

School Dropouts in Brazilian High Schools: The Impact of the Pandemic

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Abstract

This study aims to examine the impact of the COVID-19 pandemic on school dropout rates in Brazilian high schools. Data from the Anísio Teixeira National Institute for Educational Studies and Research (INEP), covering the period from 2015 to 2023, were analyzed using multiple regression with dummy variables and the Chow test. This approach allowed for the control of variables such as school location (rural or urban), administrative dependency (public or private), geographic regions (Central-West, Northeast, North, South, and Southeast), and the pandemic (specifically the year 2020, when social distancing measures were implemented). The findings indicate that dropout rates in urban and rural schools are similar; however, public schools consistently showed higher dropout rates compared to private schools across all models. Furthermore, during the pandemic period, the Northeast region exhibited dropout levels comparable to those of the North, while the South showed higher dropout rates than the North. Additionally, the pandemic led to changes in both the linear and angular coefficients of the dependent variable (school dropout), suggesting that the health crisis contributed to an increase in dropout rates in the country.

Keywords: high school, pandemic, quantitative, school dropout

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Introduction

School abandonment is a global phenomenon that has challenged educational systems over the decades; however, the meaning of the term varies by country and generally refers to individuals who interrupted formal schooling before the expected age (Profiroiu et al., 2024). In Brazil, the term school abandonment refers to students who stop attending school partially or permanently but return the following year. Young people who abandon school are more likely to face a series of difficulties throughout life, including fewer employment opportunities and higher rates of involvement in risky behaviors, as noted by Rumberger and Rotermund (2012). It is a process that occurs silently and gradually; indeed, the school itself often acts as an active agent in school abandonment (Azevedo, 2023).

Recent studies indicate that school abandonment affects millions of young people around the world. Projections suggest that the COVID-19 pandemic may have worsened this situation, leading about 23.8 million children in an emerging country to potentially discontinue their education, as highlighted by Ozdemir et al. (2024). In Brazil, the risk of school dropout among elementary and high school students rose from 10% to 35% because of the pandemic, as reported by Lichand et al. (2022).

Several factors contribute to school abandonment, and these are multifactorial and influenced by students' socioeconomic, family, and cultural conditions. Among the main reasons are financial difficulties, lack of family involvement, a history of abuse, antisocial behaviors, and weak teacher-student relationships, according to the review by Gubbels et al. (2019). Internal factors, such as disinterest in the school environment and mental health problems, also play an important role in this process. There is also a classification of school abandonment according to the in-school, student, and family dimensions (Soares et al., 2015).

In addition to traditional factors, the pandemic exacerbated other challenges, such as inequality in access to technology and the lack of infrastructure for remote teaching (Anderete Schwal, 2024), especially in emerging countries. Studies such as Joulaei and Kalateh Sadati (2020) point out that poverty and the economic destruction resulting from the pandemic, combined with inadequate technological infrastructure, increased school abandonment rates. In Pakistan, the loss of family income during the pandemic led to child labor, forcing school abandonment, according to Khan and Ahmed (2021).

School closures, social isolation, and the forced adaptation to remote teaching caused profound impacts on the routine of millions of students and their families. Educational inequalities were widened, and many students were unable to keep up with the changes in the teaching model, as reported by Shuja et al. (2022).

In Brazil, the school abandonment rate had been progressively declining; however, the phenomenon never ceased to occur and was amplified by the COVID-19 pandemic. Lacruz et al. (2024) emphasize that, in Brazil, the pandemic represented a break in the downward trend of dropout rates, with public schools being more affected than private schools.

Although these measures were important for reducing the spread of COVID-19, it is undeniable that social isolation measures amplified inequalities among students, especially in the unequal access to technological devices and the internet (Joulaei & Kalateh Sadati, 2020; Khan & Ahmed, 2021).

In addition, it is reasonable to consider the possibility that the pandemic affected urban and rural areas differently, as well as public and private schools. Based on these issues, this article aims to answer three questions regarding Brazilian high school classes: (1) what was the impact of the pandemic on school abandonment rates?; (2) was abandonment the same between public and private schools?; and (3) was abandonment the same between urban and rural areas?

