

Exploring Education in Brazil

University of Mannheim Department of Political Science

Research Design

Filippo Panfoli 2202955

✉ filippo.panfoli@students.uni-mannheim.de | ↗ PanfoliF |
>ID 0009-0000-7861-8036 | 🌐 <https://github.com/PanfoliF>

Replication materials / L^AT_EX sources: ↗ PanfoliF/Research-Proposal-RD-NEW

Version: v0.0 | **Last updated:** January 7, 2026

Keywords: game theory

JEL: C72; D82

Prepared for: Research Design, taught by Prof. Dr. Sean Carey

License: CC BY 4.0

January 7, 2026

Abstract

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

1 Introduction

In this article, I aim to examine the educational dynamics of Brazil, with a particular focus on effects of schools quality on national tests scores. The Brazilian case offers a compelling context for analysis.

The author aims to study the impact of the institutional settings on educational quality variables. The author will use the introduction of different laws and use them to assess the impact on variables that describe the marital and educational status of women.

This project uses the Brazilian School Panel to study how teacher quality shapes student learning and school progression.

My goal is to distinguish two channels: standardized test performance (**extensive margin**) and grade progression outcomes (**intensive margin**).

2 Literature Review and Historical Setting

Knowledge and insights about the historical context and institutional settings are drawn from Encyclopedia Britannica (Ball, James, et al., 2026; Ball, Schneider, et al., 2026), CEON (n.d.) and Southey (2012).

These norms will serve as instruments to predict changes in schools quality. They are expected to positively affect the outcome variables.

A preliminary analysis of the literature on education in developing countries, highlighted a study from Turmena and Bitencourt (2022). The journal article constitutes the milestone of this article and serves as main reference for the literature on education in Brazil. This paper suggests that the "Law No. 5.692/1971 (Reforma do Ensino de 1º e 2º Graus)" had a major effects on education. I will exploit data related to this law.

3 Data

All projects begin with data collection, which is a crucial step. However it takes a lot of time and effort.

In order to select the best source, many datasets have been explored and many institutional websites have been visited.

Potential data sources included IPUMS and the Instituto Brasileiro de Geografia e Estatística (“Portal Do IBGE”, 1967). Additionally, aggregated data may be retrieved from the Brazilian Education Panel Databases (Huberts et al., 2025), which covers the period from 1996 to 2015. Eventually, the article from Rubiane Daniele Cardoso de Almeida et al. (2023) offers panel data on some demographic aspects.

4 Methodology

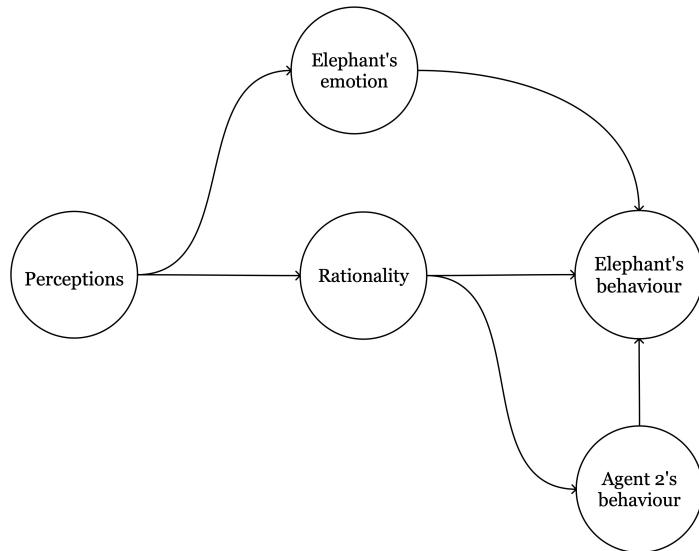


Figura 1: Causal DAG.

To establish causality between the dependent and independent variables, the

analysis will employ causal inference techniques. As a possible solution to the identification problem the study will provide results from a Difference-in-Difference. This technique is able to isolate the effect produced by the introduction of the laws in the variables that approximate education quality. Nonetheless, without appropriate control variables no identification strategy is reliable. Following best practices of the political science field, only a deep analysis of the literature will provide for suitable control variables.

4.1 Extensive Margin

The first of the two regression presented in the paragraph looks at the extensive margin. Therefore, it investigates the relationship between teachers quality and test scores. The equation used is the following:

$$Y_{smt}^{score} = \beta_0 + \beta_1 TQ_{smt} + \beta_2 INFRA_{smt} + \gamma X_{smt} + \mu_m + \lambda_t + \varepsilon_{smt}$$

Teachers quality is measured as number of students per class *or* as teachers education.

