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Learning at Home: Distance Learning Solutions and Child Development during the COVID-19 Lockdown

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DISCUSSION PAPER SERIES

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the COVID-19 Lockdown**

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ABSTRACT

Learning at Home: Distance Learning Solutions and Child Development during the COVID-19 Lockdown*

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 educational 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, we estimate child fixed effects models to analyze how the lockdown has affected children's emotional wellbeing and their home learning process. 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 effect on boys, on kids attending kindergarten (in Italy) or secondary school (in France), and on children whose parents have a lower education level. We also find that the increase in the time spent in front of screen is correlated to a worse learning achievement and emotional status, while the opposite is true for the time spent reading. The use of interactive distance learning methodologies, that has been much more common in Italy than in France, appears to significantly attenuate the negative impact on lockdown on the learning progresses of both Italian and French kids.

JEL Classification: I24, J13, J24

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

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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.

The current paper aims at analysing at an early stage how the COVID-19 lockdown 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 lockdown, 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 lockdown so that adapted educational program could be offered them in the medium and the long run.

To address these research questions and to identify policy priorities, we explore the time use of Italian and French kids during lockdown through a descriptive analysis and we estimate child 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 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 real time online survey. This allows us to offer the first comprehensive evaluation of the effects of the lockdown on children’s learning and contribute to the few emerging studies that already analyzed the heterogeneity of home schooling experienced by families during the lockdown, in different countries. [Burgess and Sievertsen \(2020\)](#) for instance describe the possible effects of the outbreak for children’s education. [Andrew et al. \(2020\)](#) collected data on children aged 4-15 between April 29 and May 12 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 emotional status and the quality of time-use of Italian kids improved when fathers were more involved in childcare.

The cross-country focus on France and Italy is noteworthy since both countries were hugely affected by COVID-19 and their school systems are mostly public. This implies that the analysis would not be severely confounded by children’s enrolment in private schools that are more likely to have better educational technologies, as shown for the UK ([Andrew et al., 2020](#)). At the same time, the comparison between France and Italy is interesting because their educational systems differ in terms of both policy priority and results ([Woessmann, 2016](#)), and in the way distance learning resources has been provided

¹According to the UNESCO, up to 192 simultaneous country-wide closures have affected 91.2% of world’s student population at the beginning of April (source: UNESCO Institute for Statistics Database, COVID-19 Impact on Education).

during the crisis. They also differ in the duration of school closure: Italy started on March 4 2020, keeping school closed until the end of the academic year; 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 analyses 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. For instance, Jaume and Willén (2019) found that, being exposed to the average incidence of strikes during primary school, reduces labour 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 lockdown 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. It is thus meaningful to study 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 (Walsh et al., 2018), 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 lockdown. This allows us evaluating how children reacted to the lockdown 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 parents’ perceptions about the effectiveness of 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), showing a mixed evidence on the effects of online classes on achievement comparing to traditional lectures. On the differences among alternative online learning solutions, Figlio et al. (2013) analysed 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 lockdown obliged all teachers to suddenly adopt distance learning strategies, but often without

²According to the OECD family database for 2015, France spends 3.7% of GDP in family policies, while Italy only 2.5%.

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 setup 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.

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 when French parents are highly educated or they were at home during the lockdown. As to children's emotional wellbeing, the negative effect of the lockdown that we estimate on the basis of parents' perceptions is twice as large for Italian children. We estimate that both French and Italian kids increased the time spent reading by 0.3 hours on average, and the time spent in front of screen (out of classes) by 1.3 hours on average during lockdown. The negative effects of lockdown on both children learning and emotional status is attenuated when children spend more time reading, while it is amplified when they spend more hours watching TV or in passive screen activities (youtube, socials, and similar). Our regression results suggest that younger kids (aged 3-6) suffered more from the lockdown, both in terms of learning achievement and emotional status, in particular in Italy, where 40 per cent of them did not receive any type of distance learning support from their teachers. Kids attending secondary schools also experienced important losses in terms of learning achievement when they could not attend online classes, and this is particularly evident in France, where almost 30 per cent of them did not benefit from interactive distance learning methods. In general, the use of interactive methods seem to attenuate the negative evaluation parents give on the lockdown effects. It is interesting to observe that 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.

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 lockdown. Section 4 presents the estimation strategy and the results of the analysis of the effect of lockdown 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, but 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 absenteeism.

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 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 than Italian in all subjects: reading, maths, and science. French schools achieve higher attendance rates at all levels, but particularly at early ages.³ 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 vs 162, about 23.5% 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 most children in primary and lower secondary school maintain 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, and, for older kids, even during the day. Higher secondary schools in France tend to have dedicated counsellors (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.

Another important difference across the two countries is the cost of raising children, that is higher, in terms of childcare, for Italian parents. 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 (Pailhé et al., 2019). 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

³Since 2019, education is compulsory from age 3.

⁴Fertility rate in France in 2019 stands at 1.8 children per woman, above the OECD countries average of 1.6 and well

largest among OECD countries, accounting for about 3.7% of the GDP in 2015, which is about 50% larger than the Italian expenditure (2.5% of the GDP). Child benefit is generous, especially from the third child (which in Italy is virtually absent, with some proposals being discussed in the Parliament at the time of writing). 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 stay 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 sacrificing their job for taking care of their children.⁵

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 relevant 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 early 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, when 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 schools started straight after summer holidays, that is on September 14 for most regions.⁶

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 if and 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

above the 1.3 children per woman registered in Italy.

⁵According to the European Platform for Investing in Children (EPIC), in 2018 in Italy only 25.7% of children aged 0-3 attended formal ECEC, while the figure almost doubles, reaching 50.0% in France. As to kindergarten age, the enrolment rate is much larger in both countries, 91.0% in Italy and 94% in France.

⁶Only daycare services were allowed to work, under strict restrictions, starting from July 1.

use them, being free to decide what type of learning methods proposing to their students.⁷

In both countries, children differ in terms of IT equipment availability,⁸ in terms of parental investment (that could depend on parents' level of education and working status during lockdown) and on the types of distance learning they benefited from during lockdown. All these factors likely generated high heterogeneous impacts of schools closures on children' learning 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 through a real-time online questionnaire targeted to families.⁹ We started to spread our surveys in Italy on April 7 and in France on April 21. Both survey have been available until the end of the outbreak, on May 10. Final assembled data provide information on 3,352 families 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 socio-economic groups, the geographical and family type distributions are in line with national statistics reported by ISTAT (see Table A2, Panel A). The only notable exceptions are for the South of Italy, which is slightly under-represented, and the share of mono-parental households, which is strongly under-represented. The situation is similar for France: the sample is relatively well balanced at geographical level (excepted for the Paris area) while single parents are still under-represented (see Table A2, Panel B).

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, labour 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 living in the household. We 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 educational improvement during lockdown 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. In particular, we collected 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 equipment as computers, pads, smartphones, and this in order to identify situations of digital divide.¹⁰

⁷For instance, the CNED platform 'Ma classe à la Maison' was used by about 24 per cent of lower secondary students (DEPP, 2020).

⁸About 9 per cent of school principals declared that all or most of their students had outdated, defective or unsuitable equipment (DEPP, 2020)

⁹Both surveys were jointly developed with an European team of researchers. Similar surveys were also spread in Spain (Lidia Farré and Libertad Gonzales), Germany (Christiane Schwieren) and Austria (Doris Weichselbaum). French and Italian surveys added a specific section on children.

¹⁰For France, just 0.5% of primary and secondary school children do not have access to IT equipment. While in Italy the figure rises to about 9%, we do not observe significant differences in the impact of the lockdown with respect to the rest of the sample.