As for the justification, school abandonment in high school has not been studied as extensively, since much of the literature cited in this article refers to primary and secondary education in Brazil and other countries. However, data from the 2023 School Census show that the dropout rate in high school is the highest among the stages of education (5.9%). When we consider school abandonment, since dropout represents the final stage, the number is probably higher than 5.9%. Therefore, it is necessary to understand the impacts of the pandemic on school abandonment in high schools.

It should be noted that this study does not seek to understand the reasons for school abandonment or to advocate for any type of public policy, but only to understand the effects of the pandemic on school abandonment in Brazilian high schools.

Literature Review

Gubbels et al. (2019) conducted a meta-analytic review of the risk factors for school abandonment, identifying antisocial behavior, substance abuse, limited parental involvement, and poor relationships with teachers as determining factors. They suggest that an effective solution requires a multidimensional approach that takes into account both individual and contextual factors, such as families, communities, and peers.

Since the causes of school abandonment are already known in the literature, it is reasonable to assume that the COVID-19 pandemic raised concerns regarding school abandonment, especially in emerging countries, where educational infrastructure was already facing prior challenges. The study by Joulai and Kalateh Sadati (2020) highlights that inequality in access to technology for virtual classes increased the risk of school abandonment, particularly in countries with deficient technological infrastructure. Poverty and economic destruction, intensified by school closures, are factors that contribute to this phenomenon, leading to a decline in economic growth and in working conditions and equitable access to the labor market.

The pandemic also affected the mental health of students and their families. According to Ozdemir et al. (2024), social isolation and the difficulty of adapting to remote learning are factors that intensified school abandonment. The research reveals that students who abandon school are predisposed to physical and mental health problems, such as depression, anxiety disorders, and suicidal tendencies.

In Pakistan, the loss of family income had a direct impact on the school dropout rate (Khan & Ahmed, 2021). A 10% loss in family income led 1.659 million children to abandon school, while a 50% loss resulted in 7.2 million abandonments. The increase in child labor was another negative consequence. In addition, Shuja et al. (2022) emphasize that policies for distributing laptops and providing internet access could reduce abandonment rates.

In Iran, the phenomenon of hidden abandonment is evident, in which students are physically present in schools but are neglected in the learning process (Sadati & Saboohi Golkar, 2023). The authors identify that the unfair educational system, the decline in teachers' authority, and the informalization of school rituals contributed to this problem. In addition, the pandemic reduced the social dimension of learning, an important part of the educational experience.

Flor et al. (2022) explore the gender disparities caused by the pandemic. Their study shows that girls were more negatively affected by the economic crisis, especially in regions such as Central Europe and South Asia. The increase in domestic responsibilities and difficulties in access to technology exacerbated school abandonment among girls. This impact was more pronounced in poor countries, where girls had to help with domestic work, as also illustrated in the study by Bayley et al. (2023), which highlights the impact of early marriage and pregnancy on the increase in school abandonment.

In Brazil, more specifically in the state of São Paulo, Lichand et al. (2022) studied the impact of remote learning during the pandemic, observing that the risk of school abandonment grew significantly where remote learning was adopted. The study indicates that school abandonment in elementary and high school may have reached 35% in 2021, representing a 365% increase in the risk of abandonment under the remote regime. On the other hand, the analysis by Lacruz et al. (2024), focused on secondary education in Espírito Santo (Brazil), highlighted that the pandemic broke the downward trend in school abandonment, especially in public schools and in urban areas.

It should be noted that school abandonment represents a cost to society, especially when a pandemic event intensifies this phenomenon. According to Rumberger and Rotermund (2012), who highlight the relationship between school engagement and abandonment, students who abandon school are more likely to face unemployment, earn less throughout life, and have poorer health. In addition, they are more likely to engage in criminal behavior and to require public assistance. Reducing school abandonment, according to the authors, could generate significant savings for the government, since it is cheaper to invest in education than to promote social assistance measures to deal with the consequences of school abandonment.

Given the complexity of the issue of school abandonment in emerging countries, which already faced problems in the universalization of free, quality public education, this literature review aimed to show the different nuances faced, in Brazil and worldwide, regarding the increase in school abandonment as a result of the pandemic.