Identification also relies on: *municipal FE*: this is a way to control for possible unobserved variables that might bias the analysis. To the eyes of statistitians this is a mere intercept that captures the mean value for a town.

state FE: the same concern we had for the municipal level, motivates the use of FE at the state level. However, concern comes along with a great fortune. Cunningham (2021, chap. 2, p. 462) says: "I have a bumper sticker on my car that says "I love Federalism (for the natural experiments)". [...] United States is a never-ending laboratory. Because of state federalism, each US state has been given considerable discretion to govern itself with policies and reforms. Yet, because it is a union of states, US researchers have access to many data sets that have been harmonized across states, making it even more useful for causal inference."⁴

and *year FE*: since our dataset (Huberts et al., 2025) offers several years, we will exploit time variation too. The methodological solution to make use of panel data is again FE. In fact, thanks to this instrument, we are able to isolate the variation among years and discard the magnitude of variation in a single year.

This strategy isolates the effect of teacher quality on students test scores, which is commonly referred to as *outcome variable*.

Controls: The vector of controls is X_{smt} , while γ is the vector of coefficients. It represents the effects of control variables on our outcome variable.

4.2 Intensive Margin

The second regression presented in the paragraph looks at the intensive margin. Therefore, it investigates the relationship between teachers quality and rates of failure. The equation used is the following:

$$Y_{smt}^{failure} = \beta_0 + \beta_1 TQ_{smt} + \beta_2 INFRA_{smt} + \gamma' X_{smt} + \mu_m + \lambda_t + \varepsilon_{smt}$$

Teachers Quality is measured as number of students per class *or* as teachers education.

Again, identification relies on municipal FE, state FE and year FE.

The selected controls are:

Conclusion

The puzzle motivating this paper was deliberately simple: two elephant-human encounters occur in broadly similar environments, yet they generate sharply different behavioural trajectories. In one occasion, the elephant's threat is forceful but calibrated; in the other, violence is followed by a striking form of care.

Acknowledgements

Artificial intelligence-based tools were employed solely to improve linguistic clarity and grammar. No AI system contributed to the development of the research questions, theoretical framework or conclusions presented in this paper.

Bibliography

Books

Cunningham, S. (2021). *Causal inference: The mixtape* [Frontmatter – Contents – Acknowledgments – Introduction – Introductory Note – What Is Causal Inference? – Do Not Confuse Correlation with Causality – Optimization Makes Everything Endogenous – Example: Identifying Price Elasticity of Demand – Conclusion – Probability and Regression Review – Directed Acyclic Graphs – Introduction – Introduction to DAG Notation – Potential Outcomes Causal Model – Introduction – Physical Randomization – Randomization Inference – Conclusion – Matching and Subclassification – Subclassification – Exact Matching – Approximate Matching – Regression Discontinuity – Huge Popularity of Regression Discontinuity – Estimation Using an RDD – Challenges to Identification – Replicating a Popular Design: The Close Election – Regression Kink Design – Conclusion – Instrumental Variables – History of Instrumental Variables: Father and Son – Intuition of Instrumental Variables – Homogeneous Treatment Effects – Parental Methamphetamine Abuse and Foster Care – The Problem of Weak Instruments – Heterogeneous Treatment Effects – Applications – Popular IV Designs – Conclusion – Panel Data – DAG Example – Estimation – Data Exercise: Survey of Adult Service Providers – Conclusion – Difference-in-Differences – John Snow’s Cholera Hypothesis – Estimation – Inference – Providing Evidence for Parallel Trends Through Event Studies and Parallel Leads – The Importance of Placebos in DD – Two-way Fixed Effects with Differential Timing – Conclusion – Synthetic Control – Introducing the Comparative Case Study – Prison Construction and Black Male Incarceration – Conclusion – Bibliography – Permissions – Index

Includes bibliographical references (pages 541-553) and index]. Yale University Press.

Southey, R. (2012). *History of Brazil*. Cambridge University Press.

Articles

Rubiane Daniele Cardoso de Almeida, Benjamin M. Tabak, & Tito Belchior Silva Moreira. (2023). Demographic aspects and regional income convergence in Brazil: A panel data approach. *CEPAL Review*, 2023(139), 197–210.
<https://doi.org/10.18356/16840348-2023-139-10>

Turmena, L., & Bitencourt, J. C. (2022). A reforma de 1º e 2º graus de 1971 e a reforma do ensino médio de 2017: Algumas aproximações. *Educ. Escr.*, 13(1), e43895. <https://doi.org/10.15448/2179-8435.2022.1.43895>