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

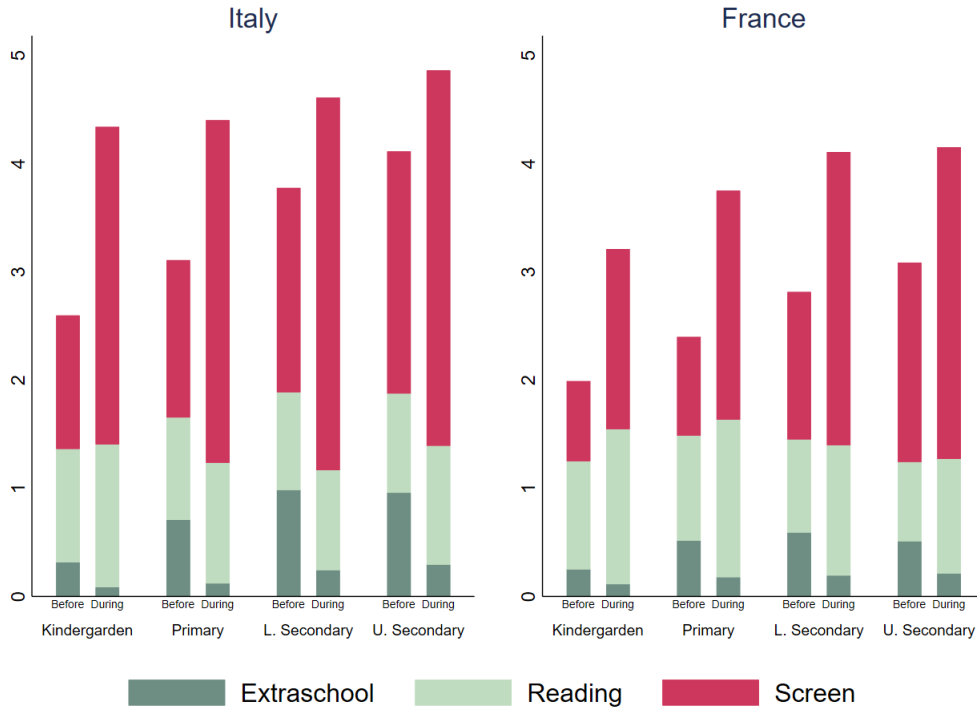
Variable	France		Italy	
	mean	sd	mean	sd
Girls	0.49	0.50	0.49	0.50
Age	9.60	3.78	7.95	3.75
Kids living in two-parents households	0.87	0.33	0.92	0.26
Kids living in one-parents households	0.13	0.33	0.07	0.26
Kids living in one-child households	0.20	0.40	0.27	0.44
Kids living in two-child households	0.52	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 kindergarten	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 general sample of 7749 children (see Table 1). Children are balanced on gender in both countries and a 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 kids live in two-children households (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. 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’ labour supply was highly affected by lockdown, as already showed by [Del Boca et al. \(2020\)](#) and [Mangiavacchi et al. \(2020\)](#) for Italy, by [Farré et al. \(2020\)](#) for Spain and by [Andrew et al. \(2020\)](#) for the UK. Table 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 shows the evolution of time devoted to three relevant daily activities of children: extraschool activities, reading and screen time. Colour green is assigned to “productive” activities in a human

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



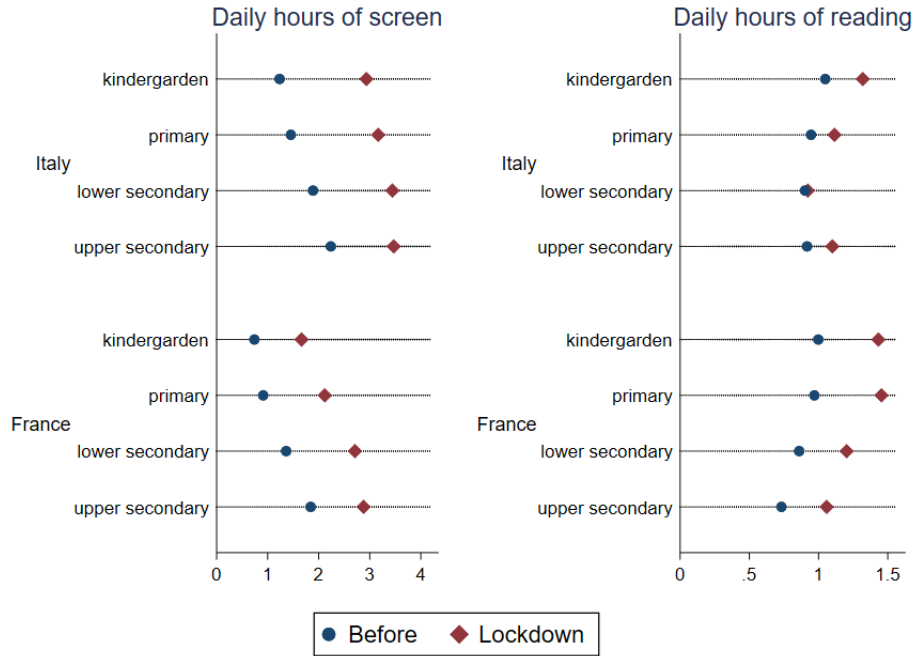
capital accumulation perspective.¹¹ Time investments made by children in productive activities has shown to be particularly important during adolescence (Del Boca et al., 2017; Giménez-Nadal et al., 2019). During lockdown, we observe the expected strong reduction in extraschool time, that reduced to less than 10 minutes per day for both countries during lockdown. This reduction seems to hit more Italian kids, since they spent more time on those activities before the lockdown (36 minutes per day vs 25 minutes per day in France). The reduction in the time spent in extraschool activities is compensated by an increase in reading time in France. In Italy this compensation is observed only for pre-school children, where reading is performed by parents, which implies a reduction on overall productive time for all other kids.¹²

During the lockdown period children in both countries have allocated to passive screen an important part of the time previously devoted to school. Time spent watching TV or 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. Figure 2 shows that although important heterogeneity exists across school levels with respect to the initial amount of screen exposition, the increase was almost the same across levels (see also Andrew et al., 2020, for similar results in the UK).

¹¹The figure do not report the reduction in school hours, which is self-evident. According to the previous literature (Lavy, 2015), this huge reduction in school time is likely to have a negative effect in future test scores, that would be probably larger in Italy where schools remained closed for a longer period of time.

¹²Reading 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. See Kalb and Van Ours (2014) on the importance of reading for children’s cognitive development.

