Learning at home: home schooling resources and child development during the COVID-19 lockdown

Hugues Champeaux* Lucia Mangiavacchi† Francesca Marchetta‡ Luca Piccoli§

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Abstract

School closures, forced by the COVID-19 crisis in many countries, impacted on children's lives and their learning process. There will likely be substantial and persistent disparities between families in terms of education outcomes. Distant learning solutions adopted by schools have been heterogeneous over countries, within countries and between school levels. As a consequence, most of the burden of children's learning fell on their parents, with likely uneven results depending on the socio-economic characteristics of the family. Using a real time survey data collected in April 2020 and early May in France and Italy on children's use of time, distance learning resources and emotional status, we analyse how the lockdown has affected children's use of time, their emotional wellbeing and their home learning process. We estimate child fixed effects models to identify the main contributors of children's status during the lockdown. The analysis also focuses on the role played by online classes or other interactive methods on children's home learning and emotional status. We find that the lockdown had a stronger negative impact on Italian families, both in terms of educational progress evaluation and of children's emotional status. The increase in the time spend in front of screen appears to be related to a worse learning achievement and emotional status, while the opposite is true for the time spent reading. We highlight that different distance learning methodologies have been used in the two countries, and that attending online classes attenuated the negative impact on lockdown on the learning progresses of both Italian and French kids.

JEL codes: I24, J13, J24

Keywords: children's education, education inequality, distance learning, children's time-use, emotional skills, COVID-19

*CERDI, Université Clermont Auvergne, CNRS (France)

†University of Perugia (Dep. of Political Sciences), Perugia, Italy and IZA, Bonn, Germany.

‡CERDI, Université Clermont Auvergne, CNRS (France) E-mail: francesca.marchetta@uca.fr

§University of Trento (Dep. of Sociology and Social Research), Trento, Italy, and IZA, Bonn, Germany. E-mail: luca.piccoli@unitn.it

1 Introduction

The COVID-19 crisis in Spring 2020 has forced many countries around the world to close schools for a prolonged period of time, and teaching has been moved online on an unprecedented scale[1]. How much parents can help their children in dealing with education at home varies widely across families, as do the resources given to parents by their children's schools, since, even within the same countries or regions, schools have adopted different learning solutions. Consequently, the COVID-19 outbreak will lead to an increase in the inequality of human capital development for the affected cohorts of children. We will know the extend to which pupils academic achievements have been affected by the school closures not earlier than 2020/21 academic year where test scores or other learning assessment will be available to give a metric of the short run impact of the lock-down on human capital development.

The current paper aims at analyzing at an early stage how the COVID-19 lock-down has affected the use of time, the learning process and the emotional status of pupils aged 3 to 16 in France and Italy. We also explore parents' perceptions on the effectiveness of different distance learning solutions adopted by schools. This preliminary evaluation is especially relevant both for short run and long run policy objectives. In the short run, in view of a hypothetical repetition of the lock-down during the next academic year, in case of a degradation of the sanitary situation, it would be interesting to understand how distance education worked and how it can be adjusted so that students do not lag behind. For instance investment in educational technology and teacher training could be a short term priority. More in general, it would be important to help policymakers identifying those children who suffered more during lock-down so that adapted educational program could be offered them in the medium/long run.

To address these research questions and to identify policy priorities, we explore the time use of Italian and French kids during lock-down through a descriptive analysis and we estimate children fixed effect models for parents' evaluations of children's learning and emotional status, using original data collected on a sample of families from April 7 to May 10.

Thanks to the availability of individual data collected right in the middle of the lock-down on children's time-use, home schooling and emotional status, we dispose of a large sample of children whose parents where interviewed with a live on line survey. This allows us to offer the first comprehensive evaluation of the effects of the lock-down on children's learning and contribute to the few emerging studies that already analyzed the heterogeneity of home schooling experienced by families during the lock-down, in different countries. Burgess and Sievertsen (2020) for instance describe the possible effects of the outbreak for children's education and identify the transmission channels of this impact. They also pointed out potential future problems generated by lack of proper assessments at the end of the 2019-2020 academic year, as families and future teachers will not be properly informed about the child's progress. Andrew et al. (2020) collected data on children aged 4-15 between the 29 April and 12 May in the UK and find large variation in home learning resources provided by schools and in parents ability to support home learning. They find that private schools are much more likely to offer online classes and, even in state schools, online classes are more likely to be offered to children living in richest families. Mangiavacchi et al. (2020) show that the quality of time-use of Italian kids improved when fathers were more involved in childcare.

[1] According to the UNESCO, these nationwide closures are impacting over 60% of the worlds student population

The cross-country focus on France and Italy is noteworthy since both countries were hugely affected by COVID-19 and their school systems are almost entirely public. This implies that the analysis would not be confounded by children's enrollment in private schools that are more likely to have better educational technologies, as shown for the UK (Andrew et al., 2020). The comparison between France and Italy is interesting because their educational systems differ in terms of policy priority and results(Woessmann, 2016) and on the way distance learning resources has been provided during the crisis. They also differ in the duration of school closure with Italy started in March 4 2020 and maintained schools closed until the end of the academic year while French schools closed on March 17 and gradually reopened starting from May 10 on a voluntary basis. Moreover, even if these two countries share similar normative determinants of the time cost of children, like Catholic values, Latin cultural heritages and asymmetric gender roles, they present remarkable differences in terms of public spending for families, family policies and childcare services (Anxo et al., 2011; Pailhé et al., 2019)[2].

Our paper also contributes to the literature that analyzes the relevance of time at school for children's cognitive development. Lavy (2015), for instance, estimates the impact on academic achievement of differences in instructional time across countries and finds these differences to cause significant variation in test score outcomes: one more hour per week over the school year in the main subjects increases test scores by around 6% of a standard deviation. Other studies focused on the increase in educational inequalities when schools remain closed for a long period due to different exogenous shocks like climate change shocks (Marchetta et al., 2019) or teachers strikes (Jaume and Willén, 2019). Jaume and Willén (2019) found that, being exposed to the average incidence of strikes during primary school, reduces labor earnings of males and females by 3.2% and 1.9%, respectively. Even if we cannot measure children's test scores or use other objective metric for cognitive development, we can rely on the parental judgment of their education progress with home learning and we can identify potential detrimental effects of the lock-down on the way children allocated their time between productive and unproductive activities.

Related to this, we believe that our study provides a contribution to the growing literature on the allocation of children's time out of school as one of the determinants of cognitive and socio-emotional skills (Fiorini and Keane, 2014; Del Boca et al., 2017). During the COVID-19 outbreak kids stayed at home during three months in Italy and two months in France and they had to completely reorganize their time. Children were out of school and additionally they were without access to group activities, team sports, or playgrounds. It is thus meaningful to study how their time has been reorganized and how this reorganization is related to their learning ability and their emotional status. In particular if children's available time has been spent in productive activities this could (at least partially) compensate the detrimental effect of school closure on their cognitive development. Following the evidence on the importance of child's reading and parental reading to children at age 0-5 (Kalb and Van Ours, 2014), as well as the evidence of the detrimental effect of time spent in front of screen on cognitive development, we asked parents about children's time spent reading (or listening stories) and time spent in front of the screens both before and during the lock-down. We also asked about the time spent in extra school activities. This allows us evaluating how children reacted to the lock-down in terms of time-use and testing the mediating effects of time re-allocation on learning and emotional well-being.

Finally, the current paper contributes to the literature on *Edutech* and distance learning, evaluating

[2]According to the OECD family database for 2015, France spends 3.7% of GDP in family policies, while Italy the 2.5%. Paternity leave in France is 28 weeks against the 0.8 weeks in Italy.

parents' perceptions about the effectiveness different distance learning approaches. To the best of our knowledge, existing economic literature focuses on college students, who were the subjects of a number of experiments (Coates et al., 2004; Xu and Jaggars, 2013; Bettinger et al., 2017; Pellizzari et al., 2019), often showing negative effects of online classes on achievement comparing to traditional lectures. For instance, Figlio et al. (2013) analyzed in a experimental settings the difference between live classes and watching videos with the same lectures on internet and found that live-only instruction is slightly better than internet instruction. School closures during lock-down obliged all teachers to suddenly adopt distance learning strategies, but often without receiving clear guidelines from their superiors. Schools and teachers were thus free to choose among a large typologies of methods, that differ in the degree of interaction. This offers an ideal experimental set to study the impact of distance learning on younger students. In the survey, we asked parents to report which distance learning methods were proposed to their children. This allows us to test the difference in parents' evaluation of their children's home learning and emotional status when live classes or chats have been implemented comparing with less interactive methods, like sharing materials or videos.

We estimate that both French and Italian kids increased the time spent reading by xx hours on average, and the time spent in front of screen (out of classes) by xx hours on average. Because of the school at home, the time parents devoted to educational child care significantly augmented with Italian parents consecrating more time to their kids. This could be related to the fact that, according to our estimates, Italian parents are on average more worried about their children's home learning process with respect to their French counterparts, and this is particularly true for children in pre-primary and primary school levels. As to children's emotional well being, the negative effect of the lock-down that we estimate on the base of parents' perceptions is twice as large for Italian children. The negative effects of lockdown on both children learning and emotional status is attenuated when children spend more time reading while is amplified when they spend more hours watching TV or in passive screen activities (youtube, sociale, and similar). Doing extra-school online activities is associated to a better emotional status but to a lower achievement.

Concerning distance learning technologies, important differences emerge in the share of students that could attend online lectures in the two countries: substantially larger in Italy for all school levels. Within countries, substantial heterogeneity exists, always favoring higher grades students. Our regression results suggest that for Italian parents attending online classes played a major role in reducing the negative impact of the lock-down on the home learning process of primary and secondary students. A significant effect was not found for France.

The rest of the paper is organized as follows. Section 2 describes the institutional settings focusing on education systems and the management of distance learning in the two countries. Section 3 describes data and presents a descriptive analysis on the time use of children before and after the lock-down. Section 4 presents the estimation strategy and the results of the analysis of the effect of lock-down on the learning process and the emotional status of pupils. Section 5 concludes.

2 Education systems and distance learning in France and Italy

The organization and governance of the educational system explains the large international differences in student achievement joint with family background (Woessmann, 2016). Family background and

institutions are quite likely to also shape the educational penalty that children of different countries may suffer from the schools closure period that was undertaken to limit the diffusion of the COVID-19 during the lockdown. (Andrew et al., 2020) have already shown the importance of families' economic situation as determinant of children's time use during the lockdown in the UK. Pre-existing educational institutions may also matter. Not only differently organized schools may have offered distance learning solutions that are likely heterogeneous in quality, but also pupils trained to be autonomous in their academic work may have experienced lower losses. In addition, as substantially much of the burden of children education fell on the shoulders of their parents during the lockdown, family support policies may also have played a significant (although indirect) role: when families feel that they are supported by the state (and the society at large) in their task of raising their children and that the quality of this process really matters for the society, their involvement and effort may be larger, even in such an emergency context. The opposite could be also true: when not supported by the state, parents might feel they need to compensate for state or school absenteism.

French and Italian school systems, as well as their family welfare policies, share some similarities but also have important institutional differences. French and Italian education systems are similar at a first glance. Table A1 show that they are both largely public systems (6.9% of pupils attend private schools in Italy, in France about 21.5% although almost entirely publicly funded) characterized by compulsory education until 16 years of age. Both countries have four level of education, with lower secondary education lasting three years in Italy and four in France, and higher secondary lasting five years in Italy and only three in France. Teachers have about the same starting salary (about 30K dollars PPP for kindergarten and primary education, and about 32.5K for secondary education). Despite being apparently similar, the French system achieves better results. According to the 2018 OECD PISA report French scores are larger that Italian in all subjects: reading, math, and science. French schools achieve higher attendance rates at all levels, but particularly at early ages [3] According to OECD-PISA 2018 results, Italian adolescents also have lower expectations for academic achievements: less than 30% expect to complete tertiary education, with respect to almost 40% of French students.

Italian students go to school more days during the year (200 ve 162, about 23.% more) for primary and lower secondary levels, but school days are much more concentrated, as summer holidays last 4/5 weeks more. French classes are larger by more than 4 students and in general, for all levels, French teachers have more pupils. Other characteristics of the school organization are likely to be relevant for achievement: for instance in Italian schools, children in primary and lower secondary school mantain the same teachers for the entire duration of the school level, while in France this typically does not happen, with most teachers changing every year. In addition classmates and classrooms change in France from one year to the following one, and, for older kids, even during the day. Higher secondary schools in France tend to have dedicated counselors (more than 50% versus about 10% of Italian schools) for helping kids in their transition towards tertiary education.

