THE ITALIAN ECONOMY AFTER COVID-19

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Short-term Costs and Long-term Adjustments

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The impact of the COVID-19 pandemic on italian schools and universities: the challenge of distance learning

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INTRODUCTION

Due to historical shortcomings, the Italian education system was caught unprepared by the COVID-19 pandemic, which hit Italy earlier and harder than other European countries. The immediate response by the education system exceeded expectations: schools and universities promptly started providing online classes to the vast majority of their students, despite very limited experience with this teaching method. However, the decision to close schools will likely cause a serious loss of human capital for most students, which will affect their future study and work prospects, as distance learning is not a close substitute for in-class learning. In particular, three categories of students have been affected very strongly by the school closure: those who do not possess broadband connections or devices that allow them to follow classes online, special needs students, and those who lack motivation and family support. In this paper, we will provide some rough estimates of the learning loss caused by COVID-19 and discuss how different teaching strategies might mitigate the negative impact of distance education on learning outcomes.

The impact of the pandemic on universities is different. The learning loss is likely to be significantly lower, simply because university students have a stronger motivation to follow online lectures since attendance is not compulsory. However, for the very same reason, there is a serious risk of a downturn in enrolments in the next academic year, which is magnified by the economic recession: universities have to devise new strategies in order to make distance learning more appealing to students.

1. SCHOOLS

The Italian schooling system was deeply affected by the COVID-19 pandemic. As in other countries, schools and universities were closed immediately in order to prevent the virus from spreading at an accelerating pace. According to a study by ISS (Italian National Health Institute) and Merler, the average number of contacts per day in schools is 10 for students between 0-19 years old, which is almost twice as many as in an office or at home for all age brackets. Hence, even if pupils are supposed to be less vulnerable to the novel coronavirus infection than older people (one-third less likely to be infected than middle-aged people and one-fifth less than people over 60), the higher contact frequency makes schools a particularly dangerous place for the spread of the virus.

At the beginning of the outbreak on February 21, the government shut down schools in selected areas of Lombardy and Veneto, where the virus first struck. Eventually, all Italian schools were locked down on March 5, 2020 and remain so at the time of writing. In the 160 years since the unification of Italy, this has never happened, not even during the two World Wars. A simulation by the ISS suggests that, should schools have remained open when the rest of the country had been locked down, the reproduction rate R_t would have been equal to 1.33, higher than the critical threshold of 1.

From the outset, the government requested schools to provide online teaching to all students. On April 4, a decree turned this into an obligation for teachers of all grades. Schools reacted surprisingly quickly, despite teachers having little previous experience with distance teaching. Teachers immediately started using either e-mails and electronic registers to send homework to students, or more sophisticated online platforms, such as G-Suite for Education, Microsoft 365 Educational and Edmodo, which allow them to use video-conferencing[1].

1.1. Digital skills in Italian schools

The effectiveness of the new teaching environment depends upon teachers' and students' prior digital skills. Unfortunately, despite making some significant progress in the use of digital technologies in the past decade, Italy still

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[1] The above platforms account for roughly 30% of the solutions adopted, according to a snap survey conducted by the Ministry of Education.

lags behind most European countries. According to Pisa 2015, each internet connection in schools serves two students, compared to an average of 1.3 in the OECD. In 2015, 70% of the schools claimed to have internet connection in classrooms and 42% use electronic whiteboards: a considerable improvement compared to two years ago, when the figures were 52% and 29%, respectively. A survey conducted by the Italian Authority on electronic communications (Agcom) highlighted that 47% of Italian teachers use digital technologies at school every day, 27.5% weekly and only 4.9% never. However, the use of such technologies is quite basic: one teacher out of two only uses the electronic register to indicate whether the student is absent or to assign homework; one out of three uses PowerPoint presentations. Only around 20% of the respondents employ digital technologies to collaborate with their colleagues or to interact with students; and only 8,6% normally work on projects remotely. According to Pisa 2018, only 50% of the Italian teachers had the necessary technical and pedagogical skills to integrate digital resources into education. As far as 15-year-old Italian students are concerned, Pisa 2015 results on collaborative problem solving suggest that they are basically on par with their peers from OECD countries in using internet for school activities; they are actually better than the average in the frequency of using ICTs for learning mathematics and foreign languages. During the quarantine, however, many parents complained that their "digital native" children were particularly incapable of managing learning systems through PCs or tablets. This is not entirely surprising, as the ICILS 2018 (International Computer and Information Literacy Study) survey highlighted that only 21% of the 46,000 students interviewed in 14 countries, including Italy, are independent computer users, with the majority of students needing direct instructions to complete basic tasks. The family background affects the level of basic digital skills displayed by students.

