The 1h+ Policy in Argentina: Understanding learning outcomes effects on public primary schools

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Introduction

The pandemic Covid-19 had dramatic consequences in many countries. The expansion of the virus particularly affected public education and transformed the learning paths of more than 1.6 million of students around the world (Secretary of Evaluation and Information, 2021:11). The numerous obstacles for the regular development of the learnings procedures challenged many schools to adapt quickly to a new learning environment.

The critical impact on education also led to exacerbate the preexisting inequalities. During this period, it was evident the importance of the learning infrastructure to guarantee the continuation of the pedagogic procedures. Many schools that already had infrastructure issues suffered one of the most severe consequences of the pandemic: school exclusion. As a result of the described challenges, governments in Latin America analyzed the consequences on school performance. The World Bank estimated that 71% of students faced learning comprehension difficulties, and the rate was 12% higher for low-income students (Secretary of Evaluation and Information, 2021:12).

In Argentina, the Ministry of Education worked towards the implementation of a public policy focused on supporting primary public schools' students. By the end of 2021, the 1h+ program increased the study hours from 4 to 5 in public primary school expecting to improve students' performance. The learning assessment "Apreder" was in charge of measuring learning outcomes across the period for public and private primary schools.

This analysis is motivated by the following research question: does an extension in the study hours increase the performance of primary public schools? Considering the importance of obtaining unbiased and robust estimations, a panel data model with fixed effects and a difference in differences model was implemented.

The policy and its context

1. Disparities between public and private primary schools in Argentina

Argentina was one of the first countries in Latin America to achieve universal primary education. The rapid expansion of primary education increased from 55% in 2012 to 75% in 2022. Even though today there are more than 4.5 million Argentinian students enrolled in primary schools, there is still a concern about the existing disparities between public and private primary schools.

The learning environment is important to understand the existing segregation. In terms of educational management, public schools have been affected by restricted resource allocation and strict laws of accountability. Consequently, public schools tend to have less equipment, low quality of instruction and even lower spending on teacher's salaries in comparison with private schools. The evidence has shown that the lack of infrastructure and school resources lead to migration of medium and high-income students to private schools, while low-income students stay at public schools (Jaume, 2013:2). As a result of the segregation, public schools have been losing their role of social integration to reduce exclusion in society.

With regards to socioeconomic inequalities, Formichella (2011) explained that low-income students have less opportunities to access a better quality of education. The author emphasized that the existing socioeconomic disparities have a powerful influence on students' outcomes and the growing segregation

contributed to increase this gap. In other words, public schools have failed in their role to compensate economic inequalities and improve students' performance despite their social origin.

2. The Covid-19 in public schools

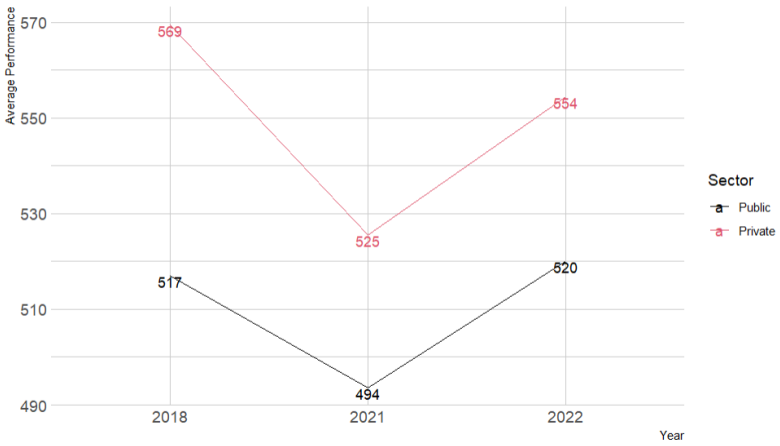
During the Covid-19 public health emergency in 2021, Argentinian schools suffered many challenges. Public schools, who were already victim of segregation and existing socioeconomic disparities, faced significant barriers in terms of infrastructure and inequalities.

The lack of digital technologies has been one of the most critical aspects for public schools. In 2021, the Argentinian Ministry of Education measured that more than 95% of students from private schools have access to internet, while the percentage for public schools decrease to 60%. Initially, the government distributed computers for low-income students. However, the absence of a connectivity policy focused on public school students was a critical impediment to access textbooks and school materials, and reduced students' interaction with teachers (Cardini, D'Alessandre & Torre, 2020:5). This situation is different from private schools, who managed to facilitate the access to learning platforms.

