

Instruction Time and Educational Outcomes[†]

Understanding differences in returns to expansions of instruction time.

Andrés Barrios-Fernández

Latest Version : June 10, 2022

Elevator Pitch

Increasing instruction time might seem as a simple way of improving students' outcomes. However, there is substantial heterogeneity in the effects of instruction time reported in the literature. When focusing on school day extensions, some studies find no effects, while others find that an additional hour of daily instruction improves test scores by 0.03σ to 0.05σ . Similarly, while some studies show that days of class lost due to bad weather do not affect students' performance, others show that additional 10 days of class before an exam improve test scores by 0.04σ to 0.07σ . These differences likely reflect differences on the quality of instruction or on the activities that are being replaced by additional instruction.

Key words: *Instruction time, heterogeneous returns, implementation challenges, education reforms.*

Key Findings

- Increasing instruction time can significantly improve students' performance.
- Using the additional time to reinforce contents seems to help to reduce inequality on test scores.
- Reducing absences is an effective way of increasing instruction time and significantly improves students' performance.
- Returns of instruction time are larger in schools that offer a better learning environment, and in settings that count with good accountability systems and in which schools have greater autonomy.
- Instruction time extensions can reduce teenage pregnancy and youth crime.
- Increasing instruction time does not necessarily generate large gains on students' performance.
- Increasing instruction time can be expensive.
- Especially in the context of large expansions, the implementation of the changes can be difficult and some schools might struggle to adapt to the new conditions.
- Using the additional time to cover new contents seems to be more beneficial for high performing students, increasing both within and between schools inequality.
- Further research is needed to determine the optimal amount of instruction time. Extending instruction time too much could be detrimental.

Author's Main Message

Instruction time extensions are not trivial. To make them effective, policy makers should consider how other elements of the school system—such as school infrastructure, school resources, and teachers—will be affected. The use of the additional time—reinforcing contents or covering new topics—is an important determinant of which students will benefit the most. These elements, as well as the type of activities that will be replaced by the additional instruction time should be considered when designing these policies.

[†] andres.bafer@alumni.lse.ac.uk. +1 (617) 5993299. Centre for Economics Performance (LSE) and VATT Institute for Economic Research.

1 Motivation

There are important differences in the amount of time that students from different countries spend at school. While primary school students receive around 650 hours of instruction per year in Finland, in Australia they receive around 1,000; similarly large differences are observed in secondary education [15]. There are also important cross country differences in the instruction time allocated to different subjects. In Portugal, for instance, primary school students spend the same amount of time in language and in mathematics. In France, however, they spend 80% more time in language than in mathematics (Figure I illustrates the distribution of instruction time across multiple countries).

Understanding to which extent differences in students' academic performance across countries are a consequence of differences in instruction time is not trivial. Luckily, the growing interest in understanding how to make schools more effective, and the increasing availability of detailed student registers have allowed us to accumulate vast evidence on the causal effect of instruction time on students' educational outcomes.

This evidence is likely to be of interest for policy makers, as many countries are considering or have already allocated substantial funds to increasing the amount of time that students spend at school. This document aims to contribute to this debate by reviewing the literature on the causal effect of instruction time, highlighting some important challenges for the implementation of instruction time extensions.

2 Instruction Time and Educational Outcomes

Instruction time can be modified by increasing the length of the school day, by extending the school term, or by redistributing the time allocated to different subjects. Each of these alternatives imposes different implementation challenges and they do not necessarily affect students' learning in the same way. This section discusses the main findings of the literature on the effect of instruction time on students' achievement and highlights the main challenges that schools systems face when implementing reforms that change the amount of time that students spend at the school or in different subjects.

2.1 Extension of the school day

A first way of increasing instruction time consists on increasing the amount of time that students spend at school each day. To provide the additional instruction time, schools need to either increase teachers' working hours or to hire new teachers. This can be costly, especially if there is a limited supply of teachers. In addition, depending on the magnitude of the reform, schools might need to invest in new infrastructure. This, for instance, was the case in several Latin American countries that recently switched from a two-shifts scheme—in which some grades were taught in the morning and some in the afternoon—to a one-shift scheme that allowed students to have classes both in the morning and in the afternoon. The effects of this type of reforms likely depend on the ability of schools to overcome these challenges and to adapt to the new conditions. In addition, since an extension of the school day mechanically reduces the time that students spend outside of the school, the benefits of these reforms not only depend on the quality of the learning opportunities available at the school, but also on their relative quality respect to the learning opportunities that students have available at home.