Given these limitations in the digital skills of teachers and students, the immediate response of the school system to the lockdown exceeded expectations: according to the data from the Ministry of Education, 77% of the teachers had no previous experience of distance teaching. We do not know exactly how many students had been previously exposed to distance learning. The Ministry of Education claims that 86% (around 6.5 million) of the pupils who attend state schools and 18% (150,000) of those in private schools are involved in distance learning. In all likelihood, this figure is an overestimate, as it considers all the schools that claim to have implemented some form of online teaching, including by e-mail or using the electronic register. However, it is

unlikely that all teachers in these schools have taken up distance teaching and that all students in a class have been following classes regularly. In addition, ISTAT (Italian National Institute of Statistics) shows that 12.3% of the students between 6 and 17 years old have no PC or tablet (although they might still use a smartphone) and that 57% have to share the PC or tablet with the rest of the family, which makes regular attendance of online classes more difficult. Therefore, we can assume that at least a third of Italian students received little or no teaching during the lockdown.

1.2. The reopening of schools

At the beginning of April, the government made it clear that schools were unlikely to reopen until September 2020 and that distance learning had to continue until then. The Prime Minister officially announced the decision on April 26. Schools ended their academic year on June 10 (with some small differences between regions), except for the final exam of the secondary cycle (the so-called Maturità) which took place (in person) from mid-June onwards. School will resume on September 1, first for students with failing grade before the summer and later for everybody. Resistance from teachers' unions led to two missed opportunities for Italian schools. On the one hand, distance teaching could have lasted well into July, thus mitigating the students' learning losses (see below). On the other hand, as an extraordinary measure, teachers' postings could have been maintained unchanged in the next academic year (the yearly turnover rate is around 25%), so as not to further disrupt the relationship between the teacher and the students after the pandemic. However, both measures were eventually rejected, and the Ministry carried on with business as usual.

At the time of writing, little is known about school organization plans in the next school year. The biggest constraint is that classrooms are too small to cope with social distancing: the average number of students per class is 19 in primary schools (with 8% of the classes having more than 24 pupils); 21 in lower secondary schools (14% above 24); and 22 in upper secondary schools (17% above 24, which increases to 38% in the first year). Since 1975, the law requires that the surface area per student for teaching activities be at least 1.80 sqm. in preschools and 1.96 sqm. in secondary schools; however, 60% of the schools were built before 1975 and do not meet such standards. It is easy to see that these statistics do not allow schools to meet the 1-meter social

distance requirement: given the average number of students per classroom, the minimum surface area should be 60 sqm. In Rome, it is estimated that the average surface area of classrooms is 45 sqm, well below the minimum requirement. In addition, most scientists think that in a closed environment where students spend many hours, one meter is too short a minimum distance and that two meters would be more reasonable.

In light of this, some form of attendance combining in-class learning and remote learning will be put in place. Regardless of which solution will be adopted, some form of distance schooling is likely to remain in place for the 2020-21 school year.

1.3. The consequences of distance schooling

Despite the remarkable effort by teachers to put in place online teaching, the closure of schools during the lockdown is bound to create a severe loss of human capital to the current cohort of students. There are two sides to this. One concerns the development of students' socio-emotional skills, including perseverance, conscientiousness, self-control, trust, attentiveness, self-esteem and self-efficacy, resilience to adversity, openness to experience, empathy, humility, tolerance of different opinions, and ability to engage productively in society. Following James Heckman, a vast amount of literature suggests that such non-cognitive skills are at least as important as cognitive ones in determining adult outcomes, such as wages, employment and health. Following this literature, it is possible to distinguish between "internalizing" and "externalizing" socio-economic skills: the former are related to the ability of children to focus their drive and determination, while the latter refer to their ability to engage in interpersonal activities.

