The long-run effect of childhood exposure to trade shocks on educational and labor market outcomes*

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Abstract

Trade liberalization policies have been widely adopted with the aim of fostering economic growth and improving living standards. However, the potential long-term consequences of such policies on human capital development and labor market outcomes remain a crucial area of investigation. While the immediate effects of trade liberalization on economic variables such as employment and productivity have been extensively studied, its long-run intergenerational impacts are not well understood. In this paper, I examine the case of the 1990 Brazilian Trade Liberalization, exploiting geographic differences in the exposure to import tariff reductions and baseline industry compositions across locations for identification purposes. My analysis reveals that higher exposure to tariff cuts is associated with a significant and persistent decline in educational attainment and labor market outcomes for future generations. I additionally explore possible channels through which trade liberalization may affect children's long-run outcomes, identifying a substantial negative effect on parental financial resources at the time of the reform as a key mechanism. Furthermore, I examine the heterogeneous effects of the policy by gender and race and undertake various robustness checks to confirm the validity of my results. My findings provide valuable insights into the intergenerational impacts of trade liberalization policies, underscoring the importance of incorporating a comprehensive understanding of policy consequences in the design and evaluation of economic interventions.

JEL codes: F16, F66, J23
Keywords: trade liberalization; education; employment; long-run.

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1 Introduction

Trade liberalization policies have become an essential component of economic development strategies across the globe, aiming to enhance economic growth and improve living standards. These policies, aimed at reducing barriers to international trade, have led to increased globalization and integration of markets in recent decades. Despite their widespread adoption and anticipated benefits, understanding the long-term intergenerational consequences of trade liberalization policies, particularly in areas such as human capital development and labor market outcomes, remains an important and underexplored area of research. While the immediate and direct consequences of such policies on employment, productivity, and trade flows have received significant attention in the literature [1], the possible ramifications on subsequent generations, who experience the effects of these policies during their formative years, have been comparatively neglected.

A deeper understanding of the intergenerational impacts of trade liberalization policies is essential , as they have the potential to shape the trajectory of economic development and social welfare for decades to come. These policies can determine opportunities for human capital accumulation and determine labor market prospects for future generations, with implications for income distribution and poverty reduction strategies. Furthermore, by understanding the effect of trade liberalization on educational attainment and labor market outcomes, policymakers can better anticipate the distributional consequences of these policies and design targeted interventions to mitigate any negative effects on vulnerable populations. Moreover, research into the long-term effects of trade liberalization can provide valuable insights into the role of early-life investments in shaping intergenerational outcomes, bolstering the case for comprehensive evaluations and careful consideration of such economic policies.

In this paper, I contribute to this vital area of inquiry by examining the case of Brazil's 1990 trade liberalization, a substantial and rapid policy shift that provides a natural experiment to analyze the long-term consequences of trade liberalization on human capital development and labor market outcomes for subsequent generations. I exploit the exogenous variation in exposure to import tariffs reductions resulting from Brazil's trade liberalization reform and its disparate impact on industry compositions across regions to identify the causal effects of trade liberalization on educational attainment and labor market prospects for cohorts who were children at the time of the reform. In my study, I employ a cohort difference-in-differences strategy to assess the long-term effects of the 1990 trade liberalization reform. This approach compares individuals exposed at a young age with those who were too old at the time of the shock, exploring the differences in their outcomes in the long run. This methodology hinges on the assumption that, in the absence of the trade liberalization policy, cohorts born close to and far away from the reform in regions with varying levels of exposure would exhibit similar trends. Taking this into account allows me to control for potential differences between regions that are more or less affected by the reform, be it due to observable or unobservable factors, as long as these differences do not change over time.

Regarding the underlying mechanisms driving the long-term repercussions of trade liberalization policies, I focus on the potential role of parental financial resources. I argue that these resources critically shape the environment and opportunities available to children during their developmental years. In the context of Brazil's trade liberalization reform, exposure to height-

[1] See for example Kovak [2013], Dix-Carneiro [2014], and Dix-Carneiro and Kovak [2017].

ened competition through the removal of tariffs may have resulted in significant job losses and decreased earnings for parents employed in vulnerable sectors. Consequently, children growing up in exposed regions could face a reduction in resources allocated for their education, leading to diminished human capital accumulation and inferior labor market outcomes later in life. To empirically investigate this central mechanism, I assess the impact of exposure to the trade liberalization policy on parental income during the reform period, leveraging contemporary data sources. This analysis enables me to establish a link between changes in parental financial resources and long-term intergenerational outcomes, shedding light on the potential causal pathway through which trade liberalization affects the lives of future generations.