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



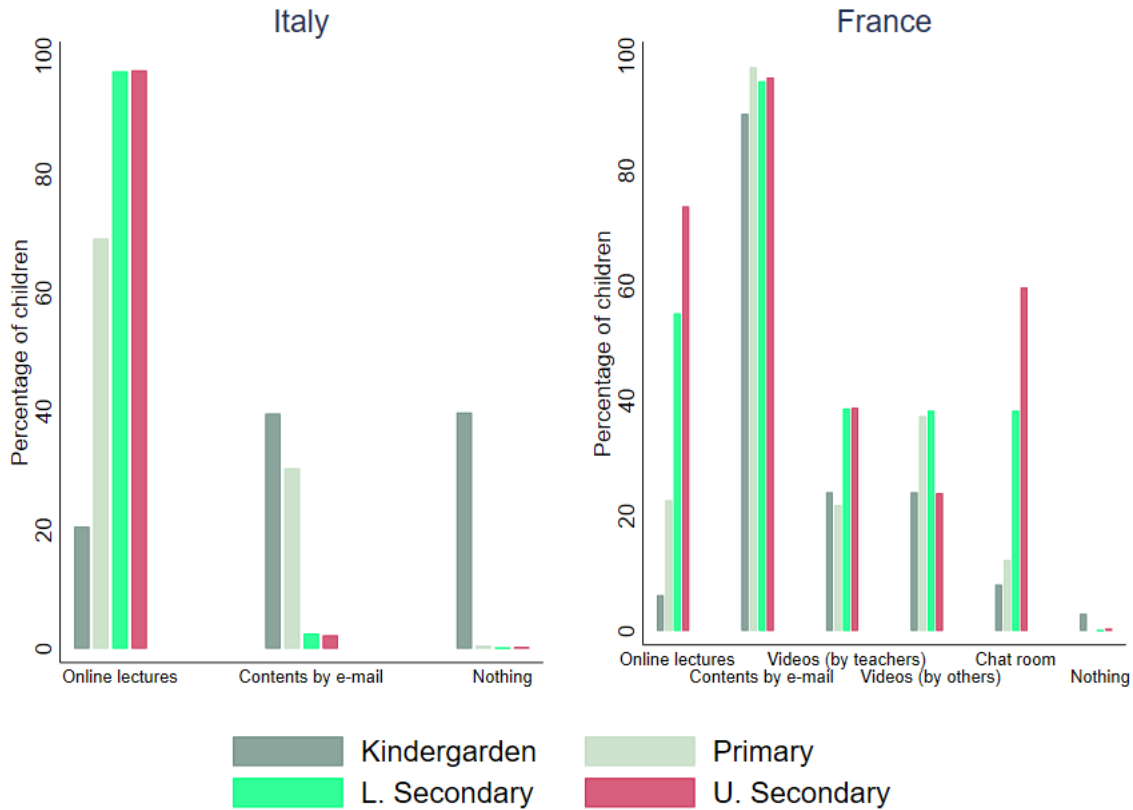
3.2 Distance learning methods and children’s educational progress

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. 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 if and how to implement distance learning activities. This of course caused an extremely heterogeneous response [DEPP \(2020\)](#).

In the survey we asked parents to report which distance learning activities were implemented by their children’s teachers and parents’ perceptions about their children’s learning progress during the lockdown. In the Italian questionnaire we asked parents if the the teachers (i) shared only education material, by mail or register; (ii) also proposed live online lectures; (iii) did not propose any distance learning activity. We also asked the number of hours of online classes proposed to the child. In the French questionnaire we asked more details on the activities proposed by teachers: parents had to indicate if their kids were involved in any of the following activities: 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 through a platform.

Figure 3 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 through a platform, but while in Italy almost all of them attended online classes as well, the percentage of online lectures for France stands at 70%. In primary school, almost all the children received contents by email or platform, while on-line classes were proposed to 65% of Italian students and to 20% of French ones. 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

Figure 3: Distribution of different home learning resources provided by schools - by country and level

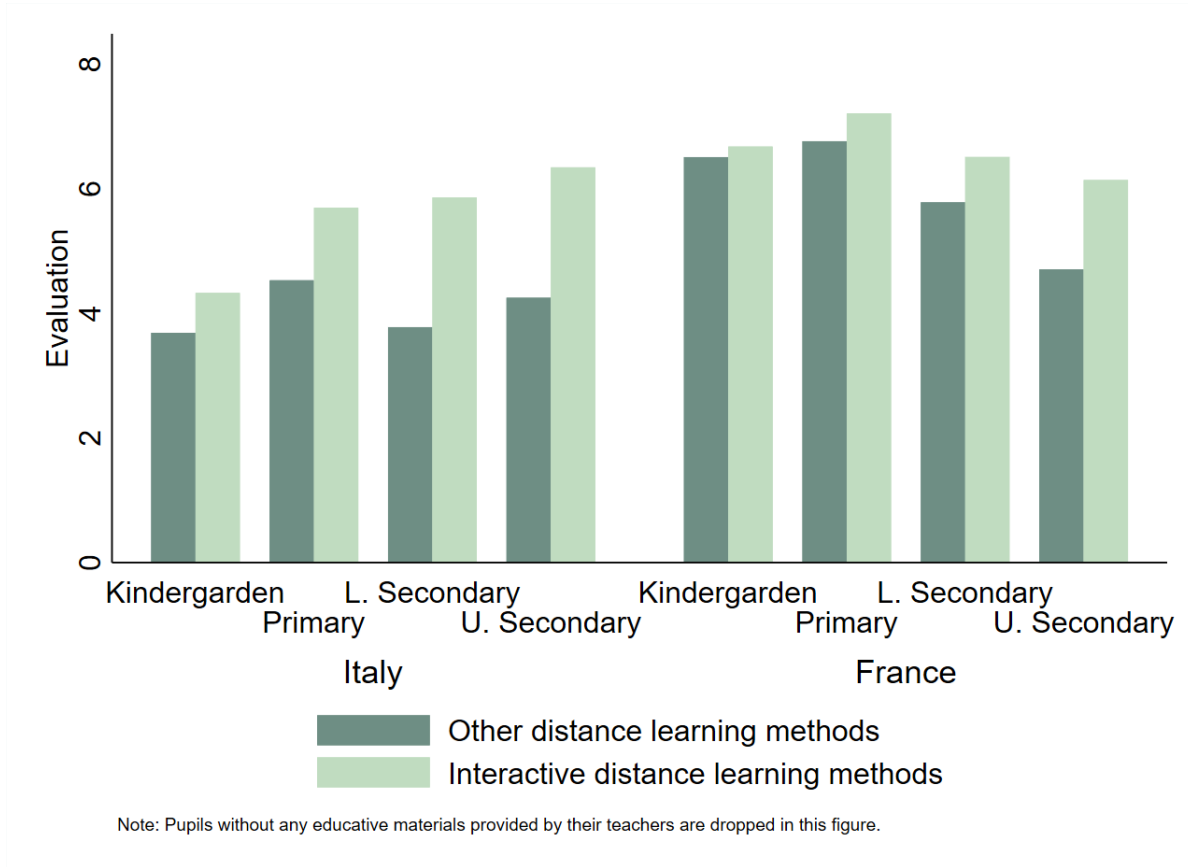


classes are unsurprisingly less common across young children (6 per cent for France, 19 per cent for Italy), with teachers preferring less interactive distance learning methodologies.

The type of distance learning activities proposed by the teachers seems to drive parent’s evaluation of children’s learning during the lockdown, especially for older children. Figure 4 describes a variable indicating parental judgment (from 1 to 10) on the quality of children learning progress. 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’ judgment is better when children were able to follow interactive lectures (on-line classes for Italy and online classes and live chat for France) and the difference gets larger with school level. In Italy the overall parents’ judgment is particularly low at all levels when no interactive classes are proposed and the implementation of interactive classes, as well as their intensity,¹³ substantially improve parents’ evaluations. Interestingly, French parents’ judgment is better for all school level, except for children in upper secondary school, with the difference among the two country being particularly important for children at kindergarden or primary school. This significant difference can be due to two different, but not alternative, explanations. On one side, it may depend on the type of inputs children received before the lockdown: the French system in kindergarden and primary school prepare children to be more independent and more flexible to changes (see Section 2), so French kids might have better adapted to the homeschooling condition.

¹³In kindergarden children who attend online classes do it for very few hours per week, while secondary school children almost maintained the same teaching schedule they had before the lockdown.