Public expenditure per student is larger in France (except for primary education), especially for higher secondary schools and the overall public expenditure on education is almost 50% larger in France in terms of percentage of the GDP. Finally French schools have much younger teachers: primary school teachers aged less than 30 are 12% of the total versus 1% of Italy, while the share of teachers aged 50 or more are 22% of the total versus 56% of Italy. Finally, in France many more teachers are men.

[3] Since 2019, education is compulsory from age 3.

Another important difference across the two countries is the cost of raising children, that is higher, in terms of childcare, for Italian parents Pailhé et al. (2019). This is particularly true for large families and for families with preschool children. Italian mothers adjust for this burden substituting housework with childcare and reducing more than man their leisure time. A clear indication that the French society is more gender equal in the division of childcare duties comes from the paid paternal leave allowance, that is of 28 weeks for France versus 0.8 weeks for Italy, while maternal leave is more balanced 42 weeks for France and 47.7 for Italy.

The lower cost for rising children in France is clearly related to the stronger social support to family that has a long tradition and is effective in keeping fertility rate quite high in the country [4] . Spending in family policies is one of the largest among OECD countries, accounting for about 3.7% of the GDP in 2015, which is about 50% more of the Italian expenditure (2.5% of the GDP). Child benefit is generous, especially from the third child (which is Italy is virtually absent, with some proposals being on discussion in the Parliament at the time of writing) and family policies are more gender balanced. In addition there are widespread subsidized day care centers for children aged 2 months to 3 years old with long opening hours (up to 11 h a day for day-care centres), as well as school recreation centers in all pre-schools and primary schools where children can be looked after before and after school time at a low price. On the other hand, in Italy day care centers are scarcely present in the territory, mostly relegated to the private initiative and, in some regions, quite expensive, implying that Italian parents are often forced to rely on grandparents or other informal childcare solutions, if not sacrifying their job for taking care of their children.

As to children, according to Cardoso et al. (2010) Italians tend to study more at home (about 154 minutes per day versus 93), watch less TV (99 minutes vs 118) and socialize less (38 minutes vs 52) with respect to their French counterparts. This is confirmed by more recent OECD data: Italian kids socialize less (22.9% of them do not invite friends at home to play or eat, etc. versus 13.8% of French children) and do less regular leisure activities as holidays, swimming, riding bike, football, and so on: a stunning 55% of Italian kids do not make any of these activities regularly, versus 39.3% of French kids. These figures highlights that for many Italian kids school represents the only place to develop social skills and the closure period may have had a negative impact also in this field of social capital development.

2.1 Education during the pandemic

The COVID-19 pandemic hit early both Italy and France, with the first confirmed cases in the last days of January. The contagion evolution forced both governments to act earlier with nation wide restrictive measures. In Italy, all schools closed on March 4 (some regions closed schools a couple of weeks earlier), while the French government followed early on, closing schools on March 16. By March 17 both countries had already implemented home confinement measures and by March 23 both countries had already issued travel limitations to citizens. These measures stayed in place until May 11, where both counties started removing limitations. France gradually reopened schools at the end of the lockdown, with full re-opening set on June 22. In Italy the re-opening has been set for September

[4]Fertility rate in France in 2019 stands at 1.8 children per woman, above the OECD countries average of 1.6 and well above the 1.3 children per woman registered in Italy.

14.[5]

Even with the closing of schools buildings, educational activities had been maintained by French and Italian governments. As the pandemic was not anticipated, schools and teachers from both countries benefited of some degrees of freedom regarding the implementation of distance learning methods. In Italy, schools were left to their own initiative by the government, which provided some guidance through the Ministry of Education guidelines and website and indicated which software platforms could be used. Nevertheless, schools had almost total freedom in deciding how to implement distance learning solutions. In France, the Ministry of Education early decreed "pedagogical continuity" for the pupils providing officials chatrooms and educational platforms, but, as for Italy, teachers were not obliged to use them, being free to decide what type of learning methods proposing to their students [6] For both countries, education during lockdown presents many heterogeneities related to the different schooling supply. Moreover, students not equipped with a personal laptop or smartphone or with a poor internet connection [7] experienced important difficulties in home schooling. Finally, specially for the youngest pupils, education mostly relied on parental investments. All these factors likely generated high heterogeneous impacts of schools closures on children' achievement and emotional status, as well as different behavioural reactions.

3 Data and Descriptive Analysis

We use original data, specifically designed for studying the effects of the lockdown at intrahousehold level, that we collected throught an on line questionnaire targeted to couples and families with children. [8] We started to spread our surveys in Italy on April 7 and in France on April 21. Both survey stayed available until the end of the outbreak, May 10. Final assembled data provide information on 3,352 couple with children in Italy and 2,154 in France. As the participation at the surveys was totally voluntary, they were not conducted using a sampling strategy, therefore we can not claim representativity at national levels. For Italy, thanks to the relevant sample size and the ability to reach all the regions and different socioeconomic groups, several key variables used in the analysis are in line with national statistics reported by ISTAT (see detailed information in Mangiavacchi et al. (2020)). In France, the sample is relatively well balanced at geographic level (excepted for the Paris area) and we do not exclude any social groups or parts of the population.

The survey recalls basic information on respondents' and partners' personal characteristics including gender, age, location of residence, highest level of education, marital status, and parental status. It also collects detailed information on respondents' and partners' labour market participation (i.e. previous and current employment, sector of employment, labor supply evolution and hours of teleworking) and on the division of household tasks before and during the outbreak. Surveys included a specific section on children of the household. We notably asked about the parental time use in terms of number of hours spent on active childcare and home-schooling. Parent's subjective opinions on the child's edu-

[5] Only daycare services were allowed to work, under strict restrictions, starting from July 1.

[6] For instance, the CNED platform 'Ma classe à la Maison' was used by about 24 per cent of lower secondary students.

[7] About 9 per cent of school principals declared that all or most of their students had outdated, defective or unsuitable equipment.

[8] Both surveys were jointly developed with an European team of researchers. Similar surveys were also spread in Spain, Germany and Austria. French and Italian surveys added a specific section on children time use.

cational improvement were also collected as well as emotional status and relationship between parents and children. We also asked questions on children time use before and after the closure of the schools. For instance, we have information about hours spent in studying, performing extracurricular activities, reading and watching tv (and other passive screens). Finally, we collected data about distance learning methods proposed to each child and about the availability of IT equipments as computers, pads, smartphones, and this in order to identify situations of digital divide.

Table 1: Children's samples in France and Italy - descriptive statistics

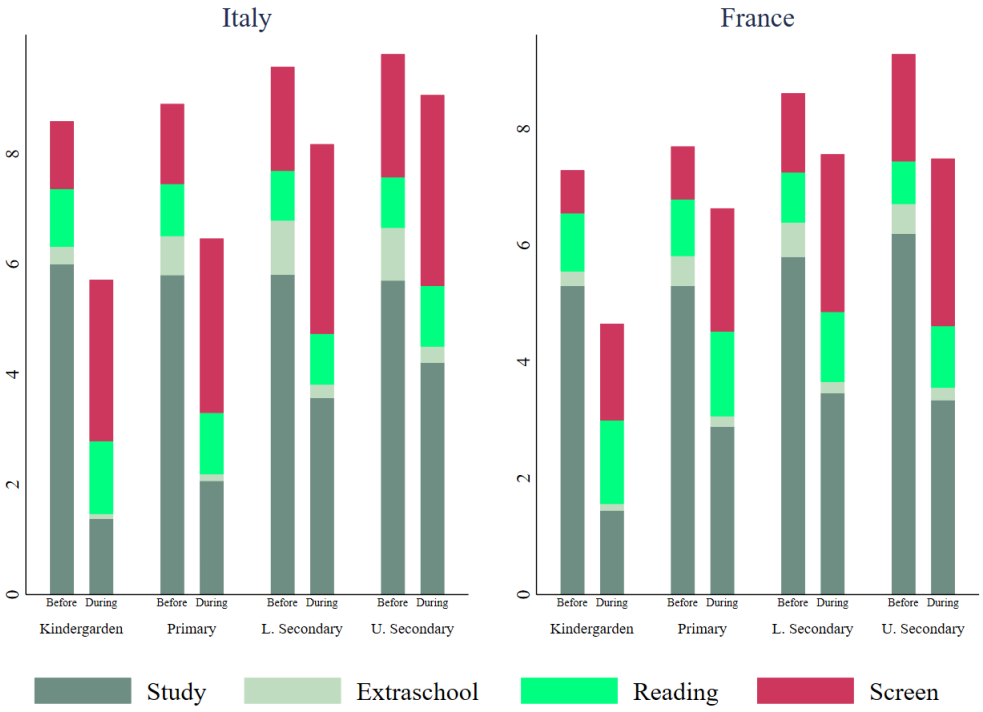
	France		Italy	
Variable	mean	sd	mean	sd
Girls	0.49	0.50	0.49	0.50
Age	9.60	3.78	7.95	3.75
Kids living in two-parents households	0.87	0.33	0.92	0.26
Kids living in one-parents households	0.13	0.33	0.07	0.26
Kids living in one-child households	0.20	0.40	0.27	0.44
Kids living in two-child households	0.52	0.50	0.56	0.50
Kids living in three-child households	0.23	0.42	0.15	0.36
Kids living in four-child households	0.04	0.19	0.01	0.12
Kids living in households with five or more kids	0.01	0.12	0.00	0.07
Kids attending kindergarden	0.25	0.43	0.32	0.47
Kids attending primary school	0.42	0.49	0.44	0.50
Kids attending lower secondary school	0.25	0.43	0.16	0.37
Kids attending upper secondary school	0.08	0.27	0.08	0.27
Age of mother	39.79	5.81	41.85	5.25
Age of father	41.98	6.56	44.47	5.90
Kids whose mother has a university degree	0.57	0.49	0.58	0.49
Kids whose father has a university degree	0.40	0.49	0.37	0.48
Kids whose mother was at home during lockdown	0.79	0.41	0.77	0.42
Kids whose father was at home during lockdown	0.63	0.48	0.52	0.50
Kids whose mother is working before lockdown	0.85	0.35	0.81	0.40
Kids whose father is working before lockdown	0.93	0.25	0.96	0.19
Kids whose mother is working during lockdown	0.70	0.46	0.55	0.50
Kids whose father is working during lockdown	0.78	0.41	0.74	0.44
Observations	3272		4477	

The two samples are composed by 3272 children in France and 4477 children in Italy summing up to a genral sample of 7749 children (see Table 1). Children are balanced on gender in both countries and bit older in France (the average age is 9.6) than in Italy (average age 7.9). 87% of children in France and 92% in Italy are living in two-parents households. More than half of the households in the two samples have two children (52% in France and 56% in Italy). The incidence of children living in families with three kids is higher in France (23% against 15%), reflecting the difference in fertility rates between the two countries (in 1.8 in France and 1.3 in Italy in 2019). Italian parents are a bit older, reflecting older age at first child of italian parents, while the incidence of mothers and fathers with university degrees and their work status before the lockdown are similar in the two countries. Our data confirm that mothers' labor supply was highly affected by lockdown, as already showed by (Del Boca et al., 2020) for Italy, by (Farré et al., 2020) for Spain and by (Andrew et al., 2020) for the UK. 1 shows

that Italian mothers were more affected than French ones: the incidence of children whose mothers is working moved from 81% to 55% in Italy , while in France from 85% to 70%.