One part of this review sought to understand the causes that led to school abandonment during the pandemic, including the adoption of remote learning (Lichand et al., 2022), the reduction in family income (Khan & Ahmed, 2021), and the lack of access to technological equipment (Shuja et al., 2022). However, Lacruz et al. (2024) assessed how the presence of an external variable (the pandemic) affected the trend of school abandonment in elementary schools in Espírito Santo; that is, it involves assessing whether or not the pandemic was a cause of school abandonment.

Knowing that this study aims to contribute to the literature by expanding the findings of Lacruz et al. (2024), the following section presents the procedures adopted to estimate whether the advent of the pandemic caused a trend break in the high school abandonment rate in Espírito Santo and in Brazil. Therefore, with the exception of the external variable

“pandemic,” we cannot make inferences about the internal and external variables that lead to school abandonment. However, we can estimate the impact of the pandemic according to the school’s location and administrative dependency, both internal variables.

These internal variables are included in the model as control variables. Regarding administrative dependency, one year before the pandemic, in 2019, 98.9% of students aged 15 to 17 in the private school system had internet access and a computer or notebook at home; in contrast, this figure was 48.6% for public school students in the same age group. In addition, public schools remained closed longer than private schools (Inep, 2022) and had greater difficulty offering remote learning to students during the pandemic (Anderete Schwal, 2024). On the other hand, regarding location, only half of rural households have internet access, whereas in urban areas this figure is 83.8% (IBGE, 2020). In this way, these variables are expected to reduce result bias and avoid heterogeneity problems.

Methodology

The data were collected from the website of the National Institute for Educational Studies and Research Anísio Teixeira (Inep), through the section “School Performance Rates” (which provides information on promotion, retention, and abandonment), at the “School” level, from 2015 to 2023. As shown below, the abandonment rate variable was transformed into its natural logarithm in order to linearize the model.

Table 1
Study Variables

Variables	Instrumentalization
Dropout Rate	$\ln(1 + \textit{Dropout Rate})$
Year	Original Format
Localization	<i>Dummy</i> 0 = Rural 1 = Urban
Dependency	<i>Dummy</i> 0 = Private 1 = Public
<i>Dummy</i> Region	0 = North 1 = Midwest, Northeast, Southeast and South
Pandemic Event	<i>Dummy</i> 0 = Years before the pandemic (2015 to 2019) 1 = Years after the pandemic (2020 to 2023)
Interaction Between Year and Pandemic	Event Multiplication between the two variables (interactive term).

Source: Prepared by the author

With regard to Table 1, it is known that the number of dummy variables is always equal to the number of categories minus one; in this sense, the Region Dummy variable uses the North as the reference category (0), while the other regions are coded as 1.

The database contains data referring to schools from all Brazilian states, totaling 1,203,928 observations. However, we removed from the sample the observations that were empty in the database; therefore, the partial sample consisted of 257,786 observations.

It is important to mention that, by excluding the missing data, we assumed that the absence of data occurred randomly with respect to the variables Abandonment Rate, Administrative Dependency, and Location, as well as due to their nonexistence for the years from 2015 to 2023, according to Lacruz et al. (2024).

Although the literature shows that abandonment is caused by factors external and internal to the school, this article was not able to consider the external variables, since the Basic Education Assessment System (SAEB) database does not provide information for the years 2016, 2018, 2020, and 2022. Therefore, the only external variable is the occurrence of the pandemic, controlled by location, administrative dependency, and region.

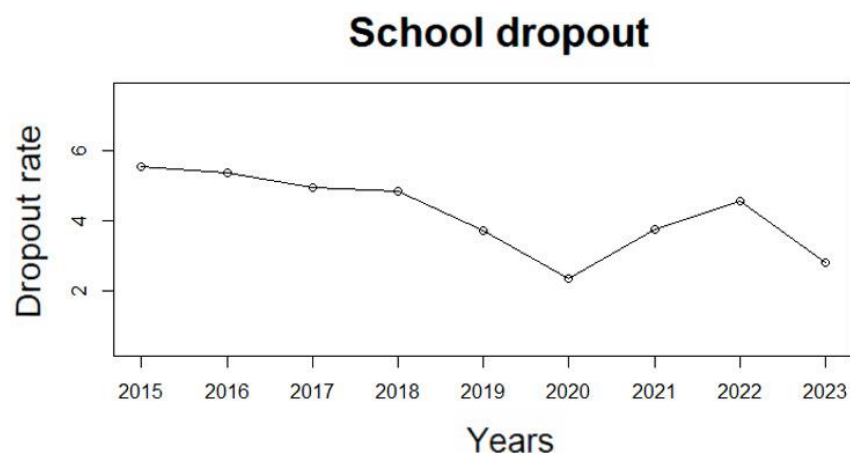
In order to measure the impact of the pandemic on school abandonment in Brazilian high schools, using Location (school located in a rural or urban setting) and Administrative Dependency (public or private school) as moderating variables, we created three multiple regression models: Model 1 (2015 to 2023), Model 2 (2015 to 2019), and Model 3 (2020 to 2023). Given these variables, we used the Chow test (1960) to understand whether or not there was a structural break in the regression models of school abandonment as a result of the pandemic.

