (2015). According to data from the LFS conducted in 2024, about two-thirds of higher-SES employees benefit from *forfait jour*, compared to barely 11% of intermediate SES and 6% of lower-SES employees.

[12] According to the French housing survey, more than 15% of couples with children (and 20% of single-parent families) live in overcrowded housing, and this condition mainly concerns families in the last quartile of the distribution of income per unit of consumption (INSEE, 2017).

adolescence (e.g., Dornbusch et al., 1987, Steinberg et al., 1994, Pinderhughes et al., 2000). This combination of factors helps explain why working from home appears to be a problem for teenagers living in the least advantaged environments but not for those living in the most advantaged.

Ultimately, it is often speculated that the rise of WFH could be a source of inequality in education, as it benefits higher-SES parents much more widely, which could enable them to support their children at school even more effectively. Our study suggests that the rise of parental WFH may also be a source of inequality for a completely different reason, namely that it may contribute to destabilizing adolescents from the most vulnerable backgrounds at a time in their lives when they need to become independent.

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Figure 1: Trends in Parental WFH, by Treatment Status

### (a) Trends in Parental WFH Probability, by Treatment Status
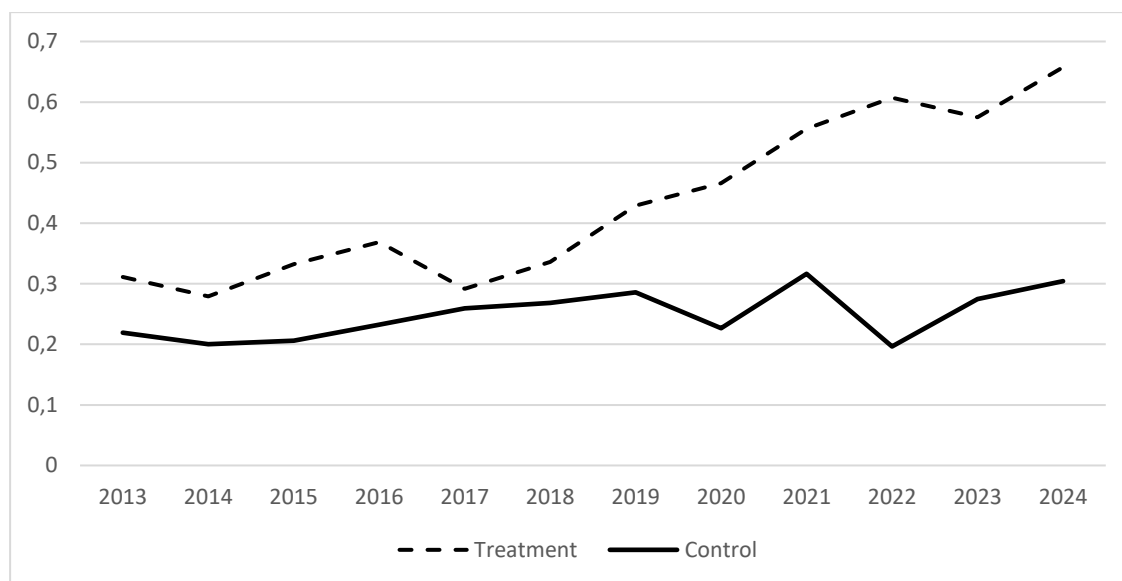
(b) Trend in the Gap in Parental WFH Probability
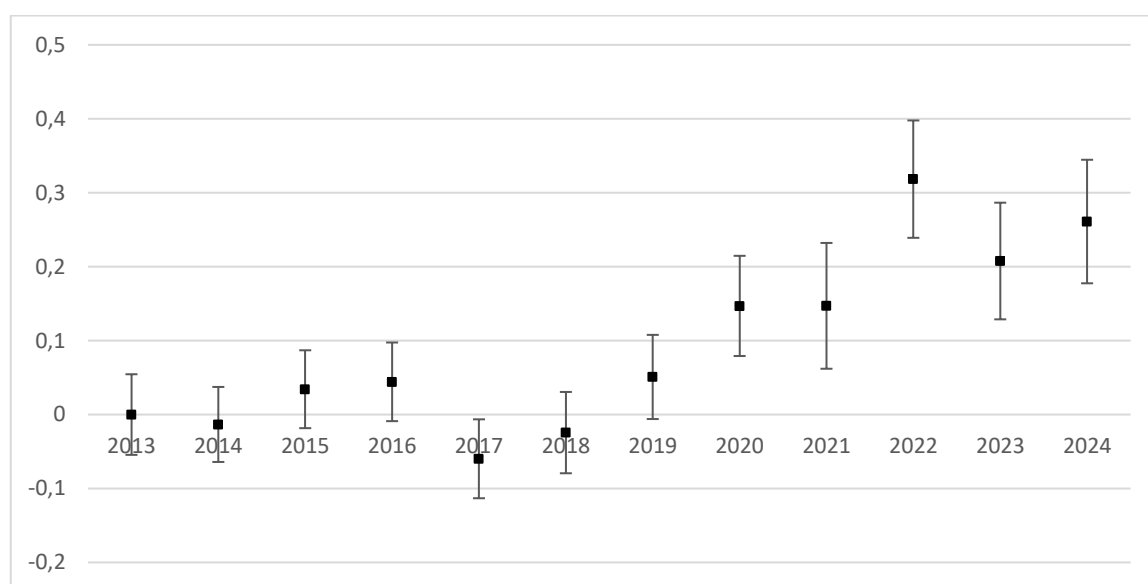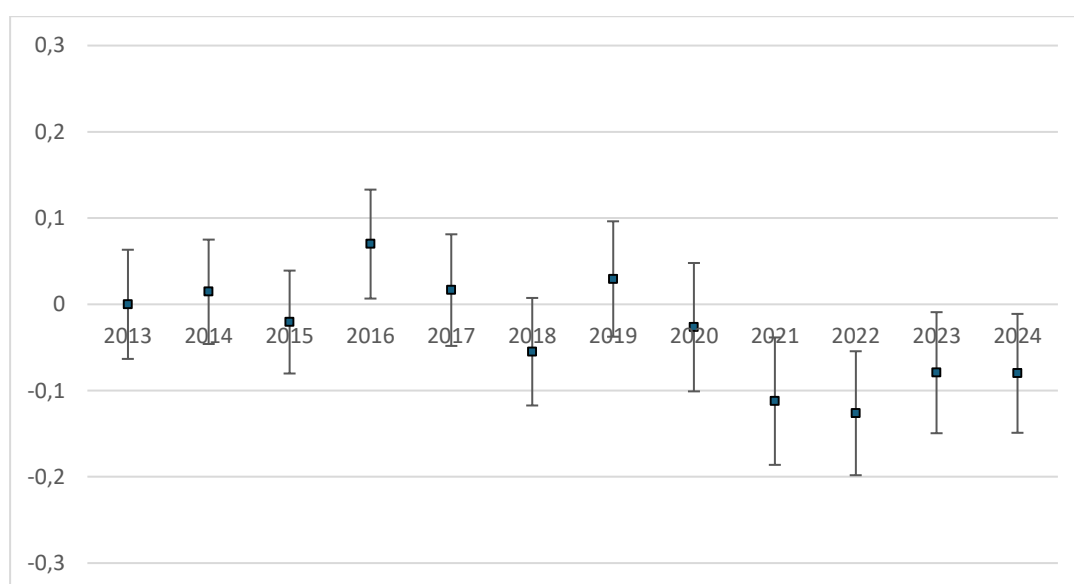