3.1 Children's use of time during lockdown

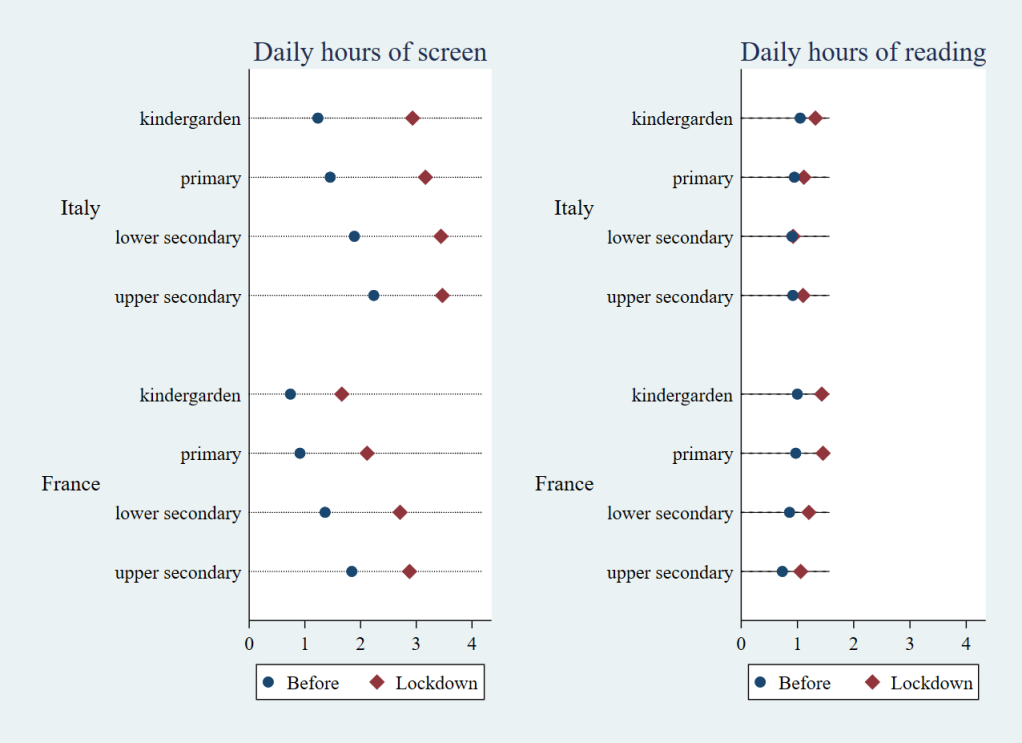
Figure 1: Children's daily activities before and during lockdown



Thanks to very detailed data on children's use of time before and after the lockdown, Figure 1 shows the evolution of typical daily activities of children. There is a clear reduction in "productive" activities (in green) from a human capital accumulation perspective, such as school, homework, and extra curricular activities in both countries. This reduction of productive time involves children of different ages and is particularly severe for children enrolled in kindergarten and primary school. The variable 'study' is not fully comparable between the two countries. For France this variable indicates daily time spent at school for the period before lockdown, and the average daily time spent studying (alone or with parents) during the lockdown. For Italy, the variable includes time spent at school before the lockdown while for the lockdown period it has been computed summing up hours of online lessons plus homeworks with parents. This variable is going to underestimate total time of studying during lockdown for secondary school pupils, who are likely to do more homeworks alone, while it is likely to well capture the time pre- and primary school pupils spent studying. According to the previuos literature (Lavy, 2015), this huge reduction in school time is likely to have a negative effect in future test scores, that would be probably higher in Italy when schools remained closed for a longer period of time. Italian children have also suffered more for the reduction in time devoted to extraschool activities that was higher in Italy before the lockdown (36 minutes per day) than in France (25 minutes per day) and was reduced to less than 10 minutes per days for both countries during lockdown. Time investments made

by children in formative activities has shown to be particularly important during adolescence (Del Boca et al., 2017; Giménez-Nadal et al., 2019). During the lockdown period children in both countries have allocated an important part of the time previously devoted to school and to extracurricula activities to screen time. Time spent watching TV on the internet (videos, socials) doubled in both countries, increasing from 1 to 2 hours on average for French kids and from 1,5 hours to 3 hours on average for the Italian ones. Although important heterogeneities exists across school levels with respect to the initial amount of screen exposition, the increase was almost the same across levels (2). (see also Andrew et al. (2020)for similar results in the UK).

Figure 2: Change in daily time devoted to reading and screen



Reading time was the only formative activity[9] that increased, although the overall difference is rather limited. Reading time was almost one hour in both countries before schools closure, in France increases up to 1 hour and 20 minutes, 10 minutes more than in Italy.

3.2 Distance learning methods and children's educational progress

Upon closure, in both countries teachers had to put in place distance learning activities, even if they were not prepared at all to that task. In both Italy and France, ministries of education provided some guidance and offered some software platforms that could be used, but schools and teachers had almost total freedom in deciding how to implement distance learning activities. This of course caused an extremely heterogeneous response [10].

[9] See Kalb and Van Ours (2014) on the importance of reading for children's cognitive development.

[10] Report xxx reports that less than 25 per cent of lower secondary school students used the CNED platform 'Ma Classe à la Maison' that was provided by French Government

Figure 3: Change in weekly hours of educational child care

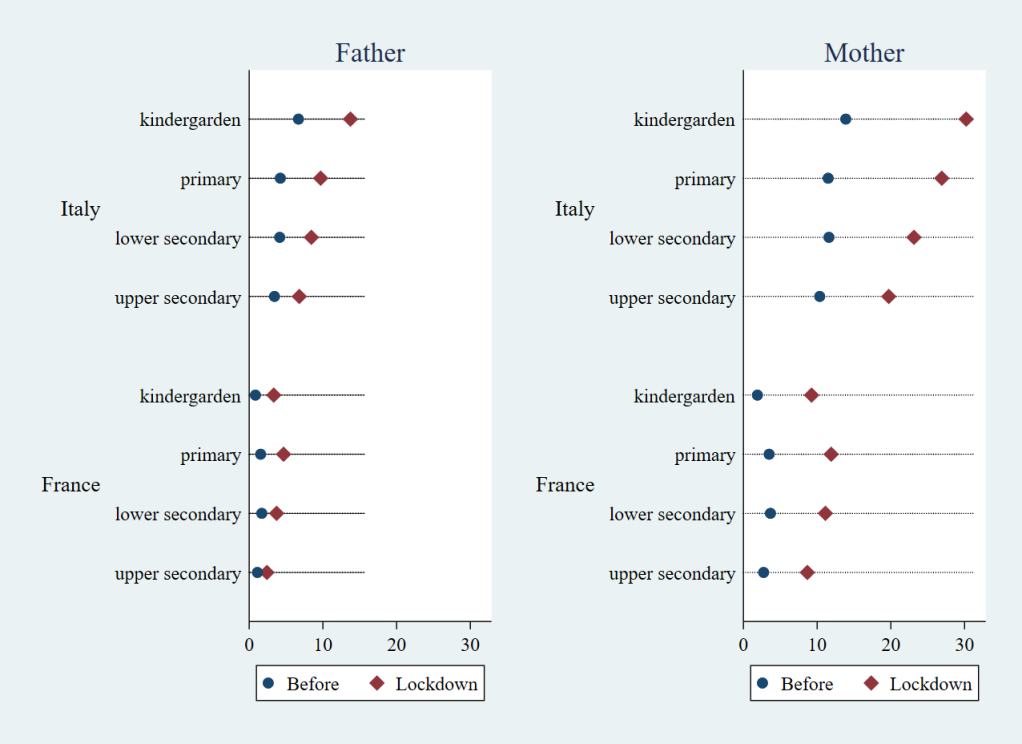
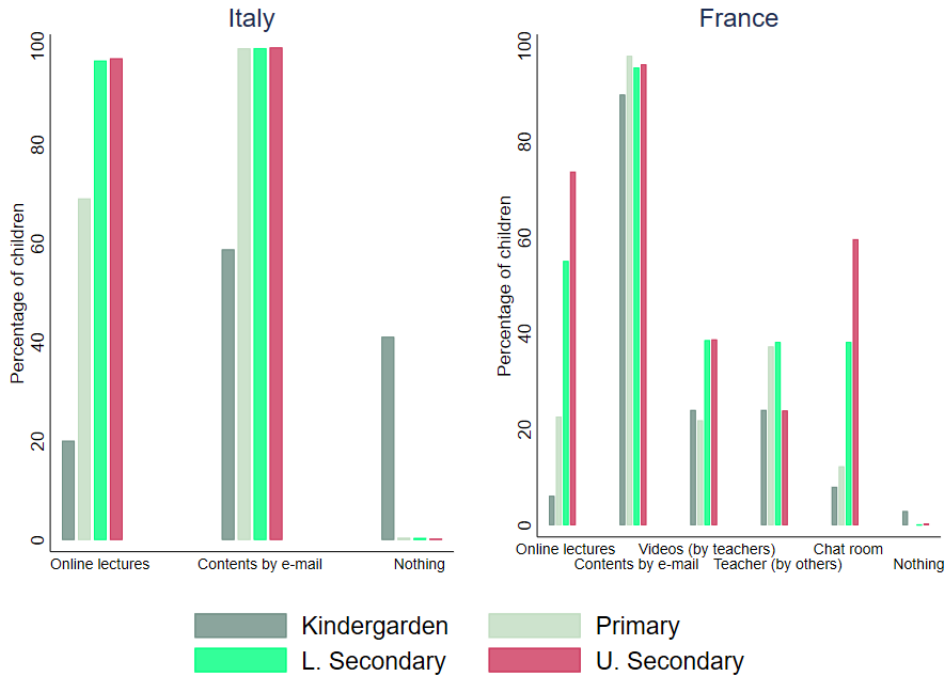


Figure 4: Distribution of different home learning resources provided by schools - by country and level



In the survey we asked parents to report which distance learning activities were implemented by their children's teachers, the number of hours of online classes and parents' perceptions about their children's learning during the lockdown. In the italian questionaire we asked parents if the the teachers (i) shared education material only by mail; (ii) also proposed online lectures; (iii) did not propose any distance learning activity. In the French questionnaire we asked more details on the activities proposed by teachers: parents had to indicate if their kids were involved in one or more than one among the following: attending online classes, participation in chats with teachers and classmates, reception of videos created by the teachers or by others, reception of educational contents by e-mail or throught a platform.

Figure 4 shows substantial differences between the two countries and across school levels. In both countries, almost all secondary school children have received contents and assignments by e-mail or throught a platform, but while in Italy almost all of them attended on line classes, the percentage of online lectures for France stands only at 70%. In primary school, almost all the children received contents by email or platform, while they were attending on-line classes in the 65% of cases for Italy and 20% of cases for France. For kindergarten, it is interesting to observe that almost 42.1 per cent of Italian kids were not involved in any activity, while only 3.6 per cent of French kids were in the same situation. Online classes are unsurprisingly less common across young children (6 per cent for France, 19 per cent for Italy), with teachers preferring less interactive distance learning methodologies.

The quality of distance learning activities seems to drive parent's evaluation of children's learning during the lockdown. Figure 5 describes a variable indicating parental judgement (from 0 to 10) on the quality of children learning with distance learning methods. When this variable takes value 10 it means that parents evaluated children's leaning with distance learning activities as good as during a normal school period. For both countries and every level, parents' judgement is worse for children who did not follow interactive lectures. In Italy parents' judgement is worse for kindergarten, primary and lower secondary children, while it is higher for upper secondary school children; conversely, in France parent's judgement is better for children at kindergarten or primary school. This can be due to several reasons: it may depend on the school inputs that, as Figure 4 shows, in France benefited more younger pupils, while in Italy secondary school students. Another possible reason might be the type of inputs received before the lockdown, France system in kindergarten and primary school prepare children to be more independent and flexible to changes (see Section 2), so French children might have better adapted to the homeschooling conditions. A third possible reason may be the level of parental stress that maybe biased parental perceptions towards a negative evaluation of their children's learning in Italy. The level of stress was likely to be higher in Italy than in France at time of the survey, when the situation in Italy was more severe in terms of number of Covid-19 cases and deaths (for the first week of May the WHO reports 137,008 cases in France and 218,268 cases in Italy).

Figure 4 also shows that, when teachers used, among others, interactive distance learning methodologies (on-line classes for Italy and online classes and live chat for France), parents' evaluation about children learning is slightly better, especially for older kids.