In order to clarify the terms used here, the Chow test (1960) provides for two types of break: linear and angular. When there is a break in the linear coefficient (intercept), we understand that the point at which the regression line crosses the Y-axis changed between the periods analyzed, whereas a break in the angular coefficient (slope) implies a change in the relationship between the dependent and independent variables, represented by a change in the slope between X and Y.

Additionally, the five regression assumptions were employed (Levine et al., 2017): multicollinearity (Variance Inflation Factor – VIF), independence of errors or residuals (Breusch-Godfrey), absence of influential values (Cook's Distance), normality of residuals (Anderson-Darling), and equality of variances or homoscedasticity (Breusch-Pagan). In addition, all assumptions, as well as the regressions themselves, were tested at the 5% significance level.

Results

As shown in Figure 1, between 2015 and 2020 the high school abandonment rate decreased from 5.54% to 2.36%. Subsequently, between 2020 and 2022, there was an increase in abandonment, from 2.36% to 4.56%. However, in 2023 the rate fell to 2.80%, the second lowest level among the data presented here.

Figure 1*Evolution of School Dropout Rates: High School (Brazil)*

Note/Source: Prepared by the author based on educational indicators from INEP (2015 to 2023).

With regard to the regression assumptions, all models showed a non-normal distribution (p -value < 0.05), heteroscedastic errors (p -value < 0.05), autocorrelation (p -value < 0.05), and absence of multicollinearity. Due to the rejection of three regression assumptions (normal distribution, homoscedasticity, and absence of autocorrelation), we used robust regression with cluster correction (school code), whose purpose is to adjust the standard errors of the coefficients so that they are not affected by heteroscedasticity and autocorrelation.

With respect to the trend break in the linear coefficient, the Chow test shows that the pandemic caused a break in the downward trend of school abandonment in Brazilian high schools. When comparing the regression lines of Models 2 and 3, the p -value was lower than 0.05, indicating a break between the models. This means that school abandonment was abruptly shifted because of the pandemic, showing a lower level than before the health crisis.

With regard to the angular coefficient, the Year variable (Models 2 and 3) indicates that the effect of time on the dependent variable (abandonment) increased considerably; therefore, it can be stated that the angular coefficient changed. Thus, it is understood that the advent of the pandemic considerably increased school abandonment.

Table 2
Results From Model Estimation

Variables	Model 1 (2015–2023)	Model 2 (2015–2019)	Model 3 (2020–2023)
Intercept	6.652**	−11.754***	−159.154***
Year	−0.003*	0.006***	0.079***
Localization	−0.014	−0.023	−0.010
Dependency	1.067***	1.235***	0.899***
Sotheast Region	−0.427***	−0.637***	−0.183***
Northeast Region	−0.152***	−0.278***	−0.011
South Region	−0.170***	−0.356***	0.045***
Central-West Region	−0.470***	−0.499***	−0.440***
Pandemic Event	−164.806***		
Interactive Term Between Year and Pandemic Event	0.081***		

Note. *, **, and *** are statistically significant at levels of 0.01, 0.001, and 0, respectively.

Next, the average school abandonment of urban and rural schools in Brazil was equivalent, since Models 1, 2, and 3 did not show statistical significance. Therefore, it is possible to infer that there is no difference in abandonment between urban and rural schools, indicating that location is not the best variable for understanding the phenomenon of school abandonment. Additionally, the Administrative Dependency dummy indicates that public schools had abandonment levels about 106% higher than private schools, with statistical significance in the three models described above.