Note: Figures 1a and 1b refer to the sample of children of age to be in grade 12. Figure 1a shows the evolution of the probability of having at least one parent who works from home separately for the control and treatment groups. Figure 1b shows the evolution of the difference between the two groups (the 2013 difference being taken as a reference) as well as the 95% confidence interval.

Figure 2: Trends in the Probability of Completing General Education on Time (Lower-SES Group)

(a) Trends in Probability, by Treatment Status
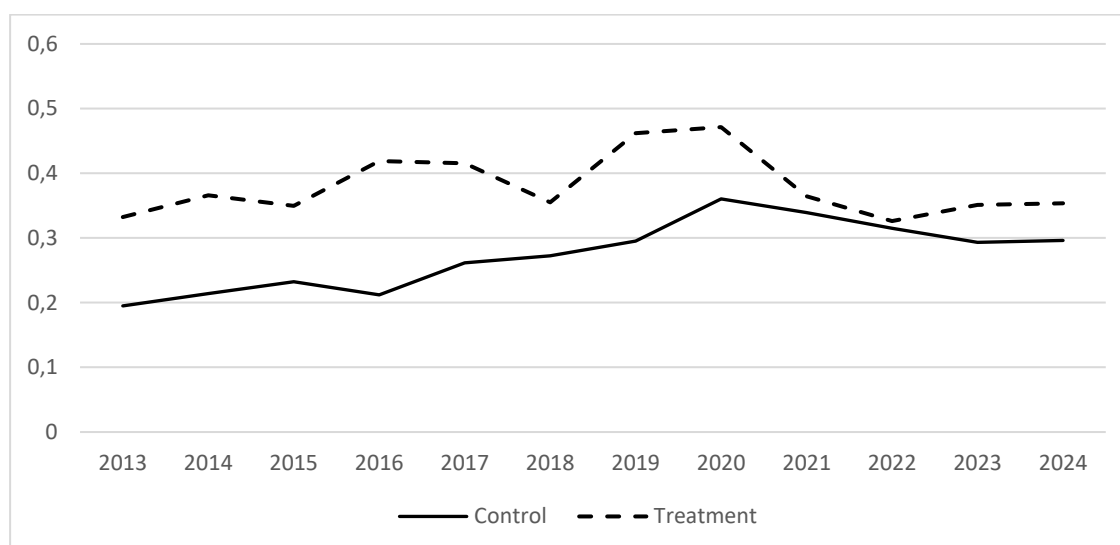
(b) Trends in the Probability Gap Between Treatment and Control Groups