3.3 Parents' evaluation of children's emotional status

The COVID-19 outbreak increased stress and burden on parents and social isolation of children from their peers and teachers. This situation may also affect the socio-emotional skills of children like mental

Figure 5: Differences in learning evaluation when interactive learning resources were proposed by schools

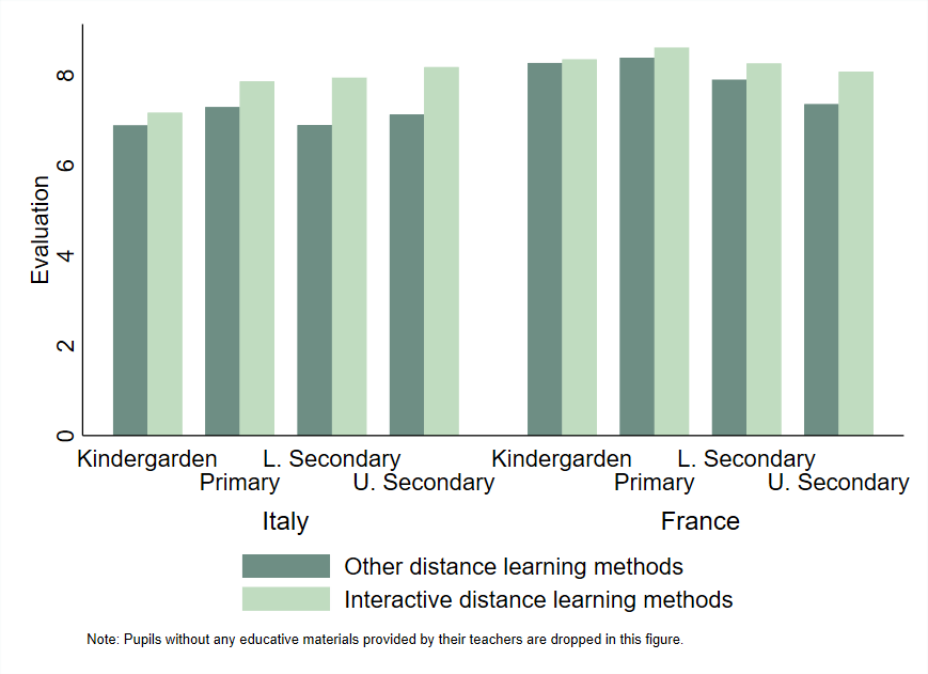
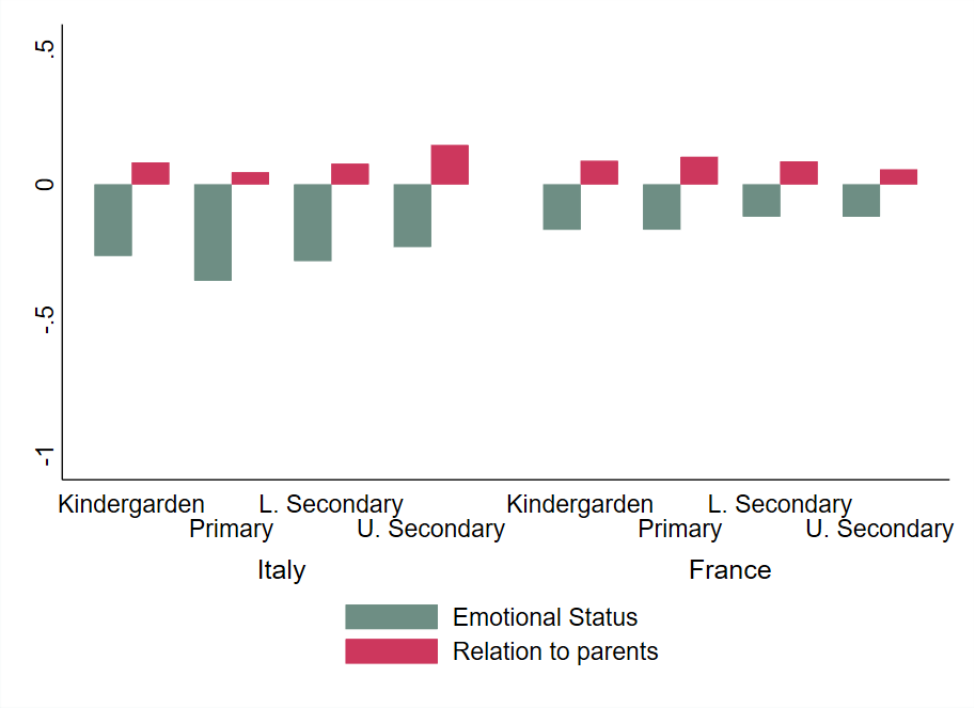


Figure 6: The evolution of emotional status and relation with parents by school level and country



health, wellbeing, and behaviour. The risk of an increase in socio-emotional problems can be higher for those living in low educated and poorest households, who have lower socio-emotional skills also in normal time (Attanasio et al., 2020). Boys are also more at risk since they are more likely to experience

behavioural issues than girls (Bertrand and Pan, 2013) as well as all adolescents. On the other hand, positive interactions between parents and children can improve socio-emotioanl skills (Moroni et al., 2019). For these reasons in the survey we asked parents to report the evolution of children's emotional status and the evolution or parent-child relationship. For both questions the response items were: "it is much worse", "it is slightly worse", "remains stable", "it is slightly better", "it is much better". We recoded the variables in order to have them at zero when the emotional status and the relation with parents were judged stable. Figure 6 plot these two variables by country. In general parents report on one hand a small reduction in children's emotional skills, on the other hand an increase in the quality of the relation with parents. Parents are more worried for younger children (those in kindergarden and primary school) comparing to those in secondary school. Italian parents appear, once more, more worried for their kids' emotional status when compared to French parents.

4 Estimation Method and Results

In this section, we analyse how the lockdown has affected children's learning process and emotional wellbeing, according to their parents' perceptions.

4.1 Estimation Methodology

For the empirical analysis we use as dependent variable in the regressions two indicators: i) parental evaluation of the child's educational progress in a 1 to 10 scale (1 for "not progressing at all" and 10 for "progressing at the same pace as when she/he was attending classes at school"); ii) parental evaluation of the child's emotional status in a -1 to 1 scale.[11] Both variables are interpreted as a variation with the lockdown, which allows us to perform fixed effect regressions of the form

$$Y_{it} = LD + FR \cdot LD + \beta X_{it} + u_i + e_{it}, \tag{1}$$

where Y_{it} is the selected outcome, LD is the impact of the lockdown in Italy on the dependent variable, and $FR \cdot LD$ is the interactive term showing the differential impact of the lockdown in France. X_{it} is a set of child-specific time-varying regressors which include the time spent in front of a screen, reading and in extra-school activities, and whether the mother and father are working. u_i represents child fixed effects. e_{it} is the idiosyncratic error. All of the regressions present standard errors clustered at region level.

To analyze the different impact that the lockdown may have on different population groups, and to avoid an excessive set of interactions, we prefer to run the same model on different sub-samples. We thus split the sample by gender, by education level attended, by education level of both parents, by both parents work status. We also separately look at children attending interactive classes or not, at children having sibling or not, and at children living with single parent.

[11] The categorical variable takes the following values: -1 for "substantially worsened"; -0.5 for "slightly worsened"; 0 for "unchanged", 0.5 for "slightly improved"; and 1 for "substantially improved". We fixed educational progresses equal to 10 and emotional status equal to 0 for the period before the lockdown. For educational progresses, this means that, by definition, coefficient can be either negative or equal to zero. The structure of our questionaire does not allow to capture an improvement in the leaning process during lockdown.

Table 2: The impact of the lockdown on education and emotional status

	Learning (1)	Learning (2)	Emotional status (1)	Emotional status (2)
Lockdown	-5.135***	-5.135***	-0.655***	-0.462***
	(0.091)	(0.138)	(0.037)	(0.051)
FrancexLockdown	1.722***	1.775***	0.349***	0.255***
	(0.114)	(0.124)	(0.045)	(0.040)
Time spent in front of screen		-0.136***		-0.063***
		(0.049)		(0.020)
Time spent in reading		0.218**		0.113***
		(0.091)		(0.027)
Time spent in extraschool activities		-0.368*		0.214***
		(0.188)		(0.040)
Mother is working		0.017		0.007
		(0.136)		(0.055)
Mother is working		0.066		0.047
		(0.127)		(0.046)
Observations	15,412	13,377	15,412	13,377
R-squared	0.818	0.826	0.582	0.615

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.2 Children's learning and emotional status during the lockdown

Table 2 presents the results of the regressions for the parental evaluation of the child's learning process (columns 1 and 2) and for her/his emotional status (columns 3 and 4), with and without covariates for the whole sample.

The negative impact of the COVID-19 lockdown on children learning has been stronger in Italy by 1.7 evaluation points in a 1 to 10 scale. The results is almost unchanged when accounting for the control variables. The increase in screen time is significantly associated to a worse evaluation of the education progresses, while the increase in the time spent reading improved parents' evaluation, with this being in line with previous literature on the impact of reading on human capital development (Kalb and Van Ours, 2014). The increase of time spent in extra-school activities is associated with a decrease in education progresses according to parents' judgment (significant only at 10%). This latter result could be driven by parents of kids who use to spend a lot of time in extra-school activities in normal times who might believe that the reduction in the time their kids devote to this kind of activities is beneficial for their learning process. Parents' work status does not significantly affect children's learning process.

A similar pattern is observed when analyzing children's emotional status: the impact is clearly negative in both countries, but it is almost twice as large in Italy. In a -1 to 1 scale, Italian kids worsened their emotional status by almost 0.5 points, while French ones only by 0.2 points. The increase in screen time has a negative association with the emotional status, while both the increase in reading and extraschool activities have a positive effect. Again, we find no evidence of a direct role of

parents' work status.

In what follows, we explore the heterogeneity in the response to the lockdown in different sub-populations. Figures 7 and 8 plot the lockdown coefficient values, as well as the 95 and 90 percent confidence intervals for learning evaluation and emotional status respectively. The coefficient is reported separately for France and Italy and for each sub-sample of the population that we examined. [12]

Looking at parents judgments, the lockdown has been more detrimental for boys than for girls in both countries. Notable differences across school levels emerge. In Italy preschoolers seem to have particularly suffered in terms of learning achievement with respect to the older kids, and, more in general, Italian parents give better evaluations to learning progresses of their older kids. For France, we do not observed the same dynamics. Parents seems quite satisfied about the learning progresses of their primary school kids, while they give worse evaluations for children in kindergarden and in secondary school. Tentative explanations for these different results can be related to the different methodologies used by teachers in the two countries. Italian secondary school pupils attended more on line classes, that seem to be quite appreciated by parents (see below), and this could have improved their parents' judgment. As pre-school pupils, the extreme negative evaluation of Italian parents can be probably explained by the fact that 40 per cent of them did not receive any learning material from their teachers during the lockdown, as presented in section 4.3 above. Looking at parents' characteristics, in France we see that when both parents were at home, as well as when they both have an university degree, they seem to be less worried about their children education. More educated parents, as well as parents who are at home during lockdown, are likely to be more comfortable in taking care about their children education. We do not observe this kind of finding in Italy. Finally, French single parents seem to be more worried about their children learning progresses, while it is not also the case for Italian ones. We do not see any differences among children with or without siblings.

When looking at the impact of lock-down on the emotional status, we see again that boys seem to suffer more than girls in both countries, according to their parents. Parents report a worse emotional status for younger children, while for kids in upper secondary school we do not observe any significant effect (this could be partly due to the larger confidence interval resulting from smaller sample size). Much of the negative effect on emotional status might probably be due to the very limited interactions with peers. For older kids, this reduction in person interaction could have been partially compensated by virtual interaction. And this could have mitigated the negative effect of lockdown on their emotional status. As for learning, we observe that university educated parents are less worried about their kids' emotional status. In particular, when mothers do not have a university degree, the worsening in the emotional status is significantly larger. Children with siblings appear to have less suffered from an emotional point of view in Italy, but not in France. Kids living with single parents present a larger decrease in their emotional status in both countries, as well as children whose parents were both working outside during lock-down.

[12] Full estimation tables are reported in Tables A2 and A3 in the Appendix.