In terms of the socioeconomic inequalities, during the pandemic students from public schools were disproportionately impacted. Considering that most students from public schools already belong to low-income families, the economic instability and uncertainty contributed to affect even more their living conditions. Additionally, because of the spread of the virus many public schools decided to suspend food security programs resulting in a limited distribution of meals (Cardini, D'Alessandre & Torre, 2020:7). The critical economic inequalities and food insecurity led to a deeper learning exclusion of public-school students.

As a result of the explained root causes, it is possible to analyze several problems related to public school performance. The overall performance results show a long-term gap between public and private schools in the period from 2018 through 2022. As can be seen in graph 1, which shows the evolution of school performance in public and private schools, during the year 2021 the average performance in public schools (494) had a larger decrease than private schools (525). Additionally, in 2021 the Argentinian Ministry of Education measured that 27.2% of students in public schools had a performance below the basic level, while the percentage for students in private schools is 11.6%. In the group of students who achieved an advanced performance, 2.1% belonged to public schools and 25.6% to private schools. In other words, students in public schools exhibit lower academic performance compared to those in private schools.

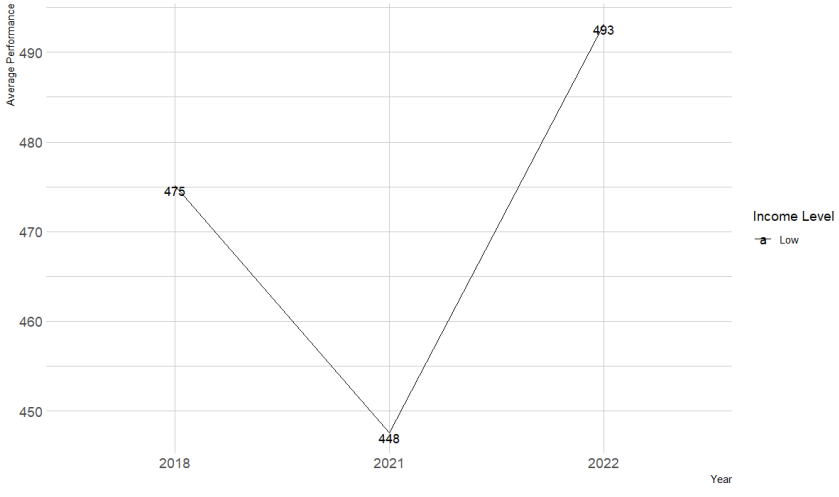
Graph 1: School Performance in Public and Private Schools



The author Formichella emphasized the importance of the socioeconomic effect to understand performance disparities (2011:153). Students' social origin, school composition and the availability of resources in public institutions are important factors to understand the performance in public schools. The measures published by the Argentinian Ministry of Education in 2021 showed that among low-income students, 41,9% have a school performance below the basic level. In contrast, the majority of high-income students have an advanced level of performance at 74%. Additionally, Graph 2 shows the school performance of low-income students from public institutions across the period from 2018 through 2022. In 2021, the performance of low-income students (448) decreased significantly more than the overall performance in public schools (494).

The most critical scenario regarding academic achievement is evident among low-income students attending public school. Even though there is a long-term performance gap between public and private schools, the pandemic notably exacerbated the challenges for low-income students who were disproportionately affected.

Graph 2: School Performance by Income Level in Public Schools



3. The extra hour of study public policy

The concerning situation of school performance in public institutions sparked numerous discussions, The government directed its attention specially to the study hours in public schools, which are regulated by the National Law of Education N° 26.206. Towards the conclusion of 2021, the Argentine Ministry of Education implemented a public policy named "1 extra hour of study (1h+)" for students in public primary schools, extending the daily class duration from 4 to 5 hours.

Prior to the program's implementation, public primary schools in Argentina operated with a daily schedule of 4 hours. During that period, Argentina provided fewer study hours compared to the Organization for Economic Cooperation and Development (OECD) average (Ministry of Education, 2021:8).

The solution to increase the study duration by only one hour was a deliberate decision, taking into account the significant efforts required by the academic community in public schools. Accordingly, the government implemented a public policy that did not involve complex alterations to the academic schedule, modifications to the organizational structure or infrastructure adjustments.

The primary aim of the program is to support students and improve their overall learning results in writing skills, reading comprehension, mathematics and sciences. Teachers are enabled to allocate the extra time to explain further the topics and facilitate a deeper understanding of the courses. These foundational areas of knowledge are fundamental and establish essential skills for students to navigate future academic years. The government has indicated its plan to gradually increase study hours by 2027.