During the lockdown, children and adolescents were isolated at home with their relatives and lacked social interactions with teachers and schoolmates; in addition, they may have suffered from the anxiety caused by the negative consequences of the pandemic on the health and well-being of family members. The overall impact on students' externalizing skills is likely to be negative. In addition, the distribution of non-cognitive skills may have become more unequal. As shown by Attanasio *et al.* (2020), the socio-emotional skills of British children aged 5 years old largely depend on the mothers' education and employment status: the longer the time spent with their families, the stronger the differences that may show up. Indeed, with social distancing and

home learning, the students are more exposed to the personal characteristics of their family members, thus exacerbating the usual (positive or negative) effect of their mothers' status on socio-emotional skills.

The second relevant aspect concerns the loss in learning outcomes for students in all grades and the equity implications (Burgess, Sievertsen, 2020). Research on the impact of face-to-face instruction time on students' learning outcomes across countries and regions concurs in finding a positive relationship, especially for basic subjects such as math rather than for soft skills. These studies suggest that one additional hour of instruction per week increases the Pisa score by 0.05-0.06 of a standard deviation[2]. In the same vein, the vast literature on summer learning loss suggests that the summer break leads to a loss in achievements, especially in math, equivalent to a month of schooling. Represented graphically, the learning loss is tantamount to a leftward parallel shift of the learning curve, which brings down everybody's learning outcome proportionally (Figure 1).

But by how much? At this stage, it is a difficult question to answer. Based upon past estimates of achievement losses of students in different grades due to the summer break, natural disasters and absence, recent work using US data concludes that students are likely to return in fall 2020 with approximately

Figure 1.

Parallel shift of the learning curve.
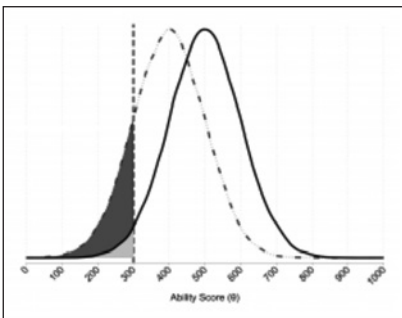
Source: Aroob Iqbal *et al.*, 2020.

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[2]   In order to compare across different countries and datasets, the impact of education policy is typically standardized in terms of standard deviation of the relevant outcome.

63-68% of the learning gains in reading compared to a typical school year, and with 37-50% of the learning gains in math (Kuhfeld *et al.*, 2020). This is a very major loss. On the other hand, Burgess *et al.* (2020) estimate a loss of 0.005 of a standard deviation per week: for the 14-week closure before the end of this school year in June, the cost in terms of lost achievements is 0.07 of a standard deviation (see above). This is also a significant number, corresponding to seven Pisa points, i.e. the difference between Italy and Croatia in average scores in math, science and reading in 2018. Online learning cannot make up for the lost ground, since it is not as effective as traditional face-to-face instruction: previous comparisons of online and traditional state schools show that students in online schools lose between 0.1 and 0.4 standard deviation on standardized tests compared to students in traditional schools.

What is the economic impact of such a massive learning loss? It is well known that future earnings are a function of human capital. Following Psacharopoulos *et al.* (2020) and assuming a 40-year working life and an average annual earnings of €25,110, we reach estimated lost earnings of €879 per year per student, and a total present value of lost earnings of €21,197 (84% of a year's average wage). While at the individual level this may not sound like too much of a price for young people to pay in the fight against COVID-19, extrapolating this estimate to the whole country leads to a much more sobering conclusion. In fact, the cost for 8.4 million Italian students will be about €178 billion – about 10% of GDP in 2019. It should be stressed that this exercise assumes, rather implausibly, that distance teaching has no effect on learning: hence, these numbers are to be interpreted as a ballpark range. On the other hand, the learning loss during the 2020 summer break will probably be greater than after a regular school year.