Figure 7: The impact of the lockdown on education - different subsamples and by country

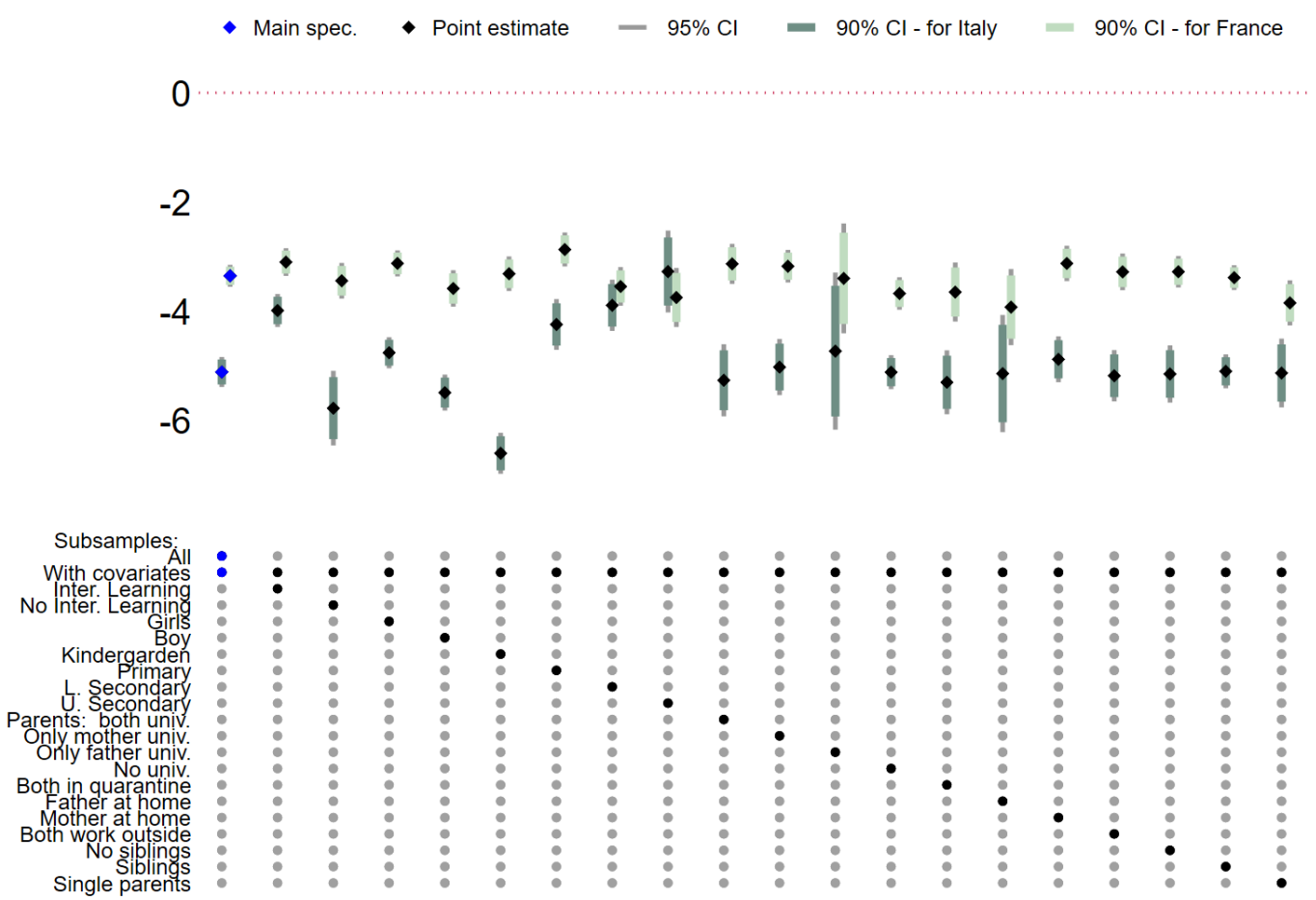
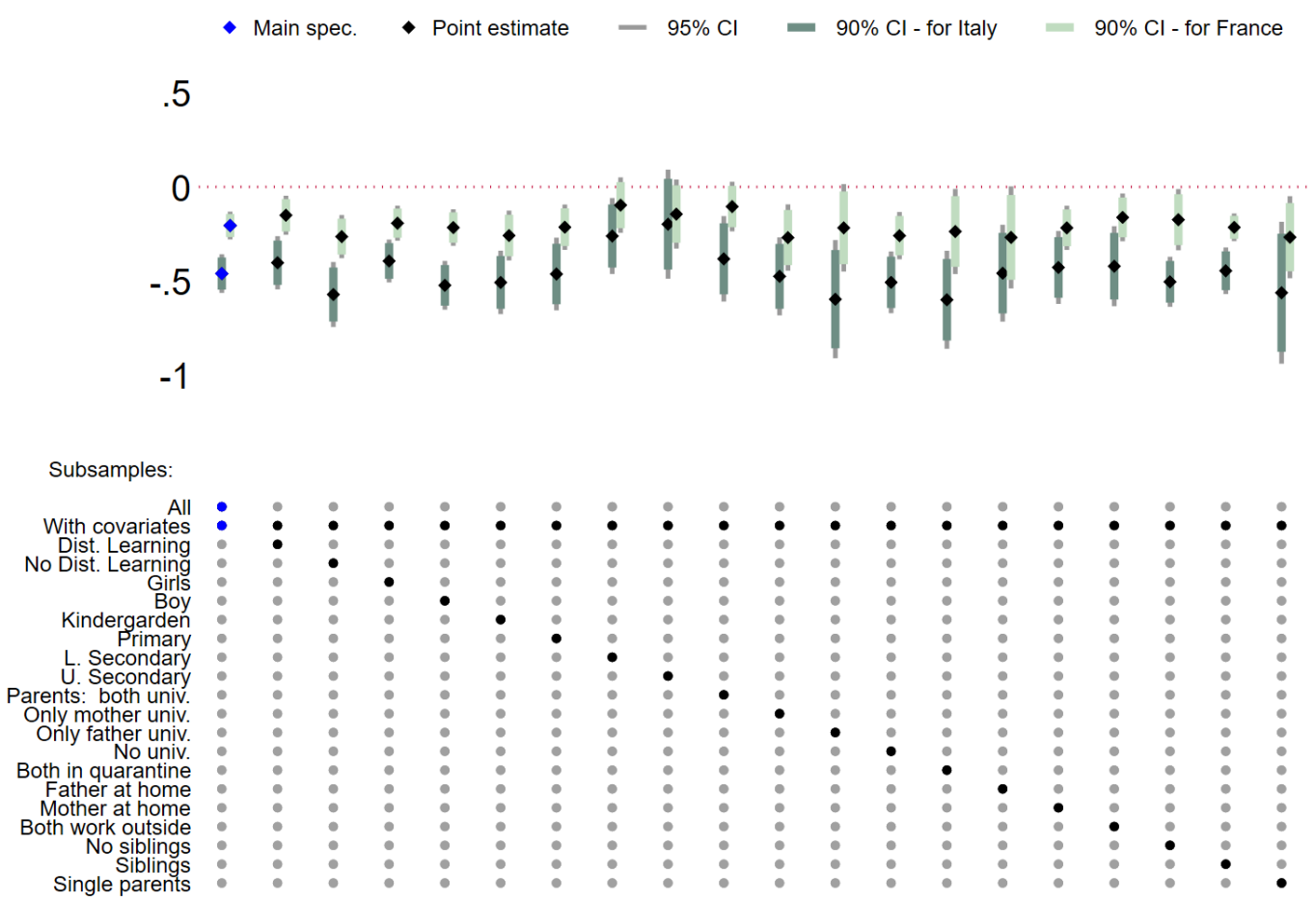


Figure 8: The impact of the lockdown on emotional status - different subsamples and by country



4.3 Distance learning methods effects

In France and in Italy, several distance learning methods have been quickly implemented just after the closure of the schools. As there were no major guidance from both governments related to the educative materials or education monitoring, teachers were relatively free to decide how to teach. In Italy, our survey collects this information using a question with three independent modalities: no materials provided by the teachers (1), materials without interactive contents (2), full or partial interactive contents (3). In the first situation, pupils had no relationship with their teachers or school and did not follow any exercise. In the second one, they were connected with the teachers using emails or internet platforms and did homework. In the last one, they both followed online lectures and received materials by emails. In France, parents can recall this information on the children's education selecting several options of distance learning. They can click on six choices: no materials provided by the teachers (1), chat room with other pupils and the teachers (2), pedagogical videos from others teachers (3), pedagogical videos from their teachers (4), materials provided by emails without interactive contents (5), online lectures (6). Putting apart the first option, the others choices are not independent and individuals can select the "chat room" option and "pedagogical videos" for example. In order to compare our results between the two countries in the regressions, we create a variable inspired by the Italian survey which differentiates if there were interactive educative contents or not during the lockdown. Therefore, we gather together in a sole modality all individuals with only emails and videos interactions from their teachers, while the individuals with at least one interactive content (online lectures or chat room) in another modality. We amend the baseline specification adding interactive variables related to learning methods and follow basic estimated fixed effects model on education level subsamples as:

$$Y_{it} = \theta LD_t + \beta_1 OnlineL_i \cdot LD_{it} + \beta_2 Homeworks_i \cdot LD_{it} + \gamma X_{it} + u_i + e_{it} \tag{2}$$

for children at kindergarden education level; and:

$$Y_{it} = \theta LD_t + \beta OnlineL_i \cdot LD_{it} + \gamma X_{it} + u_i + e_{it} \tag{3}$$

for children at primary and upper levels.[13]

Here, we denote Y_{it} the outcomes related to parents' evaluations of the education and emotional status of the child i. As variable of interest, we use raw and interacted variables with LD_t, the temporal dummy equal to one for the period during the pandemic. We interact this variable with $OnlineL_i$, representing pupils who had interactive lessons during the pandemic in Equations (3) and (4) . We also interact in Equation (3) LD_t with $Homeworks_i$, which is equal to one for pupils with educative contents but without interaction with their teachers. In Equation (3), θ captures the effect of having no educative materials provided by the teachers during the pandemic, β_1 is the differential effect from θ of having interactive learning, β_2 is the differential effect from θ of having educative contents without interaction. As we can observe in the Figure 4, there were almost any pupils at primary or upper levels who had no educative materials during the school closure, we thus decided to drop these children from our sample. Therefore in the Equation (4) the coefficient θ in front of the variable LD_t captures the effect of having educative contents without interaction during the lockdown and, β in front of the interactive term between LD_t and $OnlineL_i$ captures the differential effect from θ of having interactive lectures. X_{it} is a vector of time varying controls including work force participation of the parents and the time spent by children in front of screen, reading, or doing extraschool activities. u_i represents child fixed effects. All of the regressions present standard errors clustered at region level.

Tables 3 and 4 report estimates on children educational improvements for France and Italy, respectively. In order to make easiest the interpretation of our results, we graphically present these results in Figures 11 (a) and (b). For pupils enrolled in French kindergartens, we do not find significant differences between interactive and no interactive learning. At 95% confidence intervals, we also do not find any

[13]The choice to run estimates on different subsamples is based on the great diversities of our sample in terms of education levels and ages. We definitely do not consider as similar the learning methods and potential outcomes from different levels.