Note: Figures 2a and 2b refer to the sample of lower-SES children of age to be in grade 12. Figure 2a shows the evolution of the probability of completing the general education program on time for the control and treatment groups. Figure 2b shows the evolution of the difference between the two groups (the 2013 difference being taken as a reference) as well as the 95% confidence interval.

Table 1: DiD Impact on Family Environment

Dependent variables	Children of age to be in grade 10 (1)	Children of age to be in grade 12 (2)
At least one parent at home	-0.002	-0.001
	(0.003)	(0.004)
Single parent family	-0.008	-0.013
	(0.015)	(0.016)
Number of siblings	0.010	-0.039
	(0.041)	(0.041)
Rural area	0.013	0.008
	(0.017)	(0.017)
Large metro. Area	-0.018	-0.015
	(0.019)	(0.019)
Higher SES	0.023	0.024
	(0.015)	(0.015)
Intermediate SES	-0.008	-0.005
	(0.018)	(0.018)
Lower SES	-0.015	-0.019
	(0.017)	(0.017)
At least one parent WFH	0.196**	0.20.9**
	(0.026)	(0.029)
Nb obs.	29,391	31,235

Note: The first column of the table refers to the sample of respondents of age to be in grade 10 and the second column refers to the sample of respondents of age to be in grade 12. For each dependent variable, the table provides the estimated coefficient of the *Treatment* x *Post* variable in a model where the explanatory variables are *Treatment* x *Post*, *Treatment*, and a full set of gender and year dummies. The *Treatment* variable indicates that the respondent is in the treatment group, and the *Post* variable indicates that the year is after 2020. Standard errors are in parentheses. The samples used in the last row are smaller in size (N=10,030 and N=10,315) because the dependent variable (i.e., having at least one parent who works from home) is collected for only about one-third of the full sample.

Table 2: DiD Impact on Educational Outcomes

|	Held back a grade in middle school (1)	General education completed on time (2)
A- Lower-level background		
Treatment x Post	0.043* (0.023) [m=0.226] N=13,071	-0.096** (0.031) [m=0.295] N=14,142
B- Mid-level background		
Treatment x Post	0.025 (0.022) [m=0.137] N=9,880	0.006 (0.033) [m=0.468] N=10,376
C- Upper-level background		
Treatment x Post	-0.028 (0.029) [m=0.076] N=6,440	0.047 (0.053) [m=0.675] N=6,717
D- All backgrounds		
Treatment x Post x Lower	0.073** (0.037)	-0.146** (0.062)
Treatment x Post x Interm.	0.056 (0.036)	-0.046 (0.062)
Treatment x Post	-0.031 (0.028) [m=0.163] N=29,391	0.050 (0.054) [m=0.434] N=31235

Note: The first column of the table refers to the sample of children of age to be in grade 10 and the second column refers to the sample of children of age to be in grade 12. Panel A focuses on lower-SES children and shows the estimated impact of (*Treatment* x *Post*) on the probability of having repeated a grade before the end of middle school (col. 1) as well as on the probability of having completed the general high school program without repeating a grade (col. 2), in models where the independent variables are *Treatment* x *Post*, *Treatment*, a full set of gender and year dummies. The *Treatment* variable indicates that the respondent is in the treatment group, and the *Post* variable indicates that the year is after 2020. Panel B (resp. panel C) replicates this analysis for intermediate SES (resp. higher SES) children. Panel D uses the full sample and shows the estimated impact of *Treatment* x *Post*, *Treatment* x *Post* x *Lower-SES* and *Treatment* x *Post* x *Intermediate-SES* in models where the independent variables are a full set of interactions between *Treatment*, *Post* and the three SES dummies as well as a full set of year and gender dummies. Standard errors are in parentheses, and the mean *m* of the dependent variable is in square brackets.