Figure 4: Differences in learning evaluation when interactive learning resources were proposed by schools



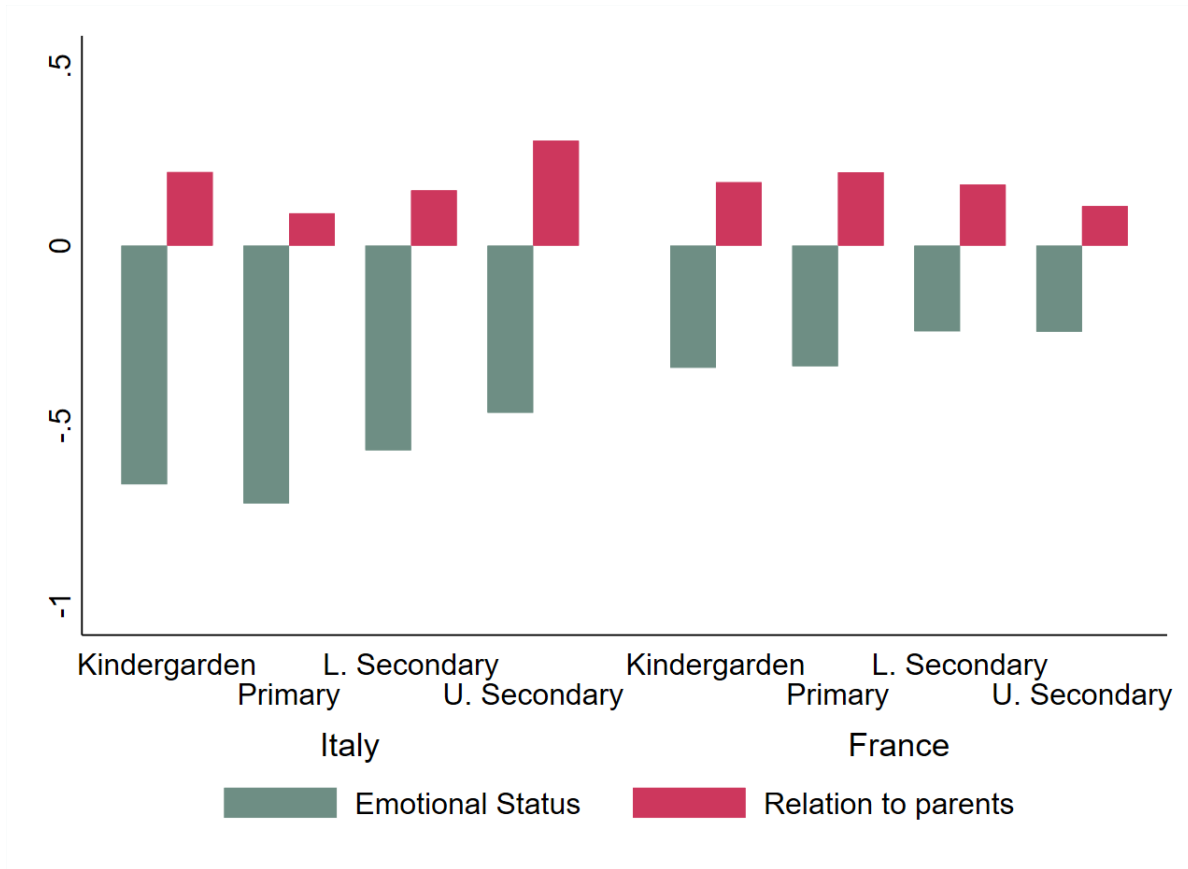
On the other side, the level of parental stress was likely to be higher in Italy at the time of the survey.¹⁴ This could have biased parental perceptions towards a negative evaluation of their children’s learning in Italy. Moreover, on April 13 French president Macron announced that schools would have been opened starting from May 11. This could have reassured French parents about the temporary nature of school closure, while no words by the Italian president Conte were spent about schools reopening, clearly indicating a more than likely reopening after the summer holiday (which actually happened).

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 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-emotional skills (Moroni et al.,

¹⁴The situation in Italy was more severe in terms of number of Covid-19 cases and deaths. According to the WHO Coronavirus Disease (COVID-19) Dashboard, by May 11 France experienced 137,073 cases and 26,338 deaths and Italy 219,070 cases and 30,560 deaths.

Figure 5: The evolution of emotional status and relation with parents by school level and country



2019). For these reasons, in the survey we asked parents to report the evolution of children’s emotional status and the evolution of 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 zero when the emotional status and the relation with parents were judged stable, and values -1 and 1 for the largest variations. Figure 5 plot these two variables by country. In general parents report on one hand an overall reduction in children’s emotional status, on the other hand a slight increase in the quality of the parent-child relationship. Parents in both countries are slightly more worried for younger children (those in kindergarden and primary school) comparing to those in secondary school. Italian parents appear, again, more worried for their kids’ emotional status when compared to French parents.

4 Estimation Method and Results

In this section, we analyze first how the lockdown has affected children’s learning process and emotional wellbeing, according to their parents’ perceptions. We then move at analysing the role played by interactive learning methods on the same outcomes.

4.1 Children’s learning and emotional status during the lockdown

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”);¹⁵ ii) parental evaluation of the child’s emotional status in a -1 to 1 scale, as explained in section 3.2 above.¹⁶ Both variables are interpreted as a variation with the lockdown, which allows us to perform fixed effect regression of the form:

$$Y_{it} = \theta LD + \beta FR \cdot LD + \gamma X_{it} + u_i + e_{it}, \quad (1)$$

where Y_{it} is the selected outcome for individual i at the time t , X_{it} is a set of child-specific time-varying regressors which include the time spent in front of a screen, and in reading, and whether the mother and father are working, LD is the temporal dummy equal to one for the period during the lockdown. We interacted this variable with FR , a dummy equal to one for french kids. θ thus measures the impact of the lockdown in Italy on the dependent variable, while β shows the differential impact of the lockdown in France.¹⁷ u_i represents child fixed effects and e_{it} is the idiosyncratic error. All of the regressions present standard errors clustered at regional 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 during lockdown. We also separately look at children having sibling or not, and at children living with a single parent.

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). Parents’ work status does not significantly affect children’s learning process. A similar pattern is observed when analysing 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 0.6 points, while French ones only by 0.3 points. The increase in screen time has a negative association with the emotional status, while the increase in reading has 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-

¹⁵We fixed educational progresses equal to 10 for the period before the lockdown. This means that, by definition, coefficient can be either negative or equal to zero. The structure of our questionnaire does not allow to capture an improvement in the leaning process during lockdown.

¹⁶We fixed emotional status equal to 0 for the period before the lockdown

¹⁷Similar results are obtained when we estimate a fully interacted version of this model, where all covariates are interacted with the dummy FR .

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

	Learning	Learning	Emotional	Emotional
	(1)	(2)	status	status
	(1)	(2)	(3)	(4)
Lockdown	-5.135*** (0.091)	-4.954*** (0.152)	-0.655*** (0.037)	-0.568*** (0.050)
France · Lockdown	1.722*** (0.114)	1.697*** (0.125)	0.349*** (0.045)	0.303*** (0.038)
Mother is working		0.077 (0.127)		0.044 (0.045)
Father is working		0.026 (0.140)		-0.000 (0.056)
Screen (time)		-0.123*** (0.047)		-0.070*** (0.021)
Reading (time)		0.209** (0.093)		0.114*** (0.028)
Observations	15,412	13,439	15,412	13,439
Adj R-squared	0.620	0.628	0.126	0.169
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. "France" is a dummy equal to one if the child is french. Here it is interacted with "Lockdown". "Screen" is a continuous variable reporting time spent by the child in front of screens before and during the lockdown. "Reading" is the time spent in reading. "Mother (Father) is working" is a time-variant dummy equal to one if the child's mother (father) is working during the period.