Table 3: Effects of distance learning methods on evaluation in France

	Kindergarden	Primary	Lower Secondary	Upper Secondary
	(1)	(2)	(3)	(4)
Lockdown	-5.055***	-3.178***	-4.182***	-4.693***
	(0.956)	(0.157)	(0.227)	(0.529)
Online Lectures	1.732	0.413*	0.628**	1.227**
· Lockdown	(1.115)	(0.207)	(0.255)	(0.493)
Homeworks	1.767*			
· Lockdown	(0.916)			
Work (mother)	0.0186	-0.228	-0.105	0.368
	(0.336)	(0.254)	(0.321)	(0.847)
Work (Father)	0.0876	0.262	0.0389	0.591
	(0.259)	(0.271)	(0.211)	(0.552)
Screen (Time)	-0.400**	-0.159	-0.0393	-0.273
	(0.167)	(0.121)	(0.103)	(0.278)
Read (Time)	0.618***	0.425*	0.186	0.641
	(0.176)	(0.202)	(0.173)	(0.378)
Extr. Activities (Time)	-0.274	-0.0819	-0.179	0.402
	(0.562)	(0.361)	(0.275)	(0.416)
Observations	1,447	2,395	1,351	410
R-squared	0.768	0.754	0.802	0.818
Child fixed effects	Yes	Yes	Yes	Yes

All results were estimated using fixed effects model on panel data from Italian and French 2020 Covid-19 online surveys. "Lockdown" is a dummy equal to one for the observations during the pandemic. "Online Lectures" is a dummy equal to one if the child had interactive distance lectures during the pandemic. "Homeworks" equals to one when the child had only no interactive lectures (for instance, pedagogical contents sent by emails). The column 1 is based on sample selection of children at kindergarten level. As many of pupils at this level did not receive any educative materials from their teachers, we keep all individuals of our sample. The coefficient in front of the "Lockdown" variable in Column 1 is consequently the effect of lockdown on parent's judgements of child's improvement when the child had no lectures. "Online Lectures · Lockdown " is the differential effect when the child had interactive lectures. "Homeworks · Lockdown" is the differential effect when the child had no-interactive lectures. For other estimates presented in columns 2 to 4, we exclude pupils without lectures from our sample because of the slight size of this sub-sample. The coefficients in front of "Lockdown" variable show the effects of having no-interactive lectures as compared to the differential effect of having on line lectures. We present these estimates for sub-samples of primary pupils (column 2), lower secondary pupils (column 3), upper secondary pupils (column 4).
Individual controls are the time characteristics of the child, the time spent in front of passive screen, time spent in reading or listening stories, time spent in extra-school activities. We also controls for mother and father's participation at the labor market. Each estimation controls for child individual fixed effects. Standard Errors in parentheses are clustered at region level. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

differences with no education continuity. However, we can not exclude that this result could be driven by the weak size our subsample of children with no education continuity. For Italian children at the same education level, we globally note a worst evaluation of children progresses than in France, as evidenced in the previous section. We recall that 40 per cent of Italian pre-school children did not received any pedagogical continuity. This is reflected in an extremely low evaluation of education progresses of those kids, that are significantly lower with respect to ones of pre-school kids receiving interactive and no interactive lectures. No significant differences are observed in pre-school kids attending or not on line classes. For both primary and secondary levels, our estimates indicate that interactive lectures are more profitable for education progresses than no interactive methods. The effect is particularly strong for Italian primary school kids, and for French secondary school pupils. Even if we find only a weak (and not significant for upper secondary) effect for online lectures in secondary degree in Italy, we can observe that very few students in that groups have only no-interactive lectures, so that we can not trust so much about associated standard errors.[14] To sum up, our results indicate that Italian parents are

[14]We can observe in the Figure 11 (b) that the confidence interval is larger than for other categories, meaning that few student are in this situation. The variance of the errors associated at the coefficient is consequently larger and estimates

Table 4: Effects of distance learning methods on evaluation in Italy

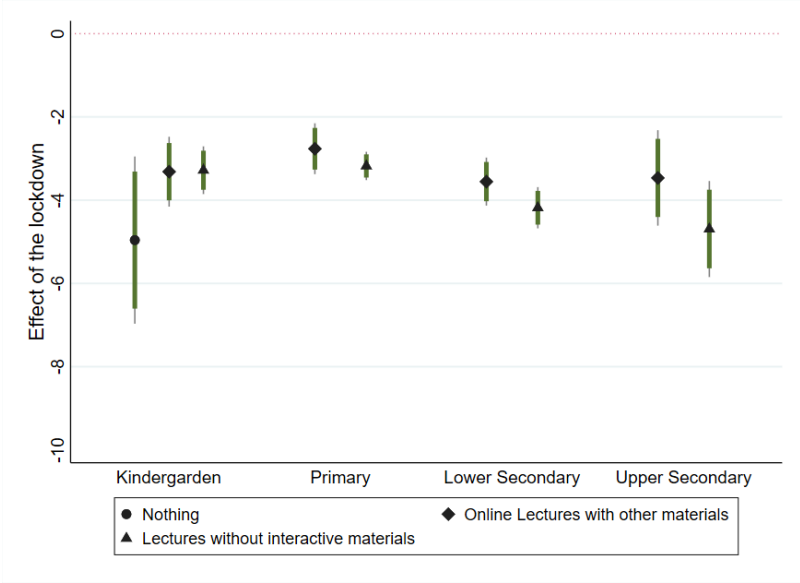
	Kindergarden	Primary	Lower Secondary	Upper Secondary
	(1)	(2)	(3)	(4)
Lockdown	-7.949***	-4.886***	-5.458***	-5.313***
	(0.286)	(0.287)	(1.011)	(1.854)
Online Lectures	2.477***	1.091***	1.735*	2.075
· Lockdown	(0.349)	(0.244)	(0.968)	(1.718)
Homeworks	1.870***			
· Lockdown	(0.349)			
Work (mother)	-0.109	0.0313	0.0774	0.478
	(0.335)	(0.235)	(0.278)	(0.354)
Work (Father)	-0.102	-0.0107	0.0946	0.340
	(0.229)	(0.137)	(0.342)	(0.403)
Screen (Time)	-0.100	-0.120	-0.0965	-0.00259
	(0.0737)	(0.0794)	(0.0744)	(0.106)
Read (Time)	0.118	0.303***	0.173	0.000497
	(0.105)	(0.105)	(0.158)	(0.175)
Extr. Activities (Time)	0.574**	0.608**	0.182	0.319
	(0.262)	(0.239)	(0.173)	(0.280)
Observations	2,137	3,404	1,170	582
R-squared	0.925	0.847	0.837	0.832
Child fixed effects	Yes	Yes	Yes	Yes

All results were estimated using fixed effects model on panel data from Italian and French 2020 Covid-19 online surveys. "Lockdown" is a dummy equal to one for the observations during the pandemic. "Online Lectures" is a dummy equal to one if the child had interactive distance lectures during the pandemic. "Homeworks" equals to one when the child had only no interactive lectures (for instance, pedagogical contents sent by emails). The column 1 is based on sample selection of children at kindergarten level. As many of pupils at this level did not receive any educative materials from their teachers, we keep all individuals of our sample. The coefficient in front of the "Lockdown" variable in Column 1 is consequently the effect of lockdown on parent's judgements of child's improvement when the child had no lectures. "Online Lectures · Lockdown " is the differential effect when the child had interactive lectures. "Homeworks · Lockdown" is the differential effect when the child had no-interactive lectures. For other estimates presented in columns 2 to 4, we exclude pupils without lectures from our sample because of the slight size of this sub-sample. The coefficients in front of "Lockdown" variable show the effects of having no-interactive lectures as compared to the differential effect of having on line lectures. We present these estimates for sub-samples of primary pupils (column 2), lower secondary pupils (column 3), upper secondary pupils (column 4).
Individual controls are the time characteristics of the child, the time spent in front of passive screen, time spent in reading or listening stories, time spent in extra-school activities. We also controls for mother and father's participation at the labor market. Each estimation controls for child individual fixed effects. Standard Errors in parentheses are clustered at region level. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

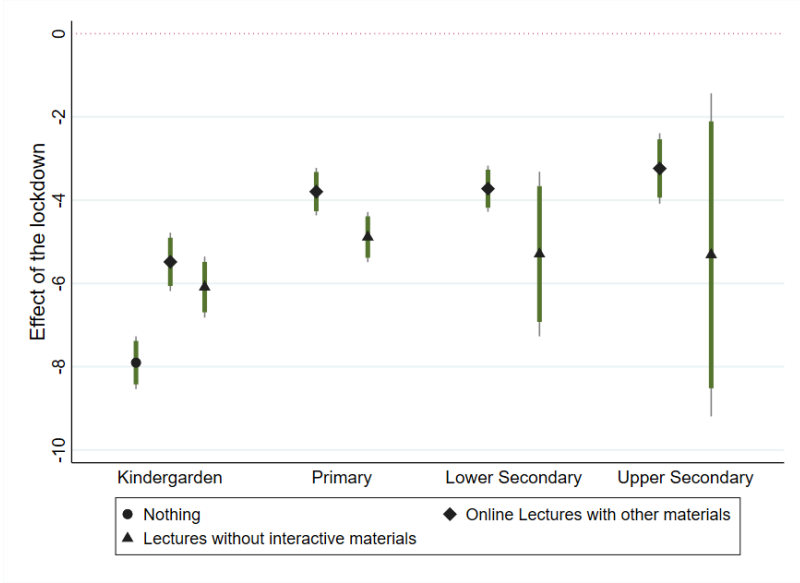
on average much worried for the learning progresses of their kids, but that the differences across the two countries become far smaller when Italian students attend online classes. This might suggest that French students are likely more independent than the Italian ones and that Italian parents are reassured when their kids have a closer contact with their teachers.

Regarding to the emotional status outcomes, results reported in Tables 5 and 6 and Figure 11 (c) show that,on average, distance learning methods do not seem to play a crucial role on psychological health. French pupils in lower secondary school and Italian kids in upper secondary school make an exception. As for the latter group, we can observe that students following online lectures do not suffer from a reduction in their emotional status different to zero, while for the ones without interactive learning methodologies, parents report a very negative and significant effect of lock-down on their psychological well-being.

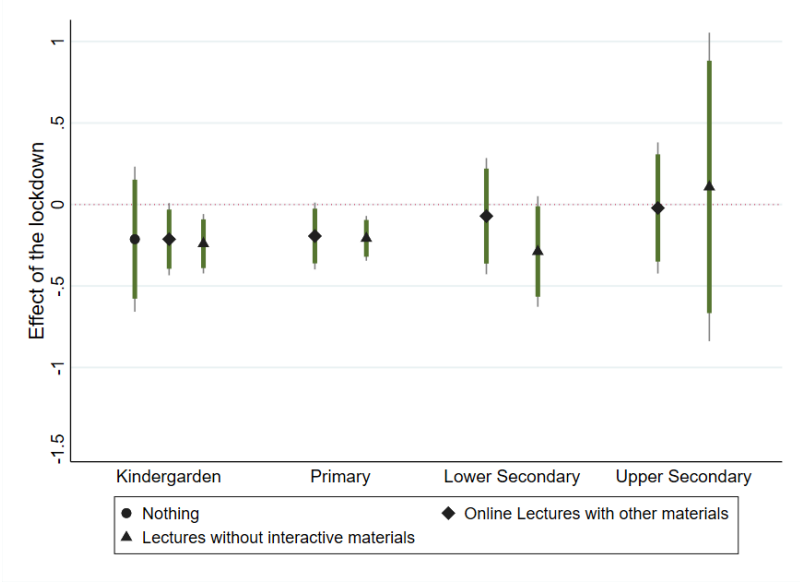
are not enough accurate.



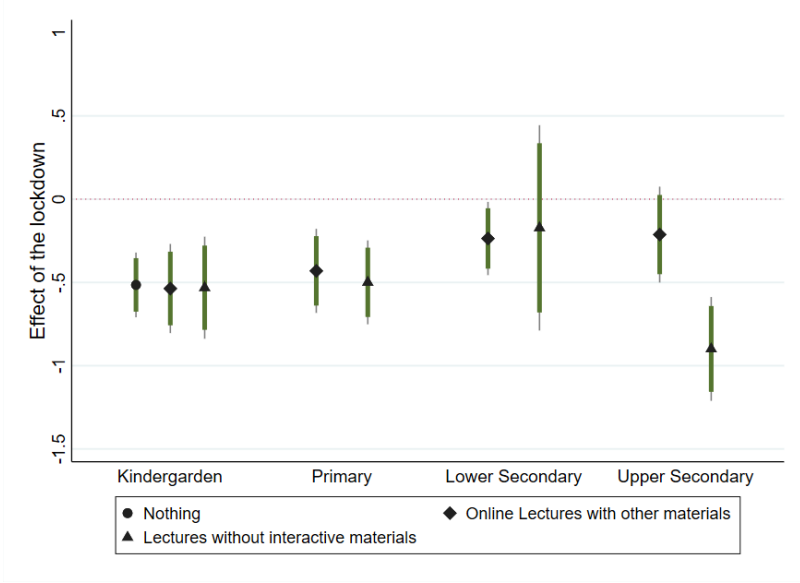
(a) Effects on educational progress [France]



(b) Effects on educational progress [Italy]



(c) Effects on emotional status [France]



(d) Effects on emotional status [Italy]

Figure 9: Effects of the distance learning methods

Table 5: Effects of distance learning methods on emotional status in France

	Kindergarden	Primary	Lower Secondary	Upper Secondary
	(1)	(2)	(3)	(4)
Lockdown	-0.281	-0.208***	-0.288*	0.108
	(0.203)	(0.0637)	(0.156)	(0.434)
Online Lectures	0.0697	0.0143	0.217***	-0.129
· Lockdown	(0.216)	(0.0761)	(0.0657)	(0.360)
Homeworks	0.0417			
· Lockdown	(0.156)			
Work (mother)	0.132	-0.0881	-0.0977	0.0926
	(0.125)	(0.115)	(0.157)	(0.314)
Work (Father)	-0.0286	0.101	0.0947	0.130
	(0.0712)	(0.0889)	(0.180)	(0.309)
Screen (Time)	-0.124**	-0.0947**	-0.0433	-0.159*
	(0.0563)	(0.0394)	(0.0631)	(0.0842)
Read (Time)	0.0760	0.0933*	0.125	0.104
	(0.0559)	(0.0492)	(0.0843)	(0.147)
Extr. Activities (Time)	0.0306	0.161*	0.230*	0.300
	(0.115)	(0.0796)	(0.123)	(0.207)
Observations	1,447	2,395	1,351	410
R-squared	0.553	0.549	0.540	0.555
Child fixed effects	Yes	Yes	Yes	Yes