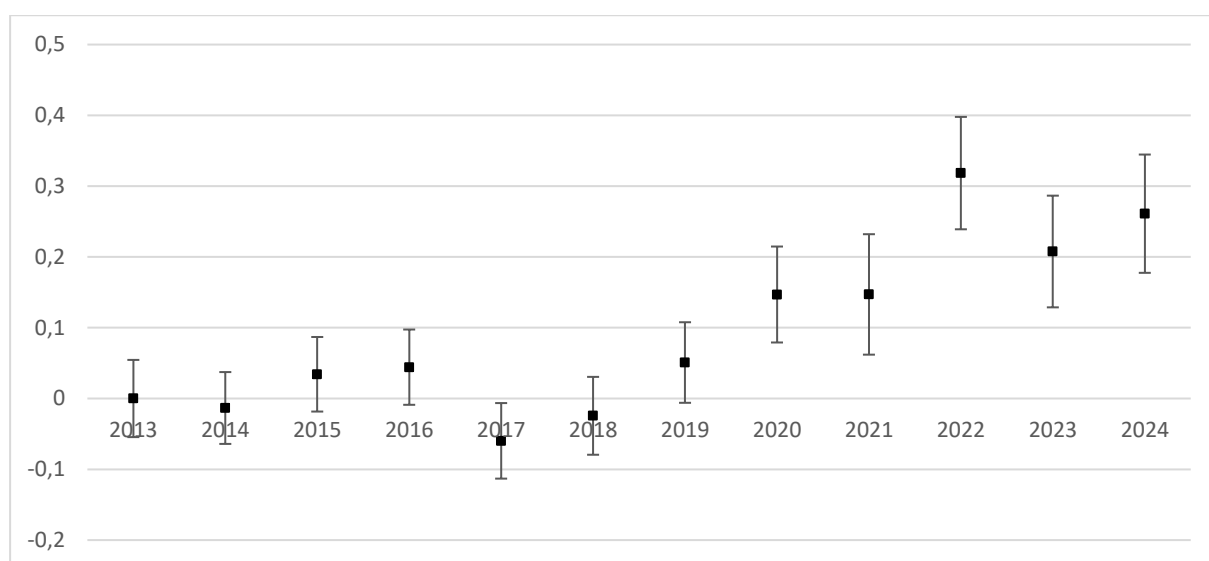# Parents Working from Home and their Children's Education

Online Appendix

Figure A1: Trends in Parental WFH (Lower-SES Group)

### (a) Trends in Probability, by Treatment Status
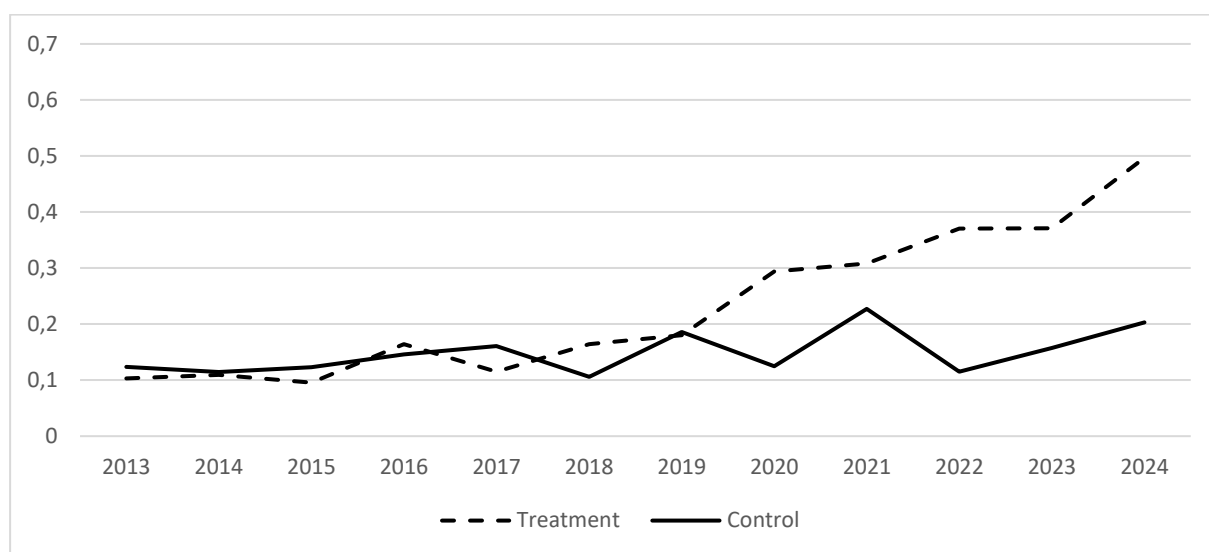
(b) Trends in the Probability Gap Between Treatment and Control Groups