Through the Southeast Region, Northeast Region, South Region, and Central-West Region dummies, it is possible to compare the average difference in school abandonment between each of these regions and the North Region, controlling for the other variables. In Model 2, it is observed that schools in the Southeast, Northeast, South, and Central-West had lower abandonment rates in relation to the North Region. However, in Model 3, only the Southeast and Central-West maintained this trend, while schools in the South Region began to show higher abandonment and those in the Northeast showed rates equal to the reference category (that is, there was no statistical significance).

Discussion and Conclusion

This article investigated the effects of the pandemic on high school abandonment rates in Brazilian schools, using Inep data from 2015 to 2023. The analysis focused on estimating the impact of the pandemic on school abandonment, considering variables such as location, administrative dependency, region, and the interaction term (year multiplied by the pandemic dummy).

Through the Chow test, we can answer the first question of this study (what was the impact of the pandemic on school abandonment rates?), in which we observed a break in the linear and angular coefficients of school abandonment rates. These results are consistent with Lacruz et al. (2024), since the researchers found a break in both coefficients. This indicates that both elementary schools and high schools had the rates of variation in school abandonment altered as a result of the pandemic.

When we observe the Pandemic Event dummy variable, it seems counterintuitive to claim that the pandemic reduced school abandonment in Brazilian high schools; after all, many countries, whether developed or not, showed an increase in abandonment as a result of the pandemic. Would Brazil be an exception? To overcome this issue, we used the interaction term, which multiplies the Year and Pandemic Event variables and, therefore, shows that the pandemic increased school abandonment in high schools.

As for the second question (was abandonment the same between public and private schools?), we found evidence that Brazilian public schools experienced a sharp increase in abandonment rates, with an increase of 110.6% (Brazil) in relation to private schools. This intensification may be explained by the speed with which measures related to education during the pandemic were adopted by public and private institutions. As an example of comparison, principals of public schools are, on some occasions, constrained by municipal, state, and federal bureaucracy. In contrast, private schools can make decisions at a speed that state bureaucracy cannot match. Thus, it is assumed that private schools were able to adapt teaching to the pandemic according to the local needs of their students, as well as monitor school abandonment among these students.

With regard to the third question (was abandonment the same between urban and rural areas?), in the comparative analysis between urban and rural schools in Brazil, none of the models showed statistical significance, which is evidence that there is no difference between students from urban and rural areas with respect to abandonment; however, it is important to note the specificities of this issue. In Brazil, classification is made according to the criteria of the Brazilian Institute of Geography and Statistics (IBGE): schools located in areas with high population density are considered urban, while those located outside metropolitan areas or in areas with low population density are considered rural. This classification differs, for example, from that of the United States, where there are four classifications, including rural schools, which are divided into “rural close to urban areas” and “rural distant from urban areas.”

These differences in the classification of urban and rural environments may affect the results when school abandonment is taken into account: are rural schools really so different from urban ones? The answer to this question requires a deeper analysis of the socioeconomic conditions, infrastructure, and access to resources available to each type of school. In addition, rural schools often face difficulties in internet access and precarious infrastructure.

With respect to the difference in abandonment among the different regions of Brazil, it was expected that most regions would have lower abandonment than the North; however, after the pandemic, the South region showed higher school abandonment.

The negative and significant coefficients for the Southeast and Central-West dummies indicate that these regions had school abandonment rates lower than the North Region even through 2023, reflecting the economic, social, and educational disparities among these regions. However, the reversal observed in the South region during the pandemic period, with a positive coefficient in Model 3, suggests that, despite having the best social indicators, this region suffered more from abandonment. In turn, the equalization of abandonment rates in the Northeast with the reference category reflects the social conditions shared by the states in the North and Northeast.

It is important to mention that this study is limited to the variables available in the Inep database; therefore, considering factors external to the school (such as socioeconomic conditions, access to technology, restrictive measures adopted by the different states of the federation, among others), in addition to considering the predictors and consequences of school abandonment, may enrich the results. Thus, it is expected that the information presented here will be useful for public managers, contributing to the formulation of public policies capable of reducing school abandonment in high school.

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