The negative impact of COVID-19 is not limited to a linear transformation of the learning curve. At least three categories of students are more affected than others by school closures. In the first place, students who do not possess broadband connections or devices that allow them to follow classes online regularly: they are estimated to be close to 35% of the total. The government has made available €85 million in order to offer devices and internet connections to students in need. Secondly, certified special needs students consist in a disadvantaged category that accounts for 3.7% of the total: more than a third of them did not receive proper online training during the lockdown according to a web survey run by Fondazione Agnelli (2020). Finally, students who lack motivation and family support and do not show up during online classes: it

is plausible that most of them come from disadvantaged family backgrounds. In fact, home schooling strongly relies on parental aid, which in turn depends on the parents' level of education, their availability, parenting style and financial resources: distance learning can make socio-economic differences in achievements even more pronounced than traditional schooling.

Represented graphically, this implies that the learning curve, on top of shifting laterally, becomes more skewed to the left: the left tail becomes fatter, which means an increase in the number of students who drop out or whose learning outcome is unsatisfactory (Figure 2).

Clearly, as distance learning becomes more established, it will be crucial to pay special attention to the lower tail of the students' distribution curve in order to define specific policies and to prevent existing educational inequalities from widening and dropout rates from increasing.

Figure 2.

Shift of the Learning Curve to the Left.
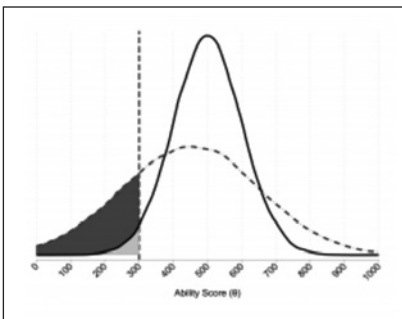
Source: Aroob Iqbal *et al.*, 2020.

1.4. What works in distance teaching and learning

In the previous section, we discussed some of the shortcomings of distance education in terms of learning loss and dropout risks. As this teaching methodology may well last into the next academic year, an obvious question arises: whether and how it can be improved so as to provide a more effective learning experience.

The topic has been hotly debated in Italy during the public health emergency, leading prominent educational institutions to assemble several collections of studies and evidence reviews[3]. Two important limitations of this evidence must be highlighted. The first is that none of the studies measures the impact of the lockdown, other social distancing restrictions, and specific circumstances (e.g., parents working from home) on learning during this global pandemic. The second is that some of the evidence on best practices comes from the higher education sector. Nonetheless, the evidence-based results offer useful insights for maximizing student outcomes at all ages.

1. *Teaching quality is more important than the type of online lessons.* Whether the teaching is in real time (synchronous teaching) or recorded (asynchronous teaching) does not matter for the students' learning outcomes. What matters is that the teaching builds on the students' prior knowledge, and that the content, feedback and subsequent assessment are clear. In an online setting, shorter lessons work better: 'bite-size content' (pre-recorded videos, approximately 6-minute long, explaining key concepts) seem to be particularly effective for younger pupils. Given that they are short, these 'bites' keep students more attentive and allow them to set their own pace by listening to the lecture as many times as needed (this is particularly important in the case of disadvantaged learners). After the asynchronous lecture, the time in the classroom can be devoted to focused discussions, using boards (like Padlet) or classroom polling apps that keep students engaged. The only caveat about this strategy is that the teacher must ensure that all students listen to the online 'bites': otherwise, re-explaining the content of the lecture amounts to a loss of learning time for students that have already watched the videos.

2. *There should still be interaction.* Within the field of distance education, three forms of interaction are widely recognized as crucial: student-content, student-student, student-teacher. These forms of interaction should be included at each stage of online/distance learning. The evidence suggests that student-student interaction is the most important one for effective distance learning; in fact, it is particularly important for classmates to help special needs students on a systematic basis.