Note: Figures A1a and A1b refer to the sample of lower-SES children of age to be in grade 12. Figure A1a shows the evolution of the probability that at least one parent works from home separately for the control and treatment groups. Figure A1b shows the evolution of the difference between the two groups (the 2013 difference being taken as a reference) as well as the 95% confidence interval.

Figure A2: Changes in Differences between Treatment and Control Groups (Lower-SES Children)

(a) Proportion of Girls
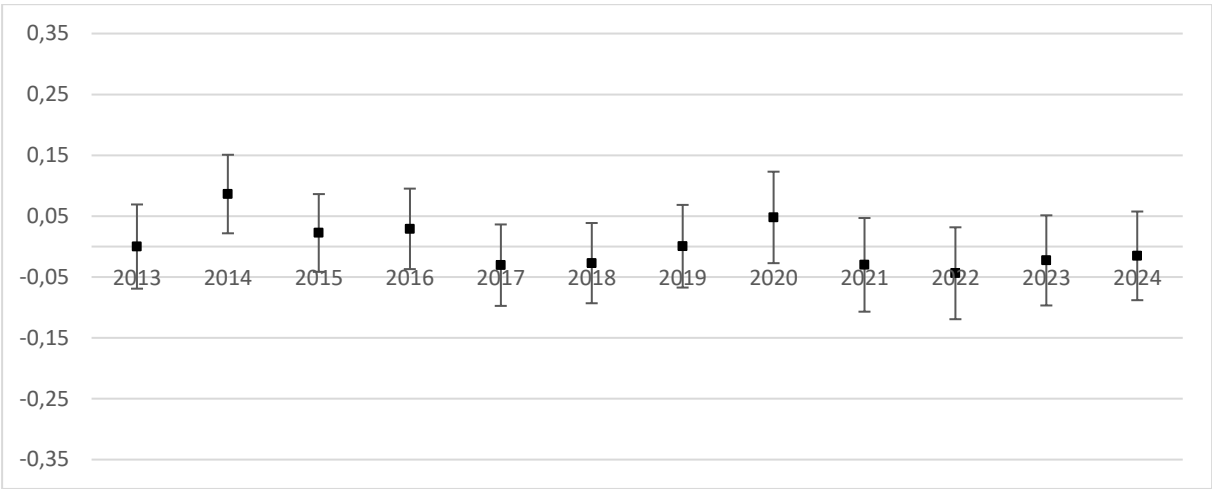
(b) Proportion of Single Parent Families
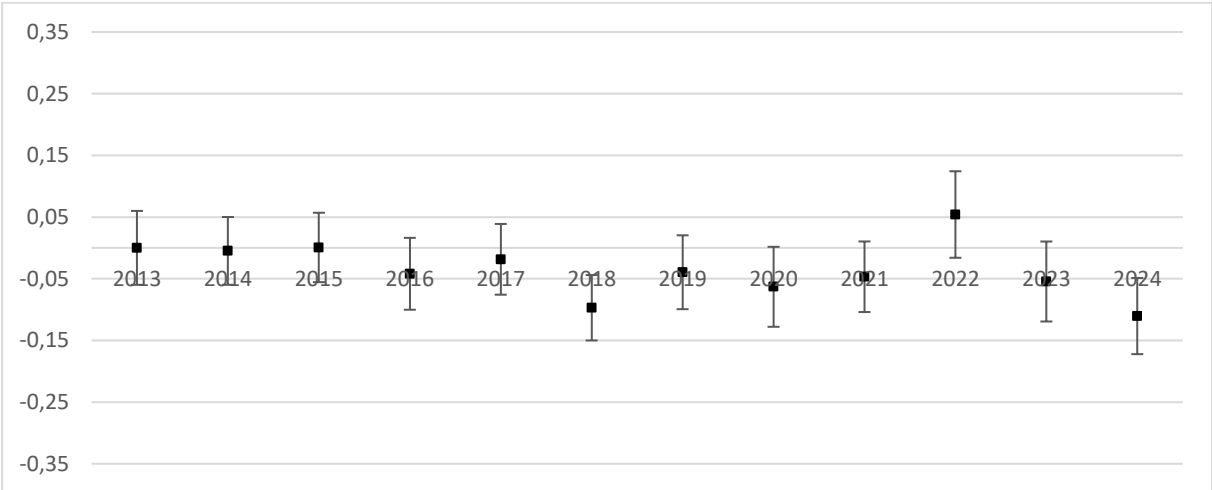