All results were estimated using fixed effects model on panel data from Italian and French 2020 Covid-19 online surveys. "Lockdown" is a dummy equal to one for the observations during the pandemic. "Online Lectures" is a dummy equal to one if the child had interactive distance lectures during the pandemic. "Homeworks" equals to one when the child had only no interactive lectures (for instance, pedagogical contents sent by emails). The column 1 is based on sample selection of children at kindergarten level. As many of pupils at this level did not receive any educative materials from their teachers, we keep all individuals of our sample. The coefficient in front of the "Lockdown" variable in Column 1 is consequently the effect of lockdown on parent's judgements of child's emotional status when the child had no lectures. "Online Lectures · Lockdown " is the differential effect when the child had interactive lectures. "Homeworks · Lockdown" is the differential effect when the child had no-interactive lectures. For other estimates presented in columns 2 to 4, we exclude pupils without lectures from our sample because of the slight size of this sub-sample. The coefficients in front of "Lockdown" variable show the effects of having no-interactive lectures as compared to the differential effect of having on line lectures. We present these estimates for sub-samples of primary pupils (column 2), lower secondary pupils (column 3), upper secondary pupils (column 4).
Individual controls are the time characteristics of the child, the time spent in front of passive screen, time spent in reading or listening stories, time spent in extra-school activities. We also controls for mother and father's participation at the labor market. Each estimation controls for child individual fixed effects. Standard Errors in parentheses are clustered at region level. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

We also present estimates based on heterogeneity of distant learning methods according to the gender of the pupils. Estimations are based on previous specifications using an interactive variable with gender to capture the heterogeneous effects. All results from these estimates are graphically presented in Appendix (PRECISE). If we do not see any difference for boys and girls in primary level, we observe, in both countries, that only girls in secondary school seem to benefit from interactive distance methodology for their educational progresses, while it is not the case for boys. Conversely, only Italian boys present a better emotional status when they can assist to on line lectures.[15].

5 Conclusions

School closures, forced by the COVID-19 crisis in many countries, impacted on children's lives and their learning process. There will likely be substantial and persistent disparities between families in terms of education outcomes. This situation may also affect the socio-emotional skills of children like mental health, wellbeing, and behaviour. Distant learning solutions adopted by schools have been heterogeneous

[15]As sample sizes by level, learning methods and gender are quite small, all results of this part need to be taken

Table 6: Effects of distance learning methods on emotional status in Italy

	Kindergarden	Primary	Lower Secondary	Upper Secondary
	(1)	(2)	(3)	(4)
Lockdown	-0.511***	-0.500***	-0.111	-0.899***
	(0.0853)	(0.120)	(0.296)	(0.149)
Online Lectures	-0.0201	0.0691	-0.125	0.687***
· Lockdown	(0.0855)	(0.0592)	(0.307)	(0.160)
Homeworks	-0.0149			
· Lockdown	(0.112)			
Work (mother)	-0.0171	0.0432	0.0403	0.0164
	(0.146)	(0.0784)	(0.113)	(0.168)
Work (Father)	-0.0105	-0.0113	0.131	0.243
	(0.106)	(0.0857)	(0.0873)	(0.159)
Screen (Time)	-0.0771**	-0.0730**	-0.0216	0.00855
	(0.0348)	(0.0292)	(0.0370)	(0.0636)
Read (Time)	0.0913	0.171***	0.0900	0.120
	(0.0543)	(0.0344)	(0.0856)	(0.0776)
Extr. Activities (Time)	0.284**	0.290***	0.349***	0.321**
	(0.107)	(0.0915)	(0.119)	(0.139)
Observations	2,137	3,404	1,170	582
R-squared	0.634	0.664	0.632	0.604
Child fixed effects	Yes	Yes	Yes	Yes

All results were estimated using fixed effects model on panel data from Italian and French 2020 Covid-19 online surveys. "Lockdown" is a dummy equal to one for the observations during the pandemic. "Online Lectures" is a dummy equal to one if the child had interactive distance lectures during the pandemic. "Homeworks" equals to one when the child had only no interactive lectures (for instance, pedagogical contents sent by emails). The column 1 is based on sample selection of children at kindergarten level. As many of pupils at this level did not receive any educative materials from their teachers, we keep all individuals of our sample. The coefficient in front of the "Lockdown" variable in Column 1 is consequently the effect of lockdown on parent's judgements of child's emotional status when the child had no lectures. "Online Lectures · Lockdown " is the differential effect when the child had interactive lectures. "Homeworks · Lockdown" is the differential effect when the child had no-interactive lectures. For other estimates presented in columns 2 to 4, we exclude pupils without lectures from our sample because of the slight size of this sub-sample. The coefficients in front of "Lockdown" variable show the effects of having no-interactive lectures as compared to the differential effect of having on line lectures. We present these estimates for sub-samples of primary pupils (column 2), lower secondary pupils (column 3), upper secondary pupils (column 4).
Individual controls are the time characteristics of the child, the time spent in front of passive screen, time spent in reading or listening stories, time spent in extra-school activities. We also controls for mother and father's participation at the labor market. Each estimation controls for child individual fixed effects. Standard Errors in parentheses are clustered at region level. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

over countries, within countries and between school levels. As a consequence, most of the burden of children's learning fell on their parents, with likely uneven results depending on the socio-economic characteristics of the family. Using a real time survey data collected in April 2020 and early May in France and Italy on children's use of time, distance learning resources and emotional status, we analyse how the lockdown has affected children's use of time, their emotional wellbeing and their home learning process.

This analysis proposed children fixed effect estimates for parents' evaluations of children's learning and emotional status. Thanks to the availability of individual data collected right in the middle of the lockdown on children's time-use, home schooling and emotional status, we dispose of a large sample of children whose parents where interviewed with a live on line survey. This allows us to offer the first comprehensive evaluation of the effects of the lockdwon on children's human and social capital development. The focus of the analysis is on the ex ante institutional differences between the two countries that may have been determined both the differences in distance learning methods adopted during the lockdown and the differences in parental evaluation of children's learning and emotional status.

Results suggest that both French and Italian parents are particularly worried by their children's home learning process. In particular Italian families give a lower evaluation than French ones to pre-primary and primary school levels, while for secondary school students evaluations are very similar. As to the implementation of distance learning technologies, differences emerge mostly in the share of students that could attend online lectures, substantially larger in Italy for all school levels. Within countries, however, substantial heterogeneity exists, favoring higher grades students. Our regression results suggest that for parents attending online classes played a role in reducing the negative impact of the lockdown on the home learning process. For children's emotional wellbeing, we find that the negative impact of the lockdown has been twice as large for Italian children. In both countries, this negative effect is attenuated by spending more time reading and doing extra-school online activities, while it is amplified by spending more hours watching TV or passive screen activities (youtube, social, and similar).

In addition the analysis shows that on one hand French educational institutions and family policies make children more resilient during the lockdown and prevent parental stress. On the other hand on-line classes offered to the majority of Italian children may have attenuated their human and social capital losses during the lockdown. These preliminary findings on the impact of the lockdown on children's cognitive and non-cognitive skills have to be corroborated with an analysis of test scores evolution in the two countries during the academic year 2020-2021.

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A Supplementary material

Table A1: Institutional comparison of the French and Italian educational systems.

		France	Italy
Age of attendance			
	Kindergarten	3-5	3-5
	Primary	6-10	6-10
	Lower secondary	11-14	11-13
	Higher secondary	15-18	14-18
School days per year			
	Primary	162	200
	Lower secondary	162	200
	Higher secondary	180	200
Summer holidays			
	weeks per year	8	12/13
Class size			
	Primary	23.7	19.1
	Secondary	25.2	21
Pupils per teacher			
	Kindergarten	23.3	12.2
	Primary	19.2	11.5
	Lower secondary	14.4	11
	Higher secondary	11.4	10.4
Attendance rate (% of the same age group)			
	Nursery	56.3%	29.7%
	Kindergarten	100.0%	93.9%
	Primary	99.7%	97.4%
	Secondary	86.4%	84.8%
Students enrolled in private institutions			
	Kindergarten	13.3%	28.3%
	Primary	14.9%	6.0%
	Lower secondary	22.1%	3.6%
	Higher secondary	29.0%	8.8%
Public expenditure per pupil (thounsand US$ PPP)			
	Kindergarten	8.2	7.4
	Primary	7.6	8.0
	Lower secondary	10.6	8.9
	Higher secondary	14.1	9.4
Public expenditure			
	Share of total public expenditure	10.8%	8.9%
	Percentage of the GDP	3.7%	2.5%
Starting salary of teachers (thounsand US$ PPP)			
	Kindergarten	30.9	30.4
	Primary	30.9	30.4
	Lower secondary	32.5	32.7
	Higher secondary	32.5	32.7
Share of female teachers			
	Kindergarten	89.4%	98.7%
	Primary	83.5%	93.6%
	Lower secondary	60.5%	76.7%
	Higher secondary	59.8%	66.2%
Distribution of primary school teachers by age class			
	Less than 30	12%	1%
	30-39	33%	11%
	40-49	34%	32%
	50 or more	22%	56%
PISA scores			
	Reading	493	476
	Math	495	487
	Science	493	468

Source: OECD.stat, Eurydice, PISA-OECD (last available year, most figures refer to 2017 or 2018)

Table A2: Full estimates by sub-samples (FE regressions)- learning evaluation

Outcome learning

	(3) Interactive learning	(4) No interactive learning	(5) Girls	(6) Boys	(7) Kindergarden	(8) Primary school	(9) Lower Secondary school	(10) Upper secondary school	(11) Both parents with university education	(12) Only mother with university education	(13) Only father with university education	(14) Both parents without university education	(15) No parents at home	(16) Only father at home	(17) Only mother at home	(18) Both parents at home	(19) Single child	(20) Child with siblings	(21) Single parent household
Lockdown	-3.976***	-6.604***	-4.786***	-5.508***	-6.619***	-4.251***	-3.899***	-3.280***	-5.290***	-5.048***	-4.740***	-5.131***	-5.322***	-5.152***	-4.902***	-5.207***	-5.168***	-5.123***	-5.152***
	(0.151)	(0.214)	(0.143)	(0.165)	(0.193)	(0.229)	(0.230)	(0.369)	(0.332)	(0.256)	(0.715)	(0.155)	(0.291)	(0.534)	(0.208)	(0.234)	(0.262)	(0.154)	(0.308)
FrancexLockdown	0.886***	3.106***	1.654***	1.917***	3.295***	1.374***	0.346	-0.476	2.148***	1.871***	1.335**	1.444***	1.651***	1.220***	1.765***	1.925***	1.886***	1.728***	1.293***
	(0.155)	(0.167)	(0.145)	(0.167)	(0.172)	(0.152)	(0.224)	(0.334)	(0.292)	(0.169)	(0.526)	(0.177)	(0.300)	(0.385)	(0.168)	(0.214)	(0.239)	(0.142)	(0.279)
Time spent in front of screen	-0.135***	-0.102	-0.187**	-0.092	-0.192**	-0.121*	-0.091	-0.043	-0.209***	-0.184*	-0.189	-0.061	-0.095	-0.143	-0.220**	-0.090	-0.098	-0.147**	-0.059
	(0.043)	(0.079)	(0.074)	(0.065)	(0.077)	(0.060)	(0.062)	(0.098)	(0.065)	(0.099)	(0.139)	(0.057)	(0.102)	(0.186)	(0.097)	(0.082)	(0.073)	(0.057)	(0.107)
Time spent in reading	0.237**	0.293**	0.155	0.277***	0.273*	0.350***	0.187	0.181	0.221*	0.317**	-0.098	0.232	0.251	0.327	0.197*	0.185	0.058	0.253**	0.312
	(0.088)	(0.130)	(0.112)	(0.095)	(0.137)	(0.096)	(0.120)	(0.188)	(0.114)	(0.141)	(0.188)	(0.139)	(0.252)	(0.276)	(0.117)	(0.111)	(0.141)	(0.098)	(0.230)
Time spent in extraschool activities	0.133	-0.249	-0.197	-0.578**	0.360	0.407*	0.036	0.320	-0.584**	-0.182	-0.558	-0.335	-0.281	-0.539	-0.295	-0.474**	-0.137	-0.440**	0.096
	(0.143)	(0.207)	(0.169)	(0.237)	(0.250)	(0.231)	(0.143)	(0.228)	(0.218)	(0.303)	(0.615)	(0.266)	(0.240)	(0.345)	(0.263)	(0.233)	(0.361)	(0.185)	(0.316)
Mother is working	0.121	-0.127	-0.026	0.046	-0.080	-0.084	-0.035	0.430	-0.017	-0.104	0.490	0.014	0.022	-0.091	0.251	-0.051	-0.101	0.038	
	(0.183)	(0.201)	(0.188)	(0.175)	(0.292)	(0.190)	(0.206)	(0.337)	(0.229)	(0.257)	(0.645)	(0.166)	(0.725)	(0.677)	(0.253)	(0.207)	(0.323)	(0.149)	
Father is working	0.144	-0.102	0.075	0.073	-0.005	0.109	0.099	0.374	0.058	0.134	-0.249	0.018	0.625	0.086	-0.008	0.094	0.385	-0.055	
	(0.189)	(0.184)	(0.181)	(0.166)	(0.196)	(0.149)	(0.203)	(0.333)	(0.452)	(0.236)	(0.667)	(0.156)	(0.522)	(0.345)	(0.420)	(0.179)	(0.328)	(0.136)	
Parent is working																			-0.095
																			(0.410)
Observations	6,691	6,680	6,560	6,817	4,050	5,809	2,524	994	4,294	3,574	796	4,655	1,606	1,368	4,465	5,918	2,912	10,465	1,434
R-squared	0.817	0.864	0.818	0.835	0.892	0.818	0.817	0.818	0.825	0.836	0.809	0.827	0.851	0.823	0.825	0.822	0.842	0.822	0.824