3. *Teacher presence is crucial for pacing the classes and providing stimuli to students.* As online learning can include both synchronous and asynchronous

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[3] Cf. the Education Endowment Foundation (UK), the Australian Institute for Teaching, and the Institute for Educational Sciences (USA).

activities, it is vital for students to know when and how to reach their teachers. This may involve setting learning goals, timetabling student activities, scheduling 'office hours' and regular check-ins with students either online or by phone, posting updated videos or lectures, and frequently using formative assessments to keep track of student progress and to detect students that might be lagging behind.

4. *Students should be encouraged to work independently.* Multiple reviews identify the value of strategies that help students (those from primary school in particular) to work independently. Evidence related to metacognition and self-regulation suggests that disadvantaged students benefit from explicit support for independent work, for example by receiving checklists or daily plans.

5. *Different approaches to remote learning suit different tasks and types of content.* Teachers should be aware of the features of different technological tools and of the types of content they are best suited to transmit. For example, games for learning were found to have a high impact on vocabulary learning in foreign languages, but there is little evidence that they also work well in other subjects.

6. *Parental support is crucial to learning.* Evidence suggests that parents/caretakers who are engaged in learning activities at home can have a positive impact on children's academic achievements and wellbeing. The School Learning Support Program (by the New South Wales Department of Education and Training) outlines a number of suggestions for parents/caretakers during distance learning: communicate key messages about the school and its aims; hold interactive workshops and chat rooms for parents; provide learning materials and resources that parents may use on their own or with their children; create a parent-only area on the school website with specific information about parental support.

2. UNIVERSITIES

Italian universities reacted swiftly to the changes imposed by the COVID-19 emergency. Most universities organized online classes and are now allowing final exams to be taken from home.

A survey conducted by CRUI (the Association of Italian University Presidents) at the end of March in 88 universities (out of 97) shows that 88% of the teaching activities were moved online. More than half of the universities delivered

more than 96% of the courses in an online setting, potentially reaching about 1.3 million students. It is likely that at the start of the new academic year in late September, while some activities will be carried out in presence – such as workshops and laboratories – most lessons and exams will take place remotely. Different from schools, universities attract students from various regions, leading to large – scale student mobility across the country that might cause a new epidemic wave. Hence, universities will be more cautious in opening their doors to students again, favoring a blended model combining distance and face-to-face teaching that could last a long time.

The learning loss among university students is likely to be lower than in schools for two reasons. On the one hand, university students are young adults who tend to be more motivated than teenagers in school, as going to university is not compulsory and is the result of a conscious decision to continue education made by half of the high school students. On the other hand, there is no evidence that online instruction at the university level is either superior or inferior to face-to-face instruction. Nevertheless, the COVID-19 pandemic may have serious consequences at the tertiary level, both on the nature of teaching and on enrollment rates.

2.1. The impact of COVID-19 on university teaching

The first consequence of the COVID-19 emergency on university teaching was the shift to online courses. If universities decide to continue distance teaching for some time, they will have to invest considerable resources on teaching methodologies in order to deliver better online and blended learning. In fact, as attending university classes is not compulsory, there is no captive market and universities will have to improve the quality of teaching in order to attract and retain students. We know from the above evidence review that synchronous and asynchronous lectures lead to similar results, provided that certain conditions are met. However, they imply different work organizations, delivery techniques, time scheduling, settings and assessment methods for teachers and students: how these factors are combined will make a huge difference for the students' experience. Hence, strategic choices can lead to success or failure for each individual tertiary institution. This implies investing massively upfront in new technological platforms and in training the faculty. Only at a later time can fixed costs be reduced thanks to online teaching.

As for revenue, not all universities will be able to increase or maintain current

tuition fees or to receive equal or higher grants from governments. Economic conditions have markedly worsened for households and public administrations. The university business model may thus have to change in order to meet the budget constraint: in the end, this might lead to a reduction in the number of academic institutions.

The second consequence concerns students' expectations about the university experience, which includes human and social interactions that online teaching fails to provide. Hence some students may decide to postpone first-year enrollment or to drop out from university altogether. This can also happen to students in science and technology, where hands-on activities and laboratory experience are particularly relevant.