(c) Proportion Living in Rural Areas
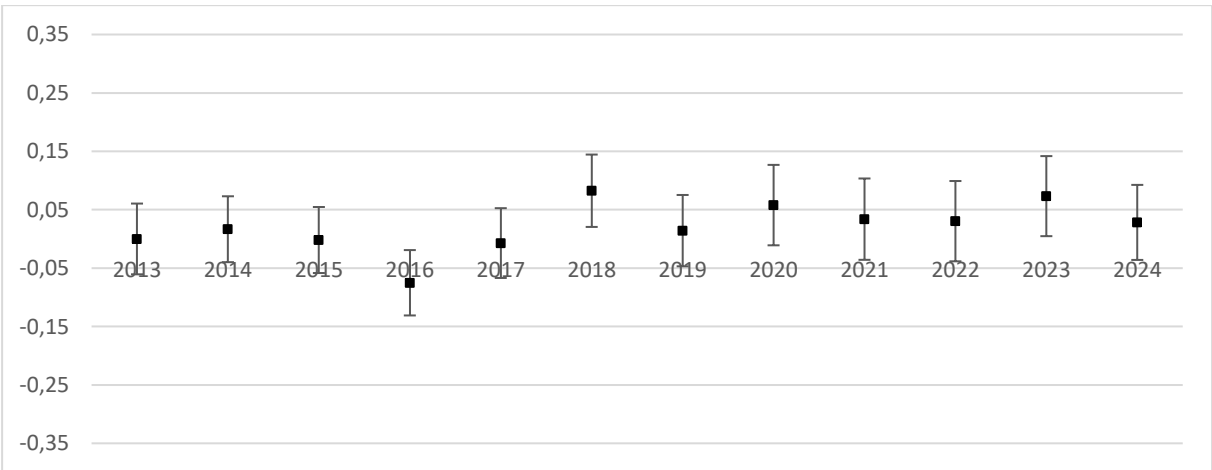
(d) Proportion Living in Large Urban Areas
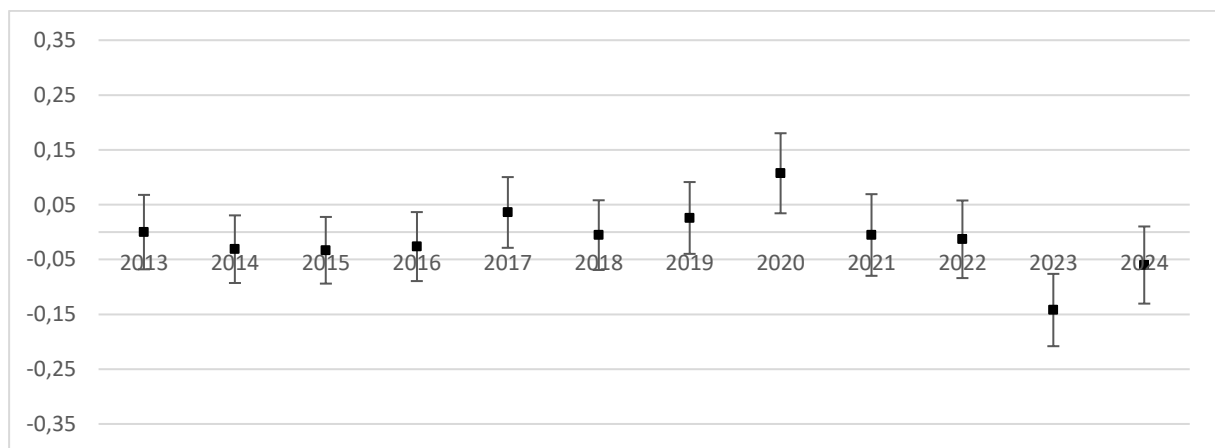
(e) Number of Children
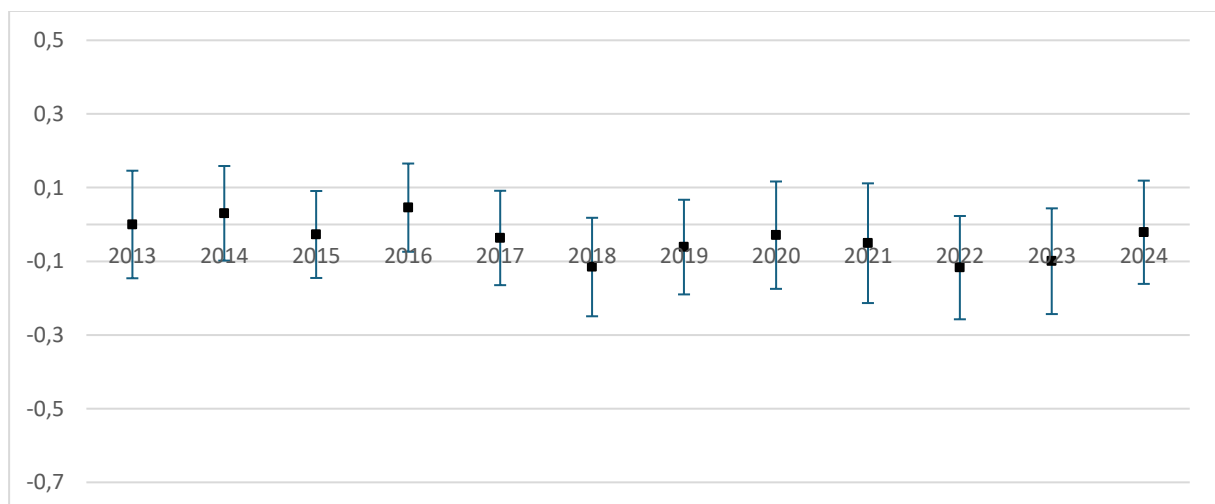
Note: Figures A2a to A2e refer to the sample of lower-SES children of age to be in grade 12. Figure A2a shows the change in the difference in the proportion of girls between the treatment and control groups (with 2013 as the reference year). Figures A2b to A2e replicate this analysis for each of the other characteristics (type of family, location, number of children).