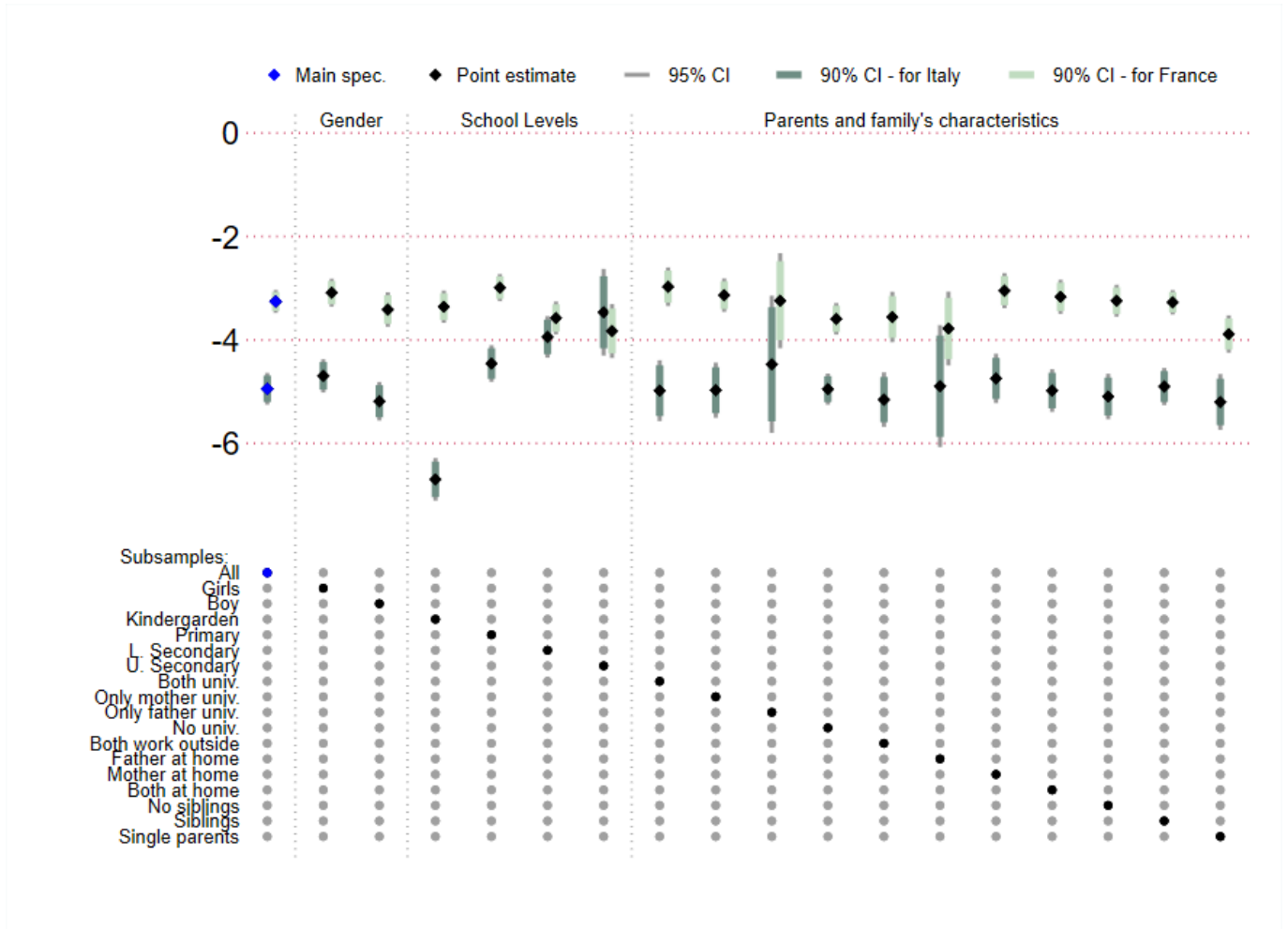
Each estimation controls for child individual fixed effects. Standard Errors in parentheses are clustered at region level. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

populations. Figures 6 and 7 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.¹⁸

Looking at parents judgments, the lockdown has been more detrimental on learning achievement 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 the learning progresses of their older kids. For France, we do not observe the same dynamics. Parents seems quite satisfied about the learning progresses of their primary school kids, while they give worse evaluations for children in kindergarten and particularly for the ones in secondary school. Tentative explanations for these different results can be related to the different type of distance learning methods used by teachers in the two countries. Italian secondary school pupils attended more online classes, that seem to be quite appreciated by Italian 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 about 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 the mother is not at home, as well as when both parents do not have an university degree, they seem to be more worried about their children's education. More educated parents, as well as

¹⁸Full estimation tables are reported in Tables A3 and A4 in the Appendix.

Figure 6: The impact of the lockdown on education - different subsamples and by country

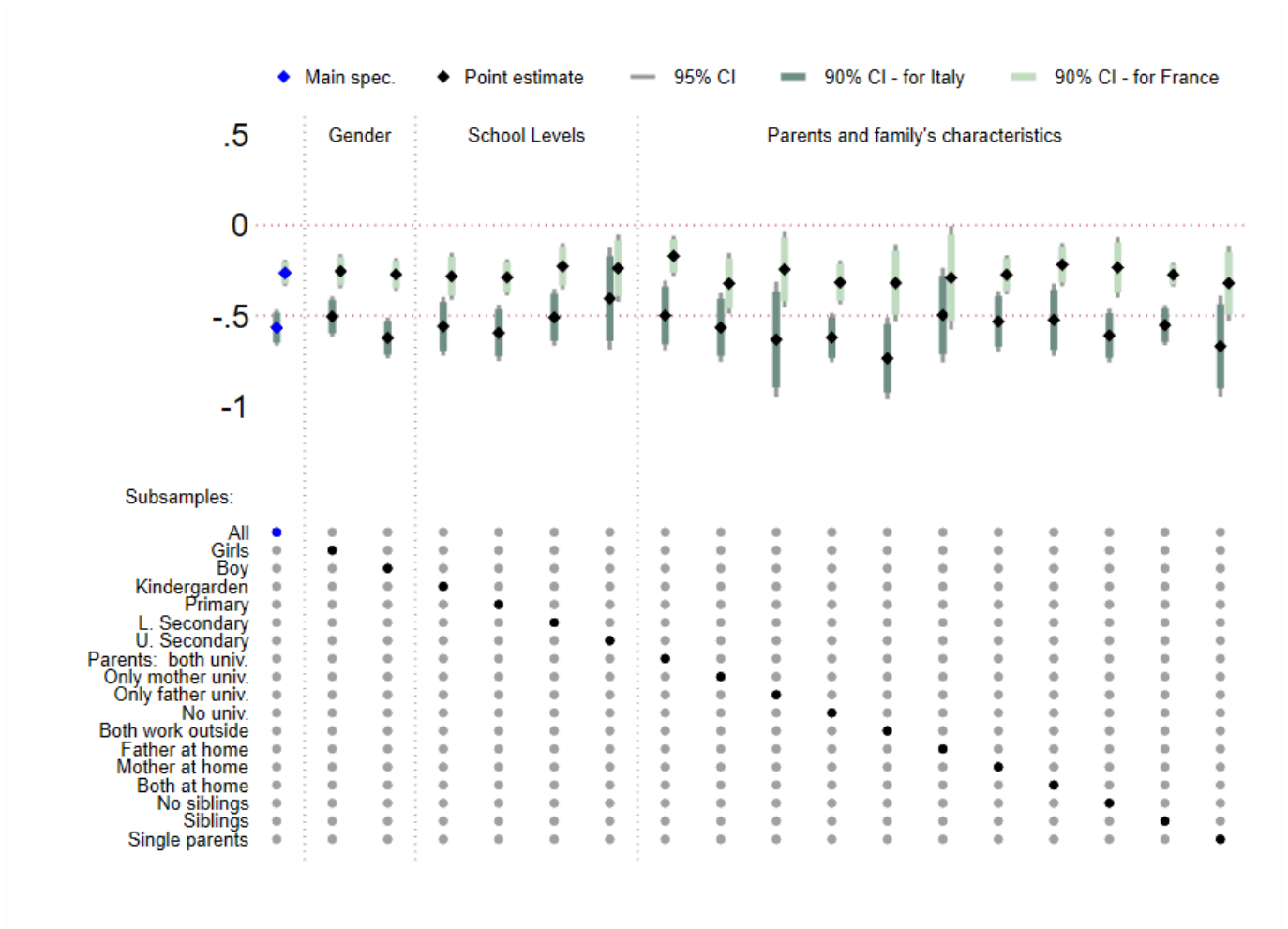


parents who are at home during lockdown, are likely to be more comfortable in taking care about their children’s education. Finally, French single parents seem to be more worried about their children learning progresses, while it is not the case for Italian ones. We do not see any differences among children with or without siblings.