The third consequence is that the pandemic can hinder students' mobility within the country. Currently, 22% of university students are enrolled in universities outside of their own region of residence and this indicator grows by 4.2% per year, according to the Ministry of Universities. This impact on mobility cuts two ways. On the one hand, if students are looking for a face-to-face experience, concerns about the pandemic can limit the propensity to move outside their region of residence and favor attendance at local institutions. On the other hand, the provision of online courses can make well-established institutions (mostly in Northern Italy) more attractive to students from distant areas, who can now attend classes remotely without facing the huge costs of moving to a different city. It is hard to predict which effect will prevail. However, a likely outcome is a greater segmentation of universities: those capable of devising high-quality online classes will attract more and better students, whereas those that prove slow to adapt will inevitably have to focus on local youth.

2.2. The impact of COVID-19 on enrolments

Around the world, universities fear that the looming recession will bring about a collapse in enrolment and a steep drop in the number of registered students. This holds true especially for Italy, where the economic crisis is expected to be more severe. According to Mariani (2015), the Great Recession caused a 13% drop in university enrolment in Italy. As the OECD currently foresees a 10.8% GDP contraction in 2020, a substantial reduction in university enrolment after COVID-19 is on the cards. The Talents Venture Observatory (a consultancy specializing in orientation services and the development of solutions to support

university education) estimates that the recession could lead to an overall loss of 35,000 students, i.e. 11% of the total number of freshmen, and a €46 million drop in university revenues.

A decline in university attendance would cause enormous damage both in terms of individual prospects and for Italy as a whole. According to OECD data, in 2018 the employment rate in the 25-64 age group was 81% for university graduates, whereas it was 71% for those who completed only primary and secondary schools. Current circumstances are also dire for young people entering the job market. Graduating during a recession leads to a loss of earnings not only in the early stages of the career, but also later, with effects that persist even ten years after graduation. In addition, consequences can last for the entire working career since those who graduate during a downturn end up accepting jobs for which they are over-qualified and change jobs more frequently. Consequently, there is a real risk that the crisis may have harmful effects on the future of young people, especially those who come from more economically disadvantaged families. The government recently allocated €300 million for scholarships on top of the usual amount of €600 million.

A separate issue is the enrolment of foreign students, which accounts for 5% of the whole student body. Academies of fine arts and conservatories are particularly exposed to the possible impacts of COVID-19, given that 15% of the students are foreign: over 12,000 students, of which 50% come from China. The Polytechnics of Milan and Turin and the University of Florence, which welcome 48% of the Chinese students in Italy, may also be seriously affected.

There are a few silver linings from the COVID-19 crisis, however. Some prestigious universities, in Italy and elsewhere, hit by the fall in the number of students, could relax the traditionally strict selection process and open their doors to students that would have never been admitted in regular times. In addition, as we discussed earlier, well-structured online courses can attract more students, especially from abroad, who would have not enrolled to that university in normal times, as online lessons reduce the costs of attendance (transport, off-site accommodation) and make enrollment compatible with a part-time job.

Another important tool in order to fight against the drop in university student numbers is the cost of tuition fees: universities should offer a rebate for students who find themselves in hard times due to the worsening economic conditions (say, if they show that their parents lost their job). Although we lack an accurate estimate of the price elasticity of demand for higher education, it is

likely that zero or very low fees can induce students who otherwise would have abandoned or would not enroll, to stay or to enroll anyway. At the same time, government and regional authorities (which provide financial support and accommodation) should increase the availability of scholarships by raising the minimum income requirement.

CONCLUSION

COVID-19 is posing different challenges to Italian schools and universities. In spite of the quick reaction to the emergency, the consequences on students are likely to be severe and last for a long period of time. In primary and secondary education, the lack of ICT skills of both teachers and students expose students to the risk of a severe learning loss. We estimate that the 14-week closure up to the end of the 2019-20 school year will cost seven PISA points and a human capital loss for the country of around €178 billion – about 10% of the annual GDP.

The learning loss for university students is likely to be lower, as they have a stronger motivation to follow distance lectures rather than in-class lectures. However, tertiary institutions risk a serious downturn in enrolments in the next academic year: they have to devise new strategies in order to make distance learning more appealing to students.

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