The full-school-day reform (FSD) implemented in Chile is perhaps the most studied of these large Latin American reforms. Bellei [4] finds that 10th grade students exposed to the reform improved their test scores by 0.05σ to 0.07σ in Spanish. In mathematics, however, it finds less stable effects ranging between 0.00σ to 0.12σ . Barrios-Fernández and Bovini [3] focus instead on incumbent students—i.e., students enrolled in a school before the adoption of the FSD—and instrument exposure to the reform with the exposure that a student would experience in case of remaining in the same school between first and fourth grade. The paper finds that a year of exposure to the full-school-day program improved fourth grade students performance in Spanish by 0.024σ and in mathematics by 0.008σ .

Reforms extending the school day have also been implemented outside of Latin America. The extension of the school day induced by these reforms, however, has usually been smaller than in the Latin American context. Huebener et al. [8] and Lavy [11] study reforms that increased weekly instruction time in Germany and Israel, respectively. The German reform increased weekly instruction time by around two hours, while the Israeli reform affected weekly instruction time through changes introduced in the funding rules of public schools. Both studies find positive effects of weekly instruction time on students' achievement. Huebener et al. [8] finds that the reform improved students' performance in mathematics, science, and reading by a little bit more than 0.05σ , while Lavy [11] finds that an additional hour of weekly instruction on mathematics, science and English improves students' performance by 0.03σ to 0.05σ . Meroni and Abbiati [13] evaluate an expansion of mathematics and reading instruction time in lower secondary schools in southern Italy and documents positive effects on mathematics test scores. According to their results an expansion of 25% in instruction time increased mathematics test scores by 0.12σ . Figlio et al. [6] show that extending the school day and providing additional literacy instruction time in low-performing schools in Florida have a positive effect on reading test scores. They document an improvement of 0.05σ on reading test scores after one year in the program. In contrast, Meyer and Klaveren [14] report that extending instruction time for 5th, 6th and 7th grade Dutch students did not significantly improve their performance in mathematics or reading.

Although most of the studies discussed in this section point towards positive effects, there are some that find no significant effects of school day extensions on students' achievement. In addition, the size of the effects documented by the studies that do find positive effects varies substantially. Part of this heterogeneity might reflect differences in the learning opportunities that students have available at school and at home in different settings, but they also suggest that the implementation of these reforms and the ability of schools to adjust to longer schedules are important in shaping their returns.

2.2 Extension of the school term

A second way of increasing instruction time consists of increasing the length of the school year. As in the case of the reforms discussed in Section 2.1, reforms extending the school year require additional teaching hours. In this type of reforms, however, the availability of teachers is less of an issue. If the teachers currently working in the school system are willing to provide the extra days of work needed to extend the school year, no additional teachers are needed. The same is true in terms of infrastructure. There might be some extra wear and tear for the additional use of school buildings, but no new infrastructure is needed.

In contrast with the evidence on the effects of extending the school day, there is little evidence on the effects of reforms that extend the school year. Most of the evidence on the effects of additional days of class on students' achievement comes from studies that exploit either regional variation on the length of the school

year or quasi-experimental variation on effective days of class. Although this type of studies do not provide many insights about how to overcome the implementation challenges of reforms extending the school term, they inform us about the potential benefits of these policies.

A set of recent papers study the effect of the number of school days prior to standardized tests on students' performance. These studies exploit either unplanned school closures due to adverse weather conditions [7, 12] or changes in term and/or test dates [1, 2]. Goodman [7] finds that days of class lost due to bad weather have no impact on students' test scores in Massachusetts. In contrast, Marcotte [12] finds that school closures induced by snow significantly reduce the number of students performing satisfactorily on reading and mathematics standardized exams in Maryland. Agüero and Beleche [1] exploit variation on exams and school year starting dates in Mexico, and show that additional days of instruction prior to examination slightly improve students' mathematics performance. They allow for non-linear returns and find that the maximum effect of additional 10 days of class ranges between 0.04σ for four grade students and 0.07σ for fifth grade students. Aucejo and Romano [2] follow a similar approach using data from North Carolina, but find smaller effects. According to their results having 10 extra days of class before state level exams improve students' performance in mathematics by 0.017σ and in reading by 0.008σ .