When looking at the impact of lockdown on the emotional status, we see again that boys seem to suffer more than girls, according to their parents, but only in Italy. Parents report a worse emotional status for younger children.¹⁹ 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, which 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. Children with siblings appear to have suffered less 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.

¹⁹Estimates are less precise for kids in upper secondary school because of the smaller sample size

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



4.2 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. For Italy, starting from the replies to the question on distance learning described above in section 3.2, we are able to build three dummy variables that take the value of 1 respectively when: (i) no materials was provided by the teachers, (ii) only materials without interactive contents was provided by the teachers (Homewrok), (iii) full or partial interactive contents was provided by the teachers (OnlineL). 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 the 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

Table 3: Effects of distance learning methods on evaluation

	France			Italy		
	Kindergarten	Primary	Secondary	Kindergarten	Primary	Secondary
	(1)	(2)	(3)	(4)	(5)	(6)
Lockdown	-5.035*** (0.936)	-3.156*** (0.139)	-4.189*** (0.182)	-8.079*** (0.307)	-5.212*** (0.296)	-5.563*** (0.907)
Online Lectures	1.742 (1.130)	0.411* (0.212)	0.633*** (0.207)	2.466*** (0.348)	1.107*** (0.250)	1.830** (0.844)
· Lockdown						
Homewrok	1.784* (0.938)			1.878*** (0.342)		
· Lockdown						
Observations	1,449	2,395	1,763	2,156	3,414	1,756
R-squared	0.768	0.754	0.802	0.924	0.845	0.832
Adj. R-squared	0.524	0.502	0.599	0.837	0.676	0.646
Child fixed effects	Yes	Yes	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. "Homewrok" 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. "Homewrok · 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 online lectures.

Individual controls are the time characteristics of the child, the time spent in front of passive screen, time spent in reading or listening stories. 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.

(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 gather together in a sole modality all individuals with only emails and videos from their teachers and we considered them as receiving only materials without interactive contents: the dummy Homewrok take value 1 for them. All individuals with at least one interactive content (online lectures or chat room) were considered receiving full of interactive contents and take the value 1 to the dummy OnlineL. We then integrate the baseline specification in equation (1) adding interactions between the lockdown dummy and the dummies related to the distance learning methods and we follow basic estimated fixed effects model on education level subsamples as:

$$Y_{it} = \theta LD_t + \beta_1 OnlineL_i \cdot LD_{it} + \beta_2 Homewrok_i \cdot LD_{it} + \gamma X_{it} + u_i + e_{it} \quad (2)$$

for children at kindergarten education level; and:

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

for children at primary and secondary levels. We prefer to split the sample in different school levels for this part of the analysis since we believe that interactive distance learning methods are not exactly the same and might have very different outcomes for younger and older kids. We estimate separately the model for Italy and for France because of the difference in the original questions on distance learning methodologies, that do not allow a perfect comparison across countries.

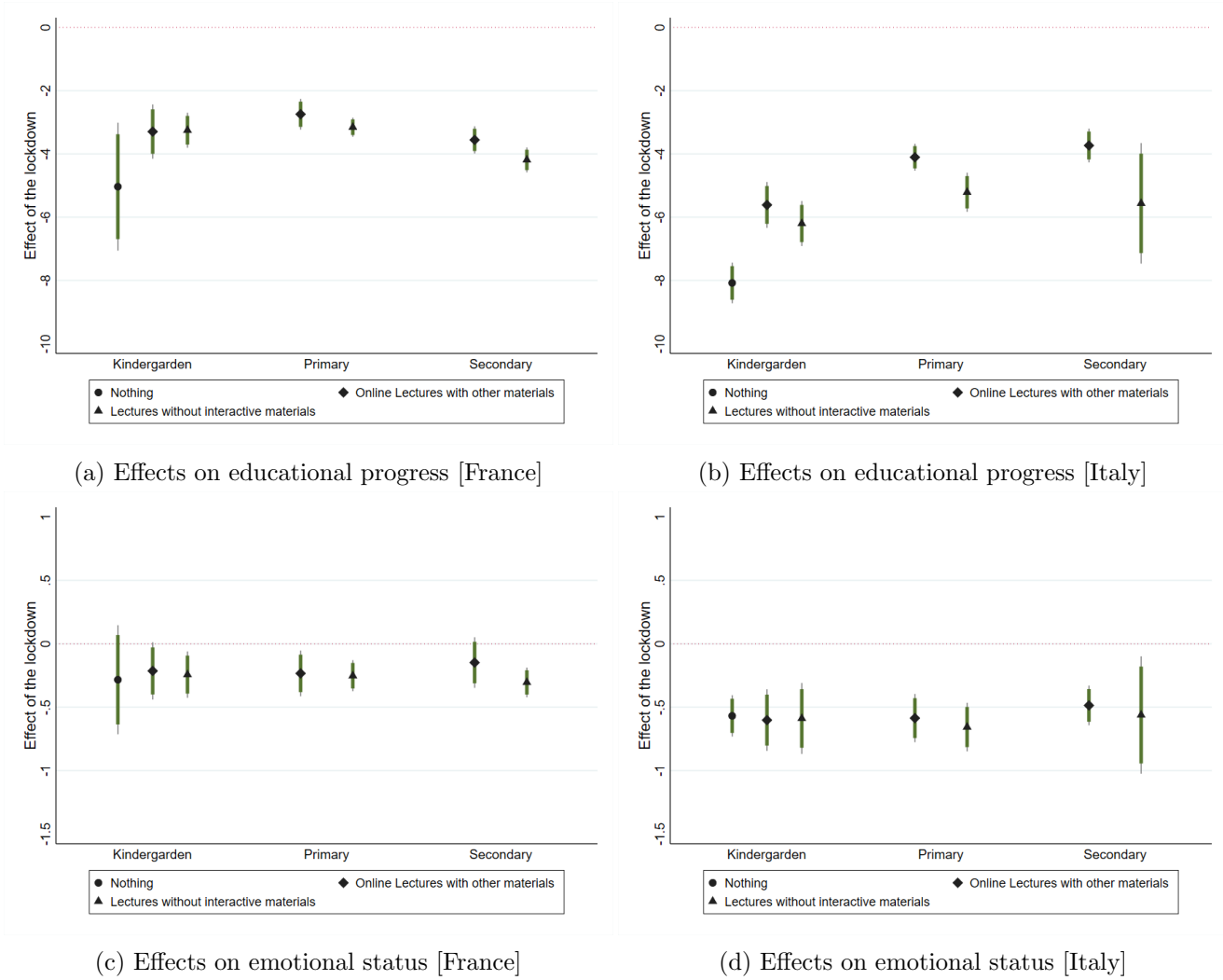


Figure 8: Effects of the distance learning methods

In Equation (2), 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 Figure 3, there were very few 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 (3) 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 or reading. All of the regressions present standard errors clustered at regional level.

