

The effect of the H1N1 pandemic on learning. What to expect with Covid-19?

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Key messages:

- 1 The analysis indicates that the extension of the winter break, adopted in 13 municipalities of the state of São Paulo during the H1N1 pandemic, significantly decreased learning outcomes among students in the 5th grade of elementary school (ES).
- 2 The decrease in math performance resulting from the two to three weeks winter break extension is equivalent to two months of learning.
- 3 The impacts were more pronounced among schools in the bottom quintile of test score distribution, which suggests that the consequences were more severe among the most vulnerable groups.
- 4 These results suggest that the effect of Covid-19 will be relevant, and remedial policies will be required to mitigate learning losses.

School closures and learning

School closures have been adopted as a preventive measure against the spread of the Covid-19 pandemic by almost all countries in the world. Such measures are unprecedented in scale: at the end of April 2020, in 190 countries, more than 1.5 billion students were out of school.¹ Most of Brazil's 48 million students in Primary and Secondary Education have been affected.² Unique in modern history, there is a great debate about the consequences for students and education professionals.

Although it is too early to determine the impact of school closures on children's learning, few would disagree that such effects will be negative. The research exploring the interruption of classes has found an increase in the risk of school dropout (Meyers and Thomasson, 2017; Bandiera et al., 2018); a decrease in literacy (Marcotte and Helmut, 2008) and proficiency (Baker, 2013); an increase in the knowledge gap between students of different socioeconomic backgrounds (Alexander et al., 2007); and lower probability of holding a college degree (Belot and Webbink, 2010).³ Together, these results indicate that, in addition to the high individual costs, the current crisis may also significantly

affect the labor productivity of the workforce in the long-term.

Despite the fact that some schools have adopted remote learning, many children lack the required equipment, access to the broadband Internet, a suitable environment for studying, and/or the presence of an adult who can help with the new teaching routine. Compounding these difficulties, few teachers have the skills required to teach remotely (World Bank, 2020).

As far as the emotional consequences of the crisis are concerned, it is likely that both teachers and students will be negatively affected during the period of social isolation. The duration of quarantine, the loss of a family member, the fear of contagion, the reduction of household income, and the disrupted family environment due to increased domestic violence are likely to scale up the damage of school closures on learning outcomes.⁴

This note aims to shed light on the potential effects of the Covid-19 pandemic on the learning of fifth grade students. We leverage the 2009 H1N1 pandemic to benchmark the impacts of the current crisis. There are limitations to this exercise that are worth pointing out. At the time of H1N1, no quarantines were adopted, the risk of contagion and mortality were lower, and the emotional and economic impacts were also incomparably lower. Thus, by relying on a less severe pandemic crisis, our main findings should be seen as lower bound effects of the Covid-19 on learning.

H1N1 in São Paulo

In July 2009, in the midst of the H1N1 pandemic, all state schools and municipal schools of 13 municipalities in the State of São Paulo extended the winter break by two to three weeks.⁵ More than 5.5 million Primary and Secondary Education students were affected by this measure, which in that year represented 69.3% of students from state and local schools. The other municipalities did not alter their school calendars.

How to estimate school closure effects on learning?

To estimate the impact of school closures on the learning of fifth grade students during the

H1N1, use data from Prova Brasil test scores in Portuguese language and mathematics. The focus is on fifth graders as in 2005 only 4 out of the 13 municipalities that postponed the return of schooling had proficiency score data for the ninth grade.

Our analysis then considers as the treatment group the schools in the municipalities that extended the winter break, while the comparison group is formed by schools in the other 632 municipalities of São Paulo state, which followed the school calendar normally.

As the school closures occurred just after the winter break of 2009, the proposed exercise compares two groups of students: those who had the usual school break period and those whose school break was extended by two to three weeks. If one assumes that the longer the time away from school, the greater the potential for forgetting the school content, our estimates will overstate the impacts of interrupting classes for two to three weeks.

Intuitively, we estimate the effect of the winter break extension by comparing the difference in the evolution of learning in the treatment and comparison groups in 2007 (before the pandemic) and 2009 (after the pandemic).⁶ For the estimates to be interpreted as a causal effect of the school closures on the learning outcomes of fifth grade students, it is necessary that the evolution of learning of the comparison group emulates what would have happened with student learning in the treated schools in the absence of the treatment (school closures).⁷ In fact, data from Prova Brasil, for the years 2005 and 2007, suggest that the learning outcomes of these two groups followed the same trend as before the H1N1 outbreak.