A related literature that highlights the importance of effective instruction days in a year focuses on students' absences. Goodman [7] finds that each absence induced by bad weather in Massachusetts decreases mathematics test scores by 0.05σ . Aucejo and Romano [2] also find that absences negatively affects students' performance in North Carolina, although their estimates are slightly smaller. Their results indicate that a 10 days reduction in absences would improve students performance in mathematics by 0.055σ and in reading by 0.029σ . Absences seem to have a larger effect on students' performance than days of class lost due to schools' closures. As discussed by Goodman [7] this asymmetry can be rationalized with a teaching model in which coordination of students is important. Teachers might be better at dealing with disruptions that affect all their students simultaneously—as school closures—than with disruptions that affect different students at different times—as absences.

A few studies have also investigated the effects of reforms that modified the length of the school year. Pischke [17] and Parinduri [16] study the effects of exceptionally short or long school years due to country-level reforms of school calendars that left the curriculum unchanged. The former studies the short 1966-67 West German school year and documents an increase of one percentage point in repetition rates in primary school, as well as a reduction of one and three percentage points in enrollment in the academic and in the intermediate secondary school track, respectively; interestingly, the study finds no significant effects on earnings or employment. The latter study examines the long 1978-79 Indonesian school year and reports a reduction in repetition rates and improved educational attainment, with positive effects also on wages and on the probability of working in the formal sector.

As in the case of the evidence discussed in Section 2.1, the studies investigating the effects of additional instructions days on students' achievement point toward positive effects. The asymmetry found in the effects of school closures and absences, suggests that reducing absences could be an effective way of increasing effective instruction time and improving students' outcomes.

2.3 Redistribution of time across subjects

Finally, the third way in which instruction time can be modified consists in redistributing the time allocated to different subjects. Depending on the size of the changes, reforms like this could increase the demand for certain types of teachers and at the same time reduce the demand for other type of teachers. Therefore, redistributing the amount of hours dedicated to different subjects might generate some political challenges. In this type of reforms the alternative use of time is very clear, and their net benefits depend on the gains that students experience on the subjects that receive the extra time, and on the losses they experience on the subjects that suffer the time reduction. An advantage of redistributing instruction time is that if the school term is already long or if students are already staying long hours at school, this does not make students to spend even more time at the school, something that in some cases could be detrimental.

I am not aware of studies on the optimal allocation of instruction or on the effects of redistributing instruction time across subjects. The most informative evidence for this type of changes comes from studies that exploit within-school or within-pupil variation in subject-specific class hours. By exploiting these sources of variation, these studies keep both the length of the school day and of the school term constant, and identify the effect of instruction time by comparing students' performance across subjects. An important assumption of these studies is that returns to instruction time are the same for all subjects.

Lavy [10] is one of the first studies following this approach. This paper examines the effect of instruction time on students' achievement using cross-country PISA data and finds that a one-hour increase of weekly subject-specific instruction time raises scores in that subject by 0.06σ . Similar effects have been documented by more recent studies following the same approach.

2.4 Who benefits the most?

The discussion in the previous sections focuses on average effects. However, increasing instruction time does not necessarily affect all students equally. As mentioned earlier, the returns to additional instruction time depend on both the learning opportunities that students have at school and at home. Thus, the quality of the school inputs, the use of the additional time, and the students' backgrounds likely play an important role in determining the returns of policies that extend instruction time (table I summarizes the results of this section).

Consistent with the idea that low-ses individuals have worse learning opportunities at home, a number of studies find that increasing instruction time is more beneficial for relatively disadvantaged students. Bellei [4], Barrios-Fernández and Bovini [3], Meroni and Abbiati [13] find that the gains of extending instruction time are larger among low-ses students. The last study, however, find that this difference is driven by high achieving disadvantaged pupils.

Despite having worse learning opportunities at home, it is not obvious that extending instruction time will always bring greater benefit to more disadvantaged students. The ability to take advantage of the learning opportunities available at the school might also play a role. Agüero and Beleche [1], for instance, finds that improvements were lower in poorer schools. Figlio et al. [6] do not find a consistent pattern in heterogeneity by socioeconomic characteristics, but they show that the effects of increased instruction time are lower for students at the bottom of the ability distribution. In line with this result, Huebener et al. [8] finds

stronger effects among high performing students. Other studies, as Lavy [11], simply do not find evidence of differential effects by students' socioeconomic status.