As a result of increasing the study hours per day, public schools had an equivalent of 38 additional days of school (Ministry of Education, 2021:9). The 1h+ program expected that more study hours would improve positively the learning outcomes, especially for low-income students. Eventually the public policy will lead to greater learning opportunities, improvement of the existing knowledge, better participation and socialization from students. Also, the policy anticipated the possibility to facilitate the transition from primary school to secondary level.

Even though the target group of the policy was focused on students in public primary schools, it also analyzed the potential benefits on teachers and families. Extending the school day not only leads to better earnings for teachers, but also provides additional time for in-depth explanation of the academic curriculum. Furthermore, it opens up the opportunity for innovation and enhancement in pedagogical methods, thereby improving the overall quality of education.

The program also has positive implications with regards to the families. The extension of the school day could serve as a mechanism to facilitate labor market insertion of parents, mostly women, who are primary responsible for childcare (Ministry of Education, 2021:10). The family income could potentially increase as a consequence of more time available for working.

Data and Methodology

1. Learning Assessment “Aprender”

The learning assessment in Argentina has been developed by the Ministry of Education in 2016 and named “Aprender”. The test is built by the Ministry of Education, the Secretary of Evaluation and Information and the Federal Council of Education. The three actors and their technical teams work together to define and validate the areas of study each year. The assessment aims to produce information to understand the

accomplishments and pending challenges in the education system, and consequently design public policies. The major objective is to develop public policies that contribute to guarantee education rights, understand learnings paths and build an equal education system (Secretary of Evaluation and Information, 2022:18).

Initially the assessment collected information about secondary students, but in 2018 they decided to incorporate primary students from public and private schools. At this moment the region of implementation is Buenos Aires, and the assessment is focused on primary and secondary students from 6° grade, which is the last year of study.

In 2018, 9,600 public and private primary schools took part in the assessment, followed by 9,638 in 2021, and a decrease to 3,900 in 2022. In 2019 only secondary schools took the test (Secretary of Evaluation and Information, 2022:28).

	2018	**2021**	**2022**
Number of schools that participated in the assessment	9.600	9.638	9.990

In terms of the areas of interest, the assessment consists of a general section which includes a test in language and mathematics and derives in a final performance score. The language questions are related to reading and writing comprehension, especially how students interpret, reflect and evaluate a text based on their previous knowledge. While the mathematics test is focused on problem solving, particularly how students use their logic to find solutions and argue about their decisions. Also, there are specific sections that change every year and include topics such as integral sex education and immigration.

2. Research question

The following study aims to conduct an impact evaluation analysis of the 1h+ program. It is expected to examine how effective the policy has been in achieving its intended goals, using data from the Argentinian learning assessment between 2018 and 2022. Following this, the primary research question centers on analyzing whether an extension of the study hours lead to higher performance scores in primary public schools.

3. Variables of Interest

The level of analysis of the datasets is schools and the variables of interest to conduct the analysis are:

- School ID: the learning assessment assigns a unique identifier number to both private and public primary schools. The ID's have been important to consolidate a dataset of schools that consecutively participated in the assessment in the three years of study.
- Sector: the sector distinguishes public schools who are identified by number 1 from private schools that are number 2.
- Income level: there are three levels of income included on the dataset. Low-income is identified by number 2, medium income by number 1 and high income by number 0.
- School performance: this variable represents the average performance on school level as a result of the language and mathematics test. The lowest performance is at 200 points and represents a score below the basic level, while the highest performance is at 800 and represents an advanced level. This is the dependent variable in the analysis.
- Year: there are three years included in the analysis, 2018; 2021 and 2022 respectively.

- Treatment: the treatment is defined by public primary schools, who are the target group of the 1h+ policy and are labeled as 1. In contrast, private primary schools are the control group because the extension of the study hours was not mandatory for them and are labeled as 0. This is the independent variable in the analysis.
- Time: the years 2018 and 2021, which are before the treatment, are labeled as 0. While 2022 represents the period after the treatment and is labeled as 1.

4. Panel Data Fixed Effects

The first model implemented is panel data fixed effects. Working with this model is possible because the learning assessment Aprender contains schools and their respective average performance that can be observed over time. One of the most important advantages in panel data is the possibility of controlling time-invariant unobservable cofounders using fixed effects which results in reliable and unbiased estimates (Dayal & Murugesan, 2023: 193).

Initially, the regression equation can be represented like this:

$$\textbf{School performance}_{¡} = \alpha + \beta\ \textbf{treatment}_{¡} + e_{¡}$$

However, it is important to be suspicious of possible unobserved cofounders that might have an influence on the true estimate. For example, intelligence, personality traits and ability are often unobserved and do not change much over time. These unobserved cofounders, which possibly vary across schools, might have an influence on school performance. In other words, an increase in the number of study hours can explain the variation in school performance to some extent, but there are unobserved variables that can influence performance as well.