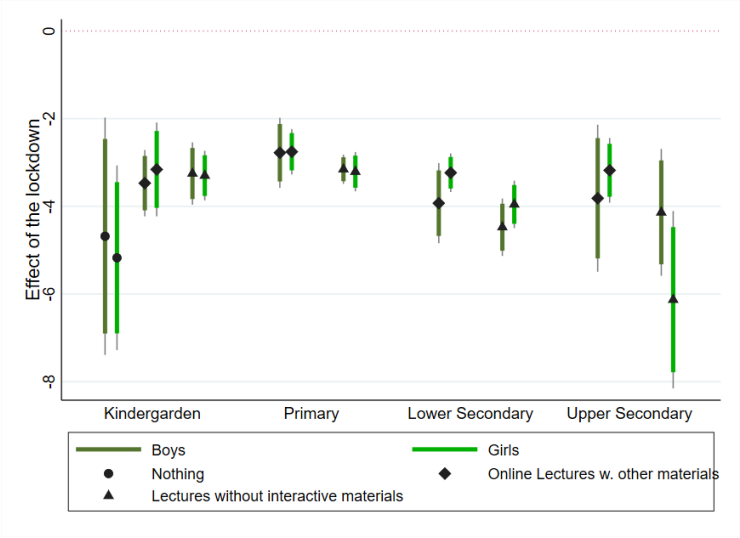
Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3: Full estimates by sub-samples (FE regressions)- emotional status

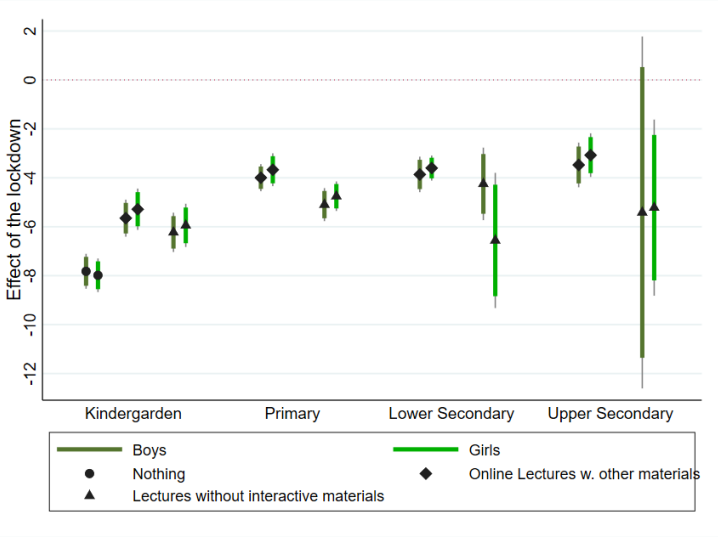
Outcome emotional status

VARIABLES	(3) Interactive learning	(4) No interactive learning	(5) Girls	(6) Boys	(7) Kindergarden	(8) Primary school	(9) Lower Secondary school	(10) Upper secondary school	(11) Both parents with university education	(12) Only mother with university education	(13) Only father with university education	(14) Both parents without university education	(15) No parents at home	(16) Only father at home	(17) Only mother at home	(18) Both parents at home	(19) Single child	(20) Child with siblings	(21) Single parent household
Lockdown	-0.407***	-0.520***	-0.394***	-0.525***	-0.511***	-0.463***	-0.262**	-0.198	-0.382***	-0.476***	-0.597***	-0.510***	-0.602***	-0.459***	-0.430***	-0.421***	-0.505***	-0.447***	-0.562***
	(0.071)	(0.072)	(0.057)	(0.064)	(0.087)	(0.095)	(0.099)	(0.142)	(0.113)	(0.103)	(0.156)	(0.081)	(0.129)	(0.128)	(0.095)	(0.105)	(0.068)	(0.062)	(0.184)
FrancexLockdown	0.257***	0.296***	0.200***	0.307***	0.249***	0.248***	0.166**	0.054	0.277***	0.203**	0.379**	0.251***	0.369**	0.190	0.211***	0.257***	0.330***	0.231***	0.294*
	(0.061)	(0.049)	(0.047)	(0.051)	(0.075)	(0.061)	(0.070)	(0.138)	(0.075)	(0.079)	(0.139)	(0.073)	(0.135)	(0.152)	(0.066)	(0.083)	(0.091)	(0.043)	(0.153)
Time spent in front of screen	-0.056**	-0.074***	-0.078***	-0.051**	-0.087***	-0.078***	-0.031	-0.013	-0.082**	-0.057	-0.023	-0.056**	-0.041	-0.083	-0.076***	-0.058*	-0.046	-0.068***	-0.012
	(0.024)	(0.022)	(0.022)	(0.025)	(0.031)	(0.024)	(0.032)	(0.057)	(0.032)	(0.047)	(0.056)	(0.026)	(0.032)	(0.062)	(0.024)	(0.033)	(0.032)	(0.019)	(0.043)
Time spent in reading	0.131***	0.093***	0.108**	0.118***	0.097**	0.143***	0.113*	0.094	0.077	0.147***	0.019	0.133***	0.114	0.244***	0.095*	0.091**	0.075	0.122***	0.027
	(0.036)	(0.031)	(0.042)	(0.037)	(0.046)	(0.031)	(0.066)	(0.068)	(0.054)	(0.051)	(0.089)	(0.038)	(0.069)	(0.067)	(0.052)	(0.038)	(0.044)	(0.033)	(0.082)
Time spent in extraschool activities	0.241***	0.231***	0.235***	0.193***	0.234**	0.251***	0.312***	0.325***	0.212**	0.201**	0.091	0.238***	0.225**	0.084	0.229***	0.211***	0.212*	0.216***	0.191
	(0.054)	(0.061)	(0.051)	(0.058)	(0.098)	(0.066)	(0.092)	(0.116)	(0.079)	(0.080)	(0.140)	(0.071)	(0.096)	(0.101)	(0.069)	(0.057)	(0.106)	(0.053)	(0.140)
Mother is working	-0.003	0.012	0.081	-0.059	0.020	-0.001	-0.031	0.021	0.018	-0.115	0.086	0.046	-0.142	0.031	0.068	-0.025	0.026	-0.006	
	(0.059)	(0.093)	(0.065)	(0.083)	(0.117)	(0.063)	(0.095)	(0.141)	(0.100)	(0.098)	(0.136)	(0.066)	(0.414)	(0.325)	(0.075)	(0.084)	(0.092)	(0.058)	
Father is working	0.072	0.015	0.053	0.044	-0.012	0.029	0.122	0.208	-0.007	0.051	0.033	0.026	0.165	0.081	0.067	0.083	0.153*	0.006	
	(0.056)	(0.067)	(0.074)	(0.062)	(0.072)	(0.066)	(0.095)	(0.158)	(0.153)	(0.124)	(0.132)	(0.070)	(0.343)	(0.140)	(0.150)	(0.065)	(0.085)	(0.066)	
Parent is working																			0.012
																			(0.145)
Observations	6,691	6,680	6,560	6,817	4,050	5,809	2,524	994	4,294	3,574	796	4,655	1,606	1,368	4,465	5,918	2,912	10,465	1,434
R-squared	0.614	0.620	0.613	0.618	0.620	0.636	0.595	0.585	0.600	0.616	0.613	0.629	0.648	0.624	0.625	0.599	0.635	0.610	0.583

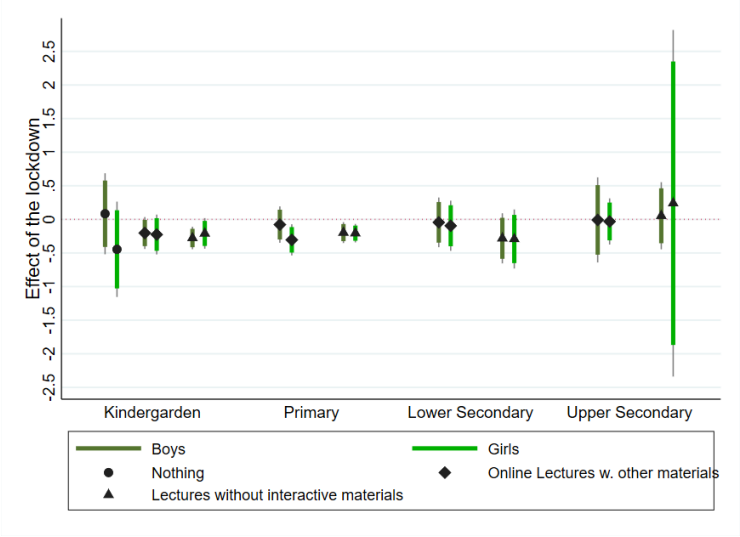
Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$



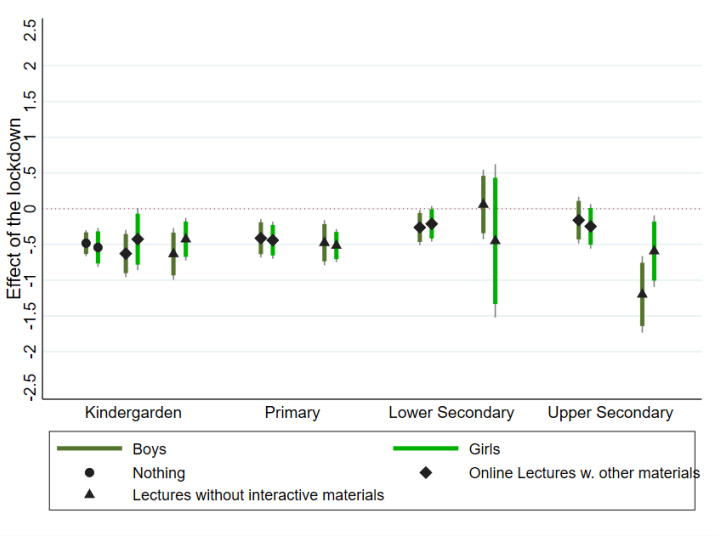
(a) Effects on educational progress [France]



(b) Effects on educational progress [Italy]



(c) Effects on emotional status [France]



(d) Effects on emotional status [Italy]

Table A4: Effects of the distance learning methods by gender