This set of results suggests that there are other dimensions beyond students' characteristics that shape the returns to instruction time. Rivkin and Schiman [18], for instance, highlight that productivity of instruction time positively depends on the quality of the classroom environment, as captured by student disruptions and student-teacher interactions. Huebener et al. [8] highlight the importance of what schools do with the extra time. They argue that using the additional time to reinforce contents already in the curriculum are likely to benefit students who struggle more at school. In contrast, using the additional time to cover new topics is likely to benefit more high performing students. There are other characteristics of the school system that also seem to matter. Lavy [10] finds that returns to instruction time are larger in countries that have set accountability systems in place, and in schools that enjoy of more autonomy. The results in Barrios-Fernández and Bovini [3] also highlight the role of school autonomy. They show that in a context of a large reform that increased weekly instruction time by around 30% in Chile, the benefits were greater for students attending no-fee charter schools. According to the paper, the greater levels of autonomy enjoyed by no-fee charter schools allowed them to better adapt to the longer schedules by making it easier for them to hire new teachers.

The results discussed in this section highlight the relevance of students' and schools' characteristics in shaping the returns of instruction time. This suggests that the design of policies that extend instruction time should consider these characteristics and their interactions in order to be effective.

2.5 Costs of extending instruction time and comparison to alternative policies

The costs of expanding instruction time depends on the approach chosen to implement the expansion and on the resources available in the school system before the implementation. For instance, the full school day reforms carried on in South America and other developing countries required substantial investment in new infrastructure. Before the reforms, these school systems relied in a double shift scheme with some grades taught in the morning and other grades in the afternoon. Offering the full day to their students made it necessary to build new classrooms, but also new recreational spaces and other facilities. These infrastructure investments are not required when expanding the length of the school term or when redistributing the time allocated to different subjects.

The best information we have about the costs of instruction time extensions comes from studies investigating extensions of the school day. Perhaps the FSD reform implemented in Chile is the one that provides the most useful information about operational costs. In Chile, all publicly subsidized schools are funded through a voucher system. The reform increased the duration of the school day by roughly 25% and the voucher amount by around 32%.¹ The new infrastructure required to implement the FSD was funded through other channels, so the increase in the voucher is a good reflection of the increase in operational costs experienced by the system. In 2021, the difference in the monthly voucher that primary schools with and without the FSD in place received for each student was around USD 25.7. The same difference was around USD 29.5 for high schools. The main driver of the increased costs are the additional hours of teaching, thus the actual cost of reforms increasing instruction time will greatly depend on teachers' salaries. The proportional

¹In primary education the school day was extended by 26.7%, while in high school by 27.3%. The voucher amount was increased by 33.3% and 31.98% in primary and high schools respectively.

increase discussed in this paragraph is likely to be informative for estimating the additional resources that an extension of the school day or of the school calendar would require, as both type of reforms need extra teaching hours.

To assess whether the gains induced by instruction time extensions on academic performance are large, it is useful to benchmark them against the effects of other school inputs. Chetty et al. [5], for instance, estimate that a 1σ improvement in teachers' value added raises end-of-grade test scores by approximately 0.1σ . Krueger [9] instead, studies the effect of class size. This study finds that students allocated to small classes (i.e., 15 students per class) obtain test scores 0.22σ higher than students allocated to large classes (22 students per class). According to this study, the cost of reducing class sizes by one third would require an increase of 33% in the total annual expenditure per student.²

As shown in previous sections, there is important heterogeneity in the effects of instruction time found in the literature. The largest effects estimated for school day extensions suggest that an additional hour of daily instruction improves academic performance by between 0.03σ and 0.05σ . This effect is between one-third and one-half of the effect of improving teacher quality by 1σ , and is approximately one-seventh of the class size reduction studied in Krueger [9]. The largest effects estimated for school calendar extensions indicate that additional 10 days of class increase academic performance by between 0.04σ and 0.07σ . This effect represents between 40% and 70% of the effect of a one σ improvement on teacher value added, and represents between 18% and 32% of a seven students class size reduction.