Table A1: Descriptive Statistics

	Sample of age to be in grade 10 (1)	Sample of age to be in grade 12 (2)
At least one parent at home	0.996	0.988
Single parent family	0.185	0.210
Number of siblings	1.93	1.70
Girl	48.6	48.5
Rural area	0.266	0.252
Large metro. Area	0.376	0.385
Higher SES	0.232	0.228
Intermediate SES	0.336	0.330
Lower SES	0.433	0.442
Nb obs.	29,391	31,235

Table A2: Academic Achievement by Gender and SES Group

	Held back a grade in middle school (1)	General education completed on time (2)
Boys	17.7	38.2
Girls	13.7	50.3
Lower-SES	22.2	29.7
Intermediate-SES	13.3	47.0
Higher-SES	7.2	67.6
All	15.8	44.1

Note: The first column of the table refers to the sample of children of the age to in grade 10 while the second column refers to the sample of the age to be in grade 12.

Table A3: The Differential Increase in Parental WFH in the Treatment Group, by SES Group

| | Pre-pandemic period | | Post-pandemic period | | *Diff. in Diff.* |
| | T | C | T | C | |
	(1)	(2)	(3)	(4)	*(5)*
Panel A: sample of grade 12 age					
Lower-SES	0.152	0.135	0.377	0.173	*0.187***
	(0.013)	(0.006)	(0.034)	(0.014)	*(0.039)*
Intermediate-SES	0.291	0.401	0.534	0.472	*0.171***
	(0.011)	(0.014)	(0.024)	(0.031)	*(0.043)*
Higher-SES	0.518	0.642	0.763	0.649	*0.238***
	(0.013)	(0.030)	(0.021)	(0.064)	*(0.076)*
Panel B: sample of grade 10 age					
Lower-SES	0.156	0.161	0.351	0.167	*0.190***
	(0.013)	(0.007)	(0.033)	(0.015)	*(0.039)*
Intermediate-SES	0.353	0.451	0.544	0.495	*0.148***
	(0.012)	(0.014)	(0.024)	(0.031)	*(0.044)*
Higher-SES	0.547	0.710	0.773	0.801	*0.136***
	(0.013)	(0.028)	(0.020)	(0.051)	*(0.063)*

Note: panel A (resp. panel B) refers to the sample of respondents of grade 12 (resp. grade 10) age for whom parental WFH information is available. For each of the three SES groups and each of the two sub-periods, the table shows the parental WFH rate separately for the treatment group (columns 1 and 3) and for the control group (columns 2 and 4). For each SES group, it gives the corresponding difference in differences (as measured by ((4)-(3))-((2)-(1))).