Considering the unobserved variables, the regression equation can be represented like this:

$$\textbf{School performance}_{¡} = \alpha + \beta\ \textbf{treatment}_{¡} + \gamma\ \textbf{intelligence}_{¡} + \gamma\ \textbf{ability}_{¡} + \gamma\ \textbf{personality}_{¡} + e_{¡}$$

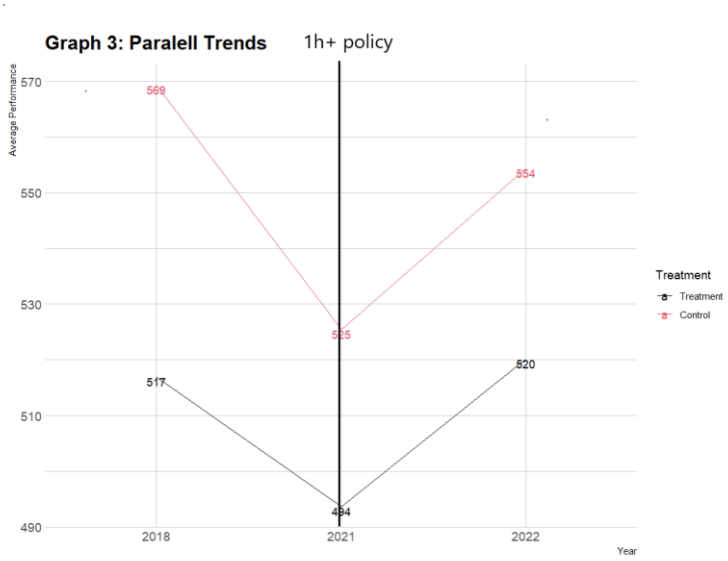
The opportunity of implementing panel data fixed effects will allow taking into account the unobserved heterogeneity across schools. As a result of the fixed effects approach, it will be possible to obtain an accurate and unbiased estimate of school performance (Dayal & Murugesan, 2023: 199).

5. Difference in Differences

The second approach to estimate the effect of the 1h+ program on public primary school performance is difference in differences (DID). To implement this model, it is necessary to distinguish between two groups: a treated group which includes public primary schools where the 1h+ program was implemented and a control group that consists of private primary schools where the program was not put into place. In this model the timing is essential, the period before the implementation of the policy is represented by the years 2018 and 2021, while after the policy change is the year 2022.

The difference in differences model assumes that the trend between the control and treatment group must be parallel before the treatment, so that any difference after the policy can be subscribed only to the intervention (Dayal & Murugesan, 2023: 229). The slope in Graph 3 indicates that before the intervention, the average performance between the control and treatment group was approximately parallel. Although the average performance for both treatment and control increased after the policy change, this study assumes that the changes in the control group are not associated with the implementation of the 1h+ policy. This statement can be supported by the fact that following the implementation of the policy, the control group

improvement was lower (554) compared to their performance before the treatment (569) in contrast to the treatment group improvement.



Findings and Interpretation

The first models implemented show regression results without fixed effects. The models reveal that public schools in which there was a change in the study hours from 4 to 5 did not improve their performance. However, after the implementation of the policy in 2022 the coefficient decreased to -6.291 compared to -32.445 in 2021 before the treatment. In other words, even though the findings did not indicate a significant improvement in the performance of public primary schools, it is noticeable that during the year the 1h+ program was implemented, there was a comparatively smaller decrease in school performance. It is important to mention that these models do not control for unobserved time-invariant cofounders and, therefore it should not be interpreted as causality.

Regression Results

	Dependent variable:	
	avg_performance	
	Model 1	Model 2
	(1)	(2)
treatment	-42.623***	-42.315***
	(2.732)	(2.619)
year2021		-32.445***
		(2.735)
year2022		-6.291
		(4.826)
Constant	550.053***	565.225***
	(1.995)	(2.383)
Observations	1,615	1,615
R2	0.131	0.203
Adjusted R2	0.131	0.201
Residual Std. Error	54.783 (df = 1613)	52.501 (df = 1611)
Note:		*p<0.1; **p<0.05; ***p<0.01

The previous estimates might be considerably biased because they did not take into account unobserved differences between schools. The new estimates incorporate school-level fixed effects in model 1, year fixed effects in model 2 and both school-level and year in model 3. The three coefficients still show that the school performance did not improve in primary public schools as a result of the 1h+ program.