3 Limitations and Gaps

3.1 Non-linearities in the Returns to Instruction Time

Returns to instruction time are unlikely to be linear. This means that the benefits of an additional instruction hour or day can be very different depending on the base level. Most of the sources of variation exploited to identify the effects of instruction time make it challenging to study non-linearities. Therefore, most of the evidence discussed in this document abstracts from this issue. Agüero and Beleche [1] is an exception. They study how additional days of instruction prior to examination affect students' performance in Mexico and show that they improve students' scores, but that they exhibit diminishing marginal returns. However, we still need more research to fully understand these non-linearities and how they interact with characteristics of the students and of the school systems.

3.2 Other Outcomes

This document has focus on the effects of instruction time on students' educational achievement. However, extending instruction time can also affect other outcomes that policy makers should incorporate to their analyses. There is evidence that increasing the time that students spend at school can reduce teenage pregnancy and youth crime, and also improve women participation in the labor market.

²The study uses as reference the 1995-96 total expenditures per enrolled student in US public schools and estimates the annual cost of the policy to be USD 2151 dollars per student. Note that as in the case of instruction time, the effects of class size found in the literature vary substantially across settings.

4 Summary and Policy Advice

With the aim of improving students educational achievement, many countries are considering or have already allocated substantial funds to increasing the amount of time that students spend at school. Time, however, is an inherently limited resource, and extending instruction time mechanically reduces the amount of time that students can dedicate to other activities. Therefore, the effect of this type of policies on students' achievement not only depends on the absolute quality of the additional time at the school, but also on its relative quality with respect to the learning opportunities available outside of the school.

Thus, the benefits of reforms that increase instruction time can vary substantially across settings, as they depend on the characteristics of the students, of the school systems, and on how the changes are implemented. This document highlights implementation challenges of three alternative ways of modifying instruction time—(1) increasing daily instruction time, (2) extending the school term, and (3) redistributing instruction time across subjects—and discusses the evidence on the effects of instruction time on students achievement. The evidence accumulated over the last decades mostly points toward positive effects, but masks important heterogeneity. While some studies find no significant or modestly positive effects, others find that additional instruction time significantly improves students' performance. These differences suggest that the design and implementation of reforms that extend instruction time is not trivial. Policy makers should carefully consider the characteristics of the students and of the schools that will be affected by the reform, and be aware that the returns to instruction time also depend on the quality of other school inputs.

Finally, it is worth taking into account that increasing instruction time might also affect relevant outcomes beyond education. There is evidence that increasing the time that students spend at school reduces teenage pregnancy and crime participation, and improves female labor market participation. These effects need to be factor when evaluating these policies.

5 Acknowledgements and competing interests

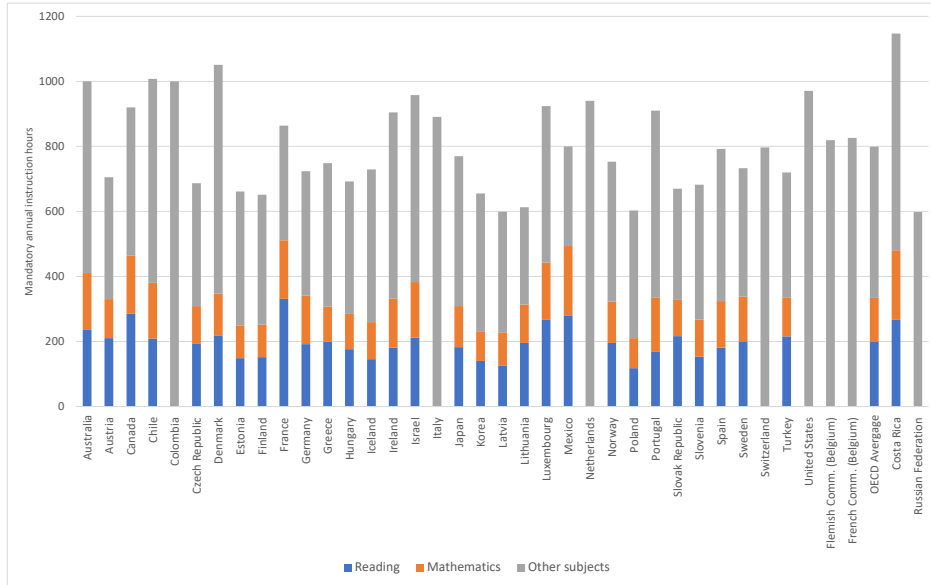
I thank the useful comments made by Jo Bladen—the editor of this submission—and an anonymous referee. The IZA World of Labor project is committed to the IZA Guiding Principles of Research Integrity. The author declares to have observed these principles.