Impacts on learning

Our results indicate that extension of the winter break due to the H1N1 pandemic had a negative average effect on proficiency in Portuguese language and mathematics, equivalent to a 0.15 standard deviation.⁸ This magnitude is high, especially when compared to a preliminary exercise by Burgess and Sievertsen; and with the average effect found for educational policies aimed to increase student learning in developing countries (McKewan, 2015).⁹

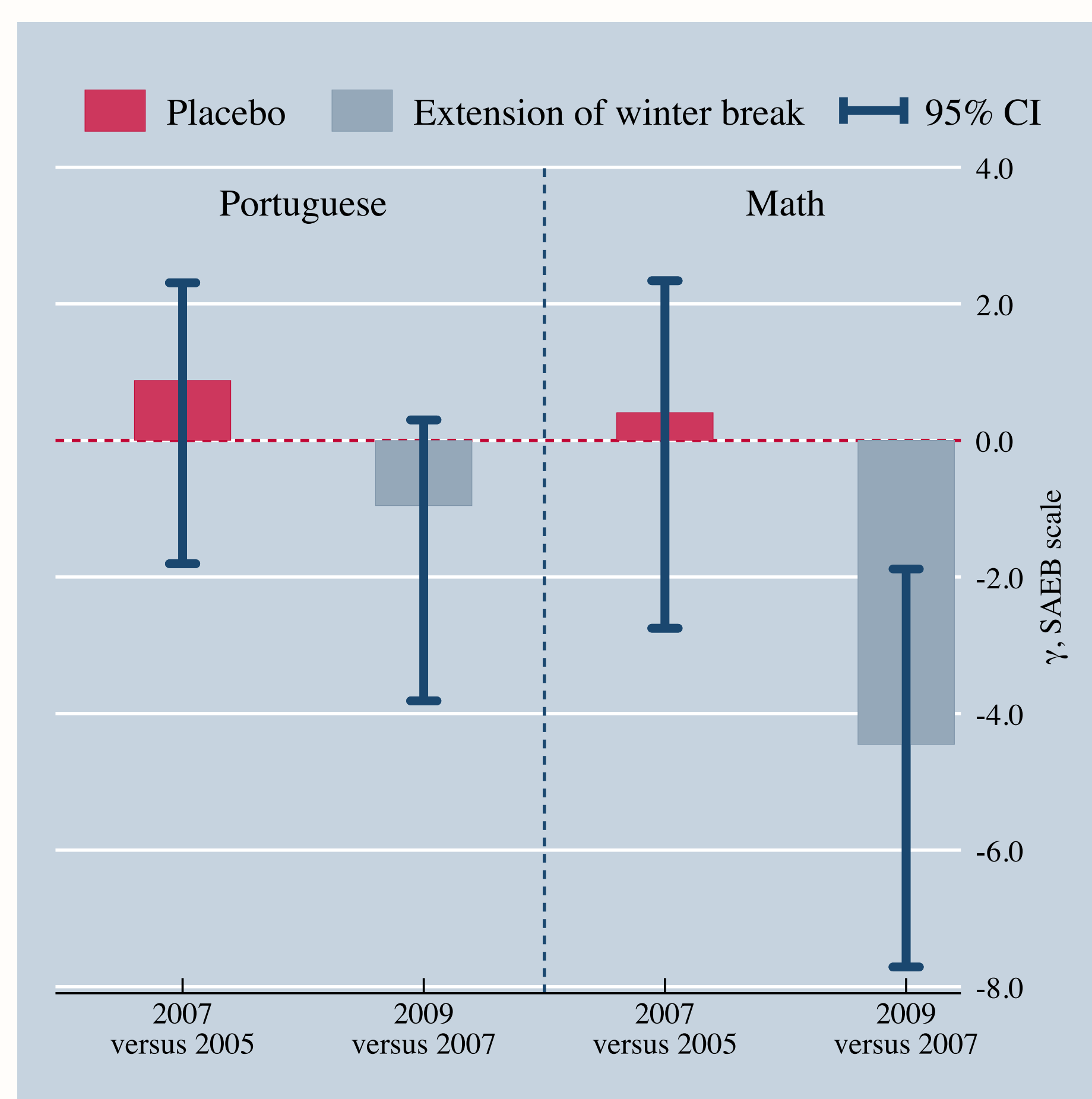
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The effect in mathematics corresponds to a 4.5 point drop in performance on the SAEB scale, or a 0.2 standard deviation.¹⁰ For Portuguese language, the estimated effect is negative, but it is not statistically different from zero (Figure 1). The higher effect on math is in agreement with Baker's work (2013) and with the literature that explores the effect of summer break on learning in the United States (Cooper et al., 1996).