My main findings provide robust evidence for the negative effects of childhood exposure to trade liberalization on long-term human capital and labor market outcomes. Using my cohort difference-in-differences approach, I demonstrate that a higher degree of exposure to tariff reductions is associated with a significant and lasting decline in educational attainment and labor market outcomes for exposed cohorts. Moreover, by exploring the potential role of parental financial resources, I confirm that reducing tariffs negatively impacts parental incomes during the period of trade liberalization. This finding suggests that one of the key mechanisms through which early-life exposure to the trade shock affects children's long-term prospects is the decline in parental financial resources during the reform. The results remain consistent and robust even after accounting for various control variables, alternative specifications, and different measures of trade exposure. Additionally, when examining gender and racial heterogeneities, my findings reveal both consistent and differential effects across these subgroups, further enriching the understanding of the policy's intergenerational consequences.

This paper contributes significantly to two main branches of economic literature. First, it adds to the growing body of research examining the economic effects of trade liberalization, an area of study that has gained increasing importance with the acceleration of globalization and market integration since the late 20th century. The Brazilian trade liberalization reform of 1990 provides a unique context for exploring these effects, as previous literature has primarily focused on other countries or studied short-term impacts. Our findings build on and extend the work of Kovak [2013], Dix-Carneiro [2014], Dix-Carneiro and Kovak [2017], and Carrillo et al. [2021], offering a more comprehensive understanding of the consequences of trade liberalization policies over a longer time horizon.

The second contribution of this paper is that it connects the literature on trade liberalization to the parallel but distinct literature on early life investments and human capital development, demonstrating the relevance of insights from both fields for understanding the far-reaching consequences of economic policy changes. Research to date has established the importance of early life investments for future outcomes, including cognitive development, educational attainment, labor market success, and social welfare [Currie and Almond, 2011, Kline and Walters, 2016, Johnson and Jackson, 2019, Bailey et al., 2018, Almond et al., 2018, Atkin, 2016, Charles et al., 2015, Carrillo, 2020]. By exploring the interplay between trade liberalization and these early life investments, this paper not only sheds light on the mechanisms through which policy changes may affect future generations but also underscores the importance of considering the full range of potential implications – both direct and indirect – when designing and evaluating economic interventions. Together, these contributions emphasize the need for a holistic approach to the study of trade liberalization and its long-term effects on societies, integrating insights from multiple disciplines and areas of research to inform more effective,

equitable, and sustainable policy decision-making processes.

The rest of the paper is organized as follows. Section 2 offers background information on the 1990 Brazilian trade liberalization reform, contextualizing its goals, implementation, and significance in shaping economic activity across the country. Section 3 delineates the Brazilian data sources and the process of constructing key variables for the analysis, while Section 4 outlines the empirical strategy employed to assess the long-term impacts of trade liberalization on educational and labor market outcomes. Section 5 details the main findings derived from our analysis, highlighting the persisting consequences of the policy for the exposed cohorts. In Section 6, we delve deeper into the heterogeneities in the effects of the trade liberalization according to gender and race, providing additional insights into how various subgroups were differentially influenced by the policy change. Section 7 explores potential mechanisms through which trade liberalization may have long-lasting effects, enabling us to better understand the driving forces behind the observed relationships. Section 8 presents a series of robustness checks to validate the credibility of our results and to safeguard against potential confounding factors and biases. Finally, Section 9 concludes.

2 Background on the Trade Liberalization

In the 1990s, Brazil underwent a period of economic liberalization characterized by a dramatic reduction in tariffs and other trade barriers. This period of liberalization was initiated in response to the economic crisis of the 1980s, when Brazil was experiencing high levels of inflation and economic stagnation. This process was characterized by a rapid increase in the openness of its economy, both to foreign trade and to foreign direct investment. This period saw the liberalization of import tariffs, the