References

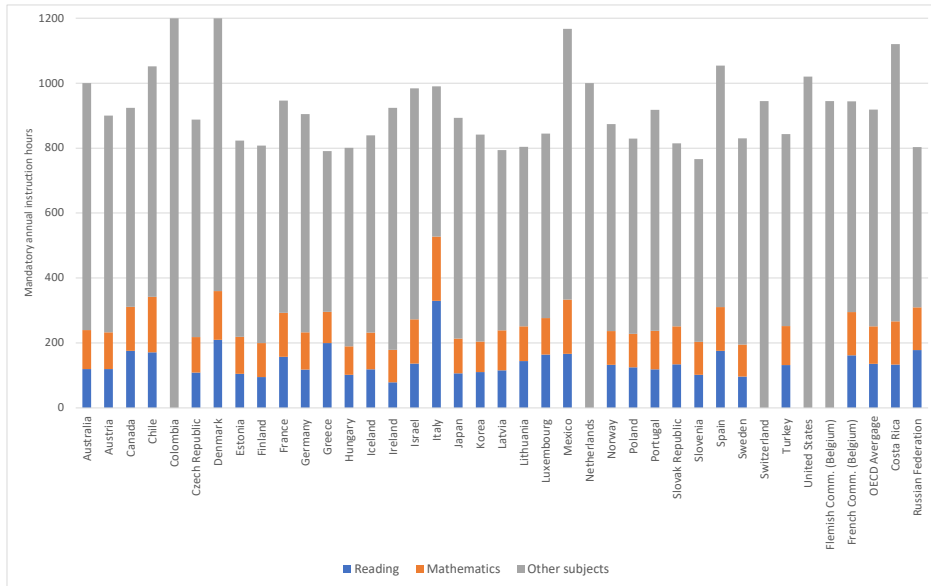
- [1] Agüero, J. M. and T. Beleche (2013). Test-mex: Estimating the Effects of School Year Length on Student Performance in Mexico. *Journal of Development Economics* 103, 353–361.
- [2] Aucejo, E. M. and T. F. Romano (2016). Assessing the Effect of School Days and Absences on Test Score Performance. *Economics of Education Review* 55, 70–87.
- [3] Barrios-Fernández, A. and G. Bovini (2021). It’s time to learn: School institutions and returns to instruction time. *Economics of Education Review* 80, 102068.
- [4] Bellei, C. (2009). Does Lengthening the School Day Increase Students’ Academic Achievement? Results from a Natural Experiment in Chile. *Economics of Education Review* 28(5), 629–640.
- [5] Chetty, R., J. N. Friedman, and J. E. Rockoff (2014, September). Measuring the impacts of teachers ii: Teacher value-added and student outcomes in adulthood. *American Economic Review* 104(9), 2633–79.
- [6] Figlio, D., K. L. Holden, and U. Ozek (2018). Who benefits from longer school days? Regression discontinuity evidence from Florida’s additional hours of literacy instruction . *Education Economics*.
- [7] Goodman, J. (2014). Flaking out: Student Absences and Snow Days as Disruptions of Instructional Time. *NBER Working Paper Series*.
- [8] Huebener, M., S. Kuger, and J. Marcus (2017). Increased Instruction Hours and the Widening Gap in Student Performance. *Labour Economics*.
- [9] Krueger, A. B. (1999). Experimental estimates of education production functions. *The quarterly journal of economics* 114(2), 497–532.
- [10] Lavy, V. (2015). Do Differences in Schools’ Instruction Time Explain International Achievement Gaps? Evidence from Developed and Developing Countries. *The Economic Journal* 125(588), F397–F424.
- [11] Lavy, V. (2019, 02). Expanding School Resources and Increasing Time on Task: Effects on Students’ Academic and Noncognitive Outcomes. *Journal of the European Economic Association* 18(1), 232–265.
- [12] Marcotte, D. E. (2007). Schooling and Test Scores: A Mother-natural Experiment. *Economics of Education Review* 26(5), 629–640.
- [13] Meroni, E. C. and G. Abbiati (2016, Nov). How do Students React To Longer Instruction Time? evidence from Italy. *Education Economics* 24(6), 592–611.
- [14] Meyer, E. and C. Klaveren (2013, 10). The effectiveness of extended day programs: Evidence from a randomized field experiment in the netherlands. *Economics of Education Review* 36, 1–11.
- [15] OECD (2019). *Education at a Glance 2019: OECD Indicators*. Paris, France: OECD Publishing.
- [16] Parinduri, R. A. (2014). Do Children Spend Too Much Time in Schools? Evidence from a Longer School Year in Indonesia. *Economics of Education Review* 41, 89–104.
- [17] Pischke, J.-S. (2007). The Impact of Length of the School Year on Student Performance and Earnings: Evidence From the German Short School Years. *The Economic Journal* 117(523), 1216–1242.