Figura 1: Estimated impact in Portuguese language and mathematics for ES fifth grade students, SAEB scale



In an ideal scenario, one estimates that the average annual gain in proficiency in mathematics between the end of the fifth and ninth grade, should be 20 points on the SAEB scale per academic year (Alves, Soares, and Xavier, 2016). Therefore, the estimated drop of 4.5 points would correspond to 9 weeks or about 2 months ($200 \text{ school days} \times 4.5/20$) of learning. This effect is large, especially when one considers that the learning base was already low: even before the pandemic, 57.2% of students in the schools affected by the measure were below the adequate level of proficiency in mathematics.

To check whether the policy had distributional effects, we estimate treatment effects on the quintiles of the mathematics proficiency distribution. The effect is negative throughout the distribution, but higher in the first quintile (-5.2 points on the SAEB scale). The strongest effect on the lower tail suggests that the negative effects were higher among students

already behind in mathematics, which explains the relatively small increase of 3.5 percentage points (6.1%) of students below the adequate level of mathematics proficiency.

These results also suggest that the effect was higher among the most vulnerable students, since local schools with the worst grades, compared to top 20% schools, had a higher proportion of students who had already dropped out (7.7 percentage points higher) or repeated some grade of ES (9.6 percentage points higher) and whose mother had not completed high school (20.7 percentage points higher).

It is important to note that the magnitude of the effect reflects not only the postponement of return to school, but also the influence of other factors associated with the context of the pandemic. The risk of contagion and the average number of hospitalizations was higher among the municipalities that extended the winter break. Parents and guardians were likely more reluctant to send children back to school, causing them to miss more school days.¹¹ The fear of contagion could also have affected the leisure activities of students, potentially triggering psychological factors such as anxiety and depression.

In addition, the school is an environment in which the student is protected from cases of domestic violence, at least temporarily. Being more exposed to risky situations can also impact their emotional state. All of these factors may have contributed to the decreases in learning.

What to expect with Covid-19?

Estimates show that the closure of schools in São Paulo, in the midst of the H1N1 pandemic, resulted in a significant drop in student performance in mathematics for ES fifth grade students. The two to three week extension of July holidays is estimated to be equivalent to the loss of two months of learning. If this estimate is a good proxy of what will happen with the actual school closures, one can expect a learning loss equivalent to half-semester of a school year. Although it is not possible to

extrapolate these results to Brazil, this analysis suggests that there will be a significant drop in student performance.

However, everyone agrees that the reopening of schools should only happen when the health of students and teachers can be guaranteed, in line with the recommendations of health professionals. In the process of returning to schools, some of the main policies to be adopted to mitigate the negative effects include: administering proficiency tests to identify the content that should be prioritized and the most vulnerable students who will need special attention; extending the daily course load; shortening the planned holiday for December and January; holding extra tuition; promoting campaigns to raise awareness about returning to school (via TV or digital media); and continuing and improving distance learning platforms to complement classroom learning.

Notes

¹UNESCO and World Bank.

²Synopsis of Primary and Secondary Education, 2019. INEP.

³In the mentioned articles, the schools were closed because of the polio pandemic in 1916 (Meyers and Thomasson, 2017); more severe winters in the USA (Marcotte and Helmut, 2008); the school holiday period (Alexander et al., 2007); and a teachers' strike (Belot and Webbink, 2010).

⁴The return to school in the context of the Covid-19 pandemic. Todos Pela Educação. May 2020.

⁵São Paulo, Campinas, Diadema, Embu das Artes, Indaiatuba, Mairiporã, Osasco, São Bernardo do Campo, Santo André, São Caetano do Sul, Sumaré, Ribeirão Preto and Taboão da Serra.

⁶The proposed estimator is the difference-in-differences: <https://github.com/worldbank/h1n1-school-closures-sp-2009>.

⁷As Prova Brasil was applied in 2005 for the first time, it was not possible to test the hypothesis of parallel trends in previous years. In 2005, 03 of 13 municipalities which chose to postpone the return to classes did not present proficiency data of ES 5th grade students (Campinas, Indaiatuba and São Caetano do Sul). Thus, as it is not possible to check the hypothesis of parallel trends for their local schools, they were excluded from the analysis.

⁸In 2007, in the local system of São Paulo, the standardized score of fifth grade students presented an average of 5.2, with a standard deviation of 0.66. Thus, a drop of -0.1 point of the grade is equivalent to a 0.15 standard deviation.

⁹Simon Burgess and Hans Henrik Sievertsen argue that closing schools for 12 weeks could lead to a 0.06 sd drop in learning. (<https://voxeu.org/article/impact-covid-19-education>).

¹⁰In 2007, in the local system of São Paulo, the mathematics score of fifth grade students presented an average of 203.41 with a standard deviation of 19.43.

¹¹Until August 2009, the number of hospitalizations for H1N1 were 35 and 20 per 100,000 inhabitants in the treated and comparison municipalities, respectively.

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