Holding constant influence of school and year differences, the policy change shows a smaller decrease in public primary schools' performance (-16.33) than model 1 (-29.37) and model 2 (-42.32). Even though increasing the number of study hours did not achieve the intended outcome of improving primary public schools' performance, it is possible to observe a lower performance difference between public and private schools when the model accounts for any time-varying factors that affect schools across years. The analysis is not conclusive because the coefficient is not statistically significant.

	Model 1	Model 2	Model 3
treatment	-29.37	-42.32 *	-16.33
	(24.83)	(8.93)	(38.95)
Num. obs.	1615	1615	1615
Num. groups: ID	752		752
R^2 (full model)	0.58	0.20	0.65
R^2 (proj model)	0.00	0.14	0.00
Adj. R^2 (full model)	0.22	0.20	0.35
Adj. R^2 (proj model)	-0.00	0.14	-0.00
Num. groups: year		3	3

*** p < 0.001; ** p < 0.01; * p < 0.05

At this point, it is possible to affirm that the 1h+ program was not successful in improving public primary schools' performance. However, considering the importance of the socioeconomic level on learning outcomes it might be interesting to include income level as another variable in the model.

Model 1 shows a multiple regression result, the treatment coefficient indicates that public primary schools in which the study hours increased from 4 to 5 have a lower performance (-34.44) than private primary schools. Even though the regression result does not implicate causality, after incorporating income level as another variable in the model the treatment coefficient decreased compared to the previous regression model result (-42.623).

In the new regression table, model 2 incorporates school income level fixed effects, model 3 year fixed effects and model 4 both school income level and year fixed effects. In this new scenario, the treatment coefficient in model 4 indicates a positive effect on public primary school performance holding constant the influence of school's income level and years. The new result suggests that public primary schools that were treated by the 1h+ policy had a positive effect on performance by 9.55 points compared to private primary schools. Nevertheless, the coefficient is not statistically significant.

	Model 1	Model 2	Model 3	Model 4
(Intercept)	563.12 ***			
	(2.12)			
treatment	-34.44 ***	-9.80	-42.09 *	9.55
	(2.34)	(21.31)	(8.51)	(22.08)
as.factor(income_level)1	-22.45 ***			
	(2.48)			
as.factor(income_level)2	-60.08 ***			
	(3.54)			
R^2	0.16			
Adj. R^2	0.16			
Num. obs.	3366	3366	3366	3366
Num. groups: school_id		1848		1848
R^2 (full model)		0.66	0.12	0.70
R^2 (proj model)		0.00	0.09	0.00
Adj. R^2 (full model)		0.25	0.12	0.34
Adj. R^2 (proj model)		-0.00	0.09	-0.00
Num. groups: year			3	3

*** p < 0.001; ** p < 0.01; * p < 0.05

The last model implemented is difference in differences. The interaction term is a dummy variable indicating whether the outcome was observed in the treatment group, and it was observed after the intervention (1) or any other case (0). The coefficient shows a positive and statistically significant coefficient of 9.368. In other words, the new estimate indicates that the 1h+ policy had a positive and significant effect on public primary school performance and was effective achieving the intended outcomes.

Difference in Differences Results

	Dependent variable:
	avg_performance
	Model 1
treatment	-49.501***
	(3.540)
time	-12.297***
	(2.276)
I(treatment * time)	9.368***
	(3.172)
Constant	559.007***
	(2.580)
Observations	1,615
R2	0.147
Adjusted R2	0.146
Residual Std. Error	54.298 (df = 1611)
Note:	*p<0.1; **p<0.05; ***p<0.01

Conclusion

The pandemic had left severe consequences on Argentinian public primary schools. Although there are many areas in public schools that require immediate attention, the government has been focused particularly on students' school performance. The 1h+ program, implemented by the end of 2021, had a

positive effect on public primary school performance by 2022. The difference in differences model provided enough evidence to affirm that as a result of additional hours of school there was an improvement on students learning outcomes.

In the short-term the policy change improved students overall reading and writing comprehension, as well as their problem solving skills. However, in long-term it might be possible to find further positive results such as facilitate students' transition to primary school, increase their engagement in class and improve their existing knowledge.

Although the public policy resulted in positive effects, policy makers should not ignore the long-term performance gap between public and private schools. Even after the policy implementation, the existing inequalities, segregation and infrastructure issues are still an important concern for public schools. The possibility of complementing the 1h+ program with additional policies to tackle students' inequalities and improve their learning environment would have a more powerful effect on school performance.

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