Table A4: Replication of Table 2 with Additional Controls

	Held back a grade in middle school (1)	General education completed on time (2)
A- Lower-level background		
Treatment x Post	0.044* (0.023) [m=0.226] N=13,071	-0.095** (0.031) [m=0.295] N=14,142
B- Mid-level background		
Treatment x Post	0.023 (0.022) [m=0.138] N=9,880	0.008 (0.033) [m=0.468] N=10,376
C- Upper-level background		
Treatment x Post	-0.027 (0.029) [m=0.076] N=6,440	0.028 (0.052) [m=0.675] N=6,717
D- All backgrounds		
Treatment x Post x Lower	0.075** (0.037)	-0.130** (0.062)
Treatment x Post x Interm.	0.055 (0.036)	-0.031 (0.063)
Treatment x Post	-0.032 (0.029) [m=0.163] N=29,391	0.037 (0.054) [m=0.434] N=31235

Note: This table shows a replication of Table 2 when we add as control variables the number of children, a variable indicating whether the household is single-parent and two variables indicating whether the residence is located in a rural area or in a large metropolitan area.

Table A5: Impact on Lower SES Children, by Gender

	Held back a grade in middle school (1)	General education completed on time (2)
A- Girls		
Treatment x Post	0.053* (0.031) m=0.197 N=6,380	-0.090** (0.047) m=0.366 N=6,934
B- Boys		
Treatment x Post	0.034 (0.035) m=0.253 N=6,691	-0.097** (0.041) m=0.228 N=7,208

Note: This table shows a replication of panel A in Table A4 separately for girls and boys.

Table A6: Replication of Table 2 without the years 2020 and 2021

	Held back a grade in middle school (1)	General education completed on time (2)
A- Lower-level background		
Treatment x Post	0.032 (0.028) [m=0.238] N=10,464	-0.097** (0.035) [m=0.286] N=12,325
B- Mid-level background		
Treatment x Post	0.007 (0.028) [m=0.147] N=7,898	0.009 (0.036) [m=0.464] N=9,077
C- Upper-level background		
Treatment x Post	-0.015 (0.034) [m=0.080] N=4,967	0.061 (0.063) [m=0.668] N=5,784
D- All backgrounds		
Treatment x Post x Lower	0.066 (0.041)	-0.161** (0.073)
Treatment x Post x Interm.	0.058 (0.034)	-0.058 (0.074)
Treatment x Post	-0.033 (0.032) [m=0.169] N=25,495	0.064 (0.064) [m=0.427] N=27,186

Note: This table shows a replication of Table 2 when the observations corresponding to the years 2020 and 2021 are removed from the work sample.

Table A7: 2SLS Analysis (Lower-SES Group)

	Parental WFH (1)	General education completed on time (2)	General education completed on time (3)
Treatment x Post	0.186** (0.048)	-0.103* (0.054)	-
Parental WFH	-	-	-0.55 (0.36)
Nb Obs.	4732	4732	4732
Mean dep. Var.	0.152	0.296	0.296

Note: This table refers to the subsample of lower-SES children of grade 12 age for whom parental WFH information is available. It reports the 2SLS estimate of the effect of having at least one WFH parent on the probability of completing general high school education on time in a model where *Treatment* x *Post* is the instrument and where we control for a treatment dummy as well as gender and date dummies. Column (1) shows the result of the first stage, column (2) the result of the reduced form, and column (3) the 2SLS estimate.

Table A8: DiD Impact on the Probability of Still Being in the General High School Track

	General education (w/o controls) (1)	General education (with controls) (2)
A- Lower level background		
Treatment x Post	0.061* (0.033) m=0.359 N=14,142	-0.058* (0.033) m=0.359 N=14,142
B- Mid-level background		
Treatment x Post	0.016 (0.033) m=0.543 N=10,376	0.018 (0.033) m=0.543 N=10,376
C- Upper-level background		
Treatment x Post	-0.014 (0.037) m=0.751 N=6,717	-0.031 (0.038) m=0.751 N=6,717
D- All backgrounds		
Treatment x Post x Lower	-0.048 (0.050)	-0.032 (0.050)
Treatment x Post x Interm.	0.027 (0.050)	0.040 (0.050)
Treatment x Post	-0.013 (0.038) m=0.504 N=31235	-0.025 (0.038) m=0.504 N=31235

Note: the first column of the table shows a replication of the second column of table 2 when the dependent variable is a dummy indicating that the respondent is still in the general education track. The second column shows a replication when we add the full set of controls for family environment.