Table 3 reports 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 Figure 8 (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 differences

Table 4: Effects of distance learning methods on emotional status

	France			Italy		
	Kindergarten	Primary	Secondary	Kindergarten	Primary	Secondary
	(1)	(2)	(3)	(4)	(5)	(6)
Lockdown	-0.284 (0.199)	-0.252*** (0.0568)	-0.304*** (0.0542)	-0.569*** (0.0779)	-0.657*** (0.0915)	-0.562** (0.220)
Online Lectures	0.0694 (0.217)	0.0183 (0.0790)	0.156** (0.0669)	-0.0335 (0.0909)	0.0705 (0.0587)	0.0757 (0.201)
· Lockdown						
Homewrok	0.0405 (0.158)			-0.0205 (0.111)		
· Lockdown						
Observations	1,449	2,395	1,763	2,156	3,414	1,756
R-squared	0.552	0.547	0.533	0.628	0.657	0.603
Adj. R-squared	0.0795	0.0857	0.0547	0.199	0.286	0.163
Child fixed effects	Yes	Yes	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. "Homewrok" 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. "Homewrok · 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 online lectures.

Individual controls are the time characteristics of the child, the time spent in front of passive screen, time spent in reading or listening stories. 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.

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 worse 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 is significantly lower with respect to those receiving interactive and non-interactive lectures. No significant differences are observed in pre-school kids attending online classes in addition to receiving material.

For both primary and secondary levels, our estimates indicate that interactive lectures are more profitable for education progresses than non-interactive methods. The effect is again stronger for Italian kids.²⁰ We can also remark that, although Italian parents are on average more worried for the learning progresses of their primary school kids with respect to French parents, the differences across the two countries become far smaller when Italian students attend online classes. This might suggest that young 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. A relevant role could be plaid by the smaller financial burden of children for French parents, given the generous child benefit system, and perhaps more importantly by the political climate around the school system. While in France the president Macron declared that school would reopen in June on early may, for Italian parents –in absence of any

²⁰Estimates for Italian secondary school kids might not be very accurate because very few students in that group have only no-interactive lectures, and this reflects in the large confidence interval, as we can observe in Figure 8 (c).

word on it by the president government– it became self-evident that schools would not reopen before the summer holiday, with negative consequences on the expectations for their children’s learning progress.

Regarding kid’s emotional status, results reported in Table 4 and Figure 8 (c) and (d) show that, on average, distance learning methods do not seem to play a crucial role on psychological health of young kids, while they seem relevant for secondary ones, at least in France. As for the Italian secondary school children, since just a few of them did not attended online lectures, estimations are not very accurate.²¹

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, well-being, and behavior. 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 a large sample of children, we analyze how the lockdown has affected their emotional well-being and their home learning process.

We show that both French and Italian parents are particularly worried by their children’s home learning process, with Italian parents giving lower evaluation than French ones to pre-primary and primary school levels. Using child fixed effect estimates, we find that that learning achievement during the lockdown was particularly difficult for very young kids (aged 3-6), especially for the ones who did not receive any distance learning support from their teachers, i.e. 40% of them in Italy vs only 2% in France. Kids attending secondary schools also experienced important losses in terms of learning achievement when they could not attend online classes, and this is particularly evident in France, where it is the case for almost 30%. More in general, 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. This is true for all school levels except for kindergarten. As to the implementation of distance learning technologies, our data show important differences in the share of students that could attend online lectures both across countries and across school levels, with observed heterogeneities favoring Italian students and higher grades students.

For children’s emotional wellbeing, our data indicates that, according to their parents, Italian children seem to suffer more than French ones. In both countries, parents report a worse emotional status for younger children. 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, which could have mitigated the negative effect of the lockdown on their emotional status. On-line classes seem to have attenuated the social capital losses of secondary-school pupils during the lockdown. As for learning, we observe that university educated parents are less worried about their kids’ emotional status.

²¹We also explored the possible heterogeneity of distance learning methods according to the gender of the pupils. Results show no differences between boys and girls in the learning evaluation outcome for kindergarten and primary level. In secondary schools it seems to benefit girls more. As to the emotional status outcome, we do not observe any significant difference between girls and boys.

Finally, our results show that both French and Italian kids increased the time spent reading by 0.3 hours on average, and the time spent in front of screen (out of classes) by 1.3 hours on average during lockdown and that 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, socials, and similar).

All in all, our results indicate that younger kids are likely to suffer more from the lockdown, both in terms of learning achievements and in terms of emotional stability. While older kids could still interact with their friend using social networks, and could easily follow online classes, this is not possible, or at least very difficult, for children under 6. While interactive distance learning could help primary and especially secondary school kids to learn during school closures, it is extremely hard for teachers to communicate remotely with very young children. Moreover, parents might find more difficult to help their pre-school age kids in their learning process since the teaching methods for this age group are less standardized and demand more creative skills. These conclusions suggest that governments should be particularly concerned to keep young pupils at school as far as possible during the sanitary crisis, while at the same time providing kindergardern teachers with training that could help them assuring the continuity of learning if schools were forced to close. As shown by our results, existing technologies for online classes were perceived as quite effective for the learning process of older children. Governments should strongly recommanded teachers to use such technologies and facilitate this task providing clear guidelines and training material to be used in case of school closure.

These preliminary findings on the impact of the lockdown on children's cognitive and non-cognitive skills should be verified in the near future through an analysis of objective outcomes, such as test scores and other indicators of non-cognitive skills, to be conducted during the academic year 2020-2021.

Declarations of interest: none

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A Supplementary material

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

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

A) ITALY			B) FRANCE		
	Our sample	ISTAT		Our sample	INSEE
<i>Family type</i> ^{1,2}					
Copules with 1 child	44.0%	47.9%	Copules with 1 child	31.2%	44.8%
Copules with 2 children	46.8%	41.7%	Copules with 2 children	50.7%	38.7%
Copules with 3 or more children	9.1%	10.4%	Copules with 3 children	15.4%	12.7%
			Copules with 4 or more children	2.6%	3.8%
Single parents	7.8%	24.5%	Single parents	14.4%	22.8%
<i>Geographical distribution</i> ^{3,4}					
Piemonte	9.6%	6.6%	AURA	12.4%	27.9%
Valle d'Aosta	0.4%	0.2%	Bourgogne-Franche-Comté	4.3%	6.8%
Liguria	2.6%	2.2%	Bretagne	5.2%	4.5%
Lombardia	20.0%	16.1%	Centre-Val-de-Loire	3.9%	5.0%
Trentino	2.2%	1.7%	Corse	0.5%	0.2%
Veneto	9.2%	8.0%	Grand Est	8.5%	8.0%
Friuli	2.3%	1.9%	Hauts-de-France	9.2%	6.3%
Emilia-Romagna	8.6%	6.9%	Île-de-France	18.9%	5.9%
Toscana	10.5%	6.0%	Normandie	5.1%	5.4%
Umbria	3.5%	1.4%	Nouvelle-Aquitaine	9.3%	7.6%
Marche	2.6%	2.6%	Occitanie	9.1%	9.9%
Lazio	9.1%	10.3%	Pays de la Loire	5.9%	4.4%
Abruzzo	1.5%	2.2%	PACA	7.8%	8.2%
Molise	0.4%	0.5%			
Campania	5.0%	10.6%			
Puglia	4.7%	7.1%			
Basilicata	0.5%	0.9%			
Calabria	1.3%	3.3%			
Sicilia	3.2%	8.8%			
Sardegna	2.8%	2.8%			