- [18] Rivkin, S. G. and J. C. Schiman (2015). Instruction Time, Classroom Quality, and Academic Achievement. *The Economic Journal* 125(588), F425–F448.

Figure I: Cross Country Differences in Instruction Time



(a) Primary Education



(b) Lower Secondary Education

Notes: The figure reports the annual number of mandatory instruction hours in primary (panel a) and lower secondary (panel b) education, and the share of that time that is spent in reading and mathematics. The data behind the figures come from the Education at a Glance 2019 report published by the OECD.

Table I: Heterogeneity in Returns to Instruction Time

Paper	Country	Variation	Heterogeneity by students' SES	Heterogeneity by school characteristics
Cerdán-Infantes (2007)	Uruguay	Extension of school-day	Larger effects on disadvantaged schools.	
Hincapié (2016)	Colombia	Extension of school-day	Larger effects on disadvantaged schools and on rural schools.	
Bellei (2009)	Chile	Extension of school-day	Larger effects on public and rural schools.	
Berthelon <i>et al.</i> (2016)	Chile	Extension of school-day	Larger effects on public and rural schools.	
Barrios-Fernández and Bovini (2021)	Chile	Extension of school-day	Larger effects among students whose parents did not attend university, had less than 50 books at home, and had no computer or Internet at home.	Larger effects in schools enjoying of greater autonomy (no-fee charter schools).
Domínguez and Ruffini (2021)	Chile	Extension of school-day	Larger earnings and employment gains among students from low-income backgrounds.	
Huebner <i>et al.</i> (2017)	Germany	Extension of school-day	Larger effects among high performing students	
Lavy (2019)	Israel	Additional resources resulting on increased daily instruction areas.	No statistically significant differences by SES.	
Meroni and Abbiati (2016)	Italy	Additional weekly instruction hours on reading and mathematics.	Larger effects among high-achieving disadvantaged students.	
Battistin and Meroni (2016)	Italy	Additional weekly instruction hours on reading and mathematics.	Larger effects among high-achieving disadvantaged students.	
Figlio <i>et al.</i> (2018)	USA (Florida)	Extension of school-day	Smaller effects for students at the bottom of the ability distribution. No clear pattern by students' SES.	
Fitzpatrick <i>et al.</i> (2011)	USA	Instruction days before exam	No statistically significant differences by SES.	
Carlsson <i>et al.</i> (2015)	Sweden	Instruction days before exam	No statistically significant differences by SES.	
Agüero and Beleche (2013)	Mexico	Instruction days before exam	Smaller effects on disadvantaged schools.	
Aucejo and Romano (2016)	USA (North Carolina)	Students' absences	Absenteeism is more detrimental for low performing students.	
Sims (2008)	USA (Wisconsin)	Instruction days before exam	Larger effects in rural schools and in districts with larger minority shares.	Larger effects in districts with higher levels of school expenditure.
Cattaneo <i>et al.</i> (2017)	Switzerland	Differences in instruction time across subjects	Larger effects on more demanding school tracks.	
Lavy (2015)	Countries taking PISA	Differences in instruction time across subjects		Larger when there are good accountability systems in place, and in settings in which schools have greater autonomy.

Notes: The table summarizes the differences in the characteristics of the pupils (column 3) and schools (column 4) that different studies find to be associated with larger gains from instruction time expansions.