Notes: 1. ISTAT – Multipurpose Survey on Households: Aspects of Daily Life 2019. 2. INSEE – Census 2016 3. ISTAT – Resident Municipal Population on January 1 2019. 4. INSEE – Census 2016

Table A3: Full estimates by sub-samples (FE regressions)- learning evaluation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	Girls	Boys	Kindergarde	Primary school	Lower ondary school	Sec-Upper school	Both ents university education	Only with mother university with vesity education	Only ther university education	Both ents with out unive- sity educa- tion	No parents at home	Only ther home	fa- Only at mother home	Both par- ents at home	Single child siblings	Child with siblings	Single par- ent house- hold
Lockdown	-4.705*** (0.162)	-5.193*** (0.182)	-6.700*** (0.213)	-4.456*** (0.174)	-3.942*** (0.197)	-3.465*** (0.411)	-4.994*** (0.297)	-4.980*** (0.262)	-4.471*** (0.658)	-4.958*** (0.152)	-5.156*** (0.262)	-4.893*** (0.585)	-4.756*** (0.231)	-4.990*** (0.205)	-5.102*** (0.222)	-4.909*** (0.176)	-5.208*** (0.259)
FrancexLockdown	1.620*** (0.142)	1.779*** (0.180)	3.338*** (0.186)	1.466*** (0.141)	0.365 (0.220)	-0.362 (0.373)	2.022*** (0.279)	1.854*** (0.167)	1.229*** (0.537)	1.359*** (0.172)	1.589*** (0.302)	1.114** (0.414)	1.702*** (0.171)	1.830*** (0.205)	1.861*** (0.217)	1.636*** (0.150)	1.319*** (0.269)
Time spent in front of screen	-0.178** (0.075)	-0.071 (0.061)	-0.206** (0.078)	-0.142** (0.062)	-0.082 (0.065)	-0.050 (0.098)	-0.186*** (0.067)	-0.174* (0.092)	-0.156 (0.145)	-0.055 (0.057)	-0.055 (0.100)	-0.091 (0.182)	-0.112 (0.287)	-0.211** (0.116)	-0.092 (0.108)	-0.130** (0.055)	-0.060 (0.105)
Time spent in reading	0.151 (0.113)	0.263** (0.098)	0.273* (0.138)	0.348*** (0.098)	0.178 (0.122)	0.204 (0.190)	0.205* (0.112)	0.311** (0.148)	-0.086 (0.197)	0.223 (0.140)	0.237 (0.261)	0.308 (0.287)	0.193 (0.116)	0.178 (0.108)	0.056 (0.136)	0.244** (0.100)	0.313 (0.227)
Mother is working	-0.028 (0.187)	0.075 (0.184)	-0.085 (0.279)	-0.086 (0.188)	-0.037 (0.203)	0.412 (0.342)	-0.003 (0.230)	-0.093 (0.261)	0.521 (0.651)	0.015 (0.167)	-0.153 (0.725)	-0.075 (0.658)	0.262 (0.257)	-0.049 (0.209)	-0.104 (0.321)	0.048 (0.157)	0.048 (0.157)
Father is working	0.081 (0.181)	0.078 (0.163)	-0.022 (0.196)	0.104 (0.153)	0.099 (0.203)	0.407 (0.327)	0.093 (0.463)	0.138 (0.232)	-0.217 (0.655)	0.021 (0.151)	0.605 (0.526)	0.081 (0.339)	0.037 (0.416)	0.110 (0.179)	0.392 (0.325)	-0.043 (0.136)	-0.091 (0.410)
Parent is working																	
Observations	6,584	6,855	4,080	5,831	2,528	1,000	4,310	3,588	798	4,683	1,616	1,370	4,490	5,943	2,930	10,509	1,443
R-squared	0.818	0.833	0.892	0.817	0.817	0.815	0.823	0.836	0.806	0.827	0.850	0.821	0.825	0.822	0.842	0.821	0.824

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

Table A4: Full estimates by sub-samples (FE regressions)- emotional status

VARIABLES	(1) Girls	(2) Boys	(3) Kindergarde	(4) Primary school	(5) Lower Secondary school	(6) Upper secondary school	(7) Both parents with university education	(8) Only mother with university education	(9) Only father with university education	(10) Both parents with university education	(11) No parents at home	(12) Only father home	(13) Only mother home	(14) Both parents at home	(15) Single child	(16) Child with siblings	(17) Single parent household
Lockdown	-0.505*** (0.056)	-0.625*** (0.057)	-0.565*** (0.083)	-0.596*** (0.077)	-0.510*** (0.077)	-0.405*** (0.139)	-0.500*** (0.097)	-0.567*** (0.095)	-0.632*** (0.158)	-0.623*** (0.068)	-0.737*** (0.113)	-0.497*** (0.130)	-0.534*** (0.083)	-0.524*** (0.099)	-0.612*** (0.075)	-0.553*** (0.055)	-0.668*** (0.136)
FrancexLockdown	0.250*** (0.046)	0.352*** (0.047)	0.278*** (0.071)	0.307*** (0.057)	0.284*** (0.065)	0.168 (0.136)	0.329*** (0.072)	0.241*** (0.077)	0.389*** (0.141)	0.308*** (0.068)	0.423*** (0.129)	0.207 (0.146)	0.259*** (0.064)	0.304*** (0.082)	0.377*** (0.094)	0.279*** (0.040)	0.348*** (0.125)
Time spent in front of screen	-0.082*** (0.024)	-0.059** (0.024)	-0.094*** (0.031)	-0.088*** (0.026)	-0.031 (0.032)	-0.022 (0.057)	-0.084** (0.036)	-0.066 (0.047)	-0.027 (0.050)	-0.064** (0.027)	-0.044 (0.034)	-0.089 (0.059)	-0.086*** (0.025)	-0.062* (0.036)	-0.052 (0.031)	-0.075*** (0.021)	-0.017 (0.045)
Time spent in reading	0.108** (0.043)	0.120*** (0.038)	0.094** (0.046)	0.141*** (0.032)	0.110 (0.069)	0.103 (0.068)	0.075 (0.052)	0.148*** (0.050)	0.017 (0.087)	0.141*** (0.037)	0.119* (0.070)	0.246*** (0.068)	0.096* (0.052)	0.090** (0.037)	0.080 (0.048)	0.122*** (0.033)	0.034 (0.082)
Mother is working	0.078 (0.068)	-0.071 (0.082)	0.019 (0.120)	-0.002 (0.065)	-0.059 (0.098)	0.016 (0.131)	0.011 (0.101)	-0.133 (0.100)	0.087 (0.136)	0.046 (0.068)	-0.109 (0.400)	0.028 (0.332)	0.064 (0.077)	-0.026 (0.085)	0.017 (0.096)	-0.012 (0.059)	
Father is working	0.044 (0.070)	0.047 (0.063)	-0.018 (0.074)	0.024 (0.064)	0.119 (0.096)	0.214 (0.153)	-0.018 (0.159)	0.057 (0.123)	0.032 (0.134)	0.025 (0.074)	0.188 (0.340)	0.083 (0.138)	0.057 (0.151)	0.076 (0.064)	0.148* (0.084)	0.004 (0.066)	
Parent is working																	0.015 (0.142)
Observations	6,584	6,855	4,080	5,831	2,528	1,000	4,310	3,588	798	4,683	1,616	1,370	4,490	5,943	2,930	10,509	1,443
R-squared	0.608	0.614	0.616	0.631	0.583	0.570	0.596	0.611	0.612	0.624	0.644	0.624	0.619	0.595	0.631	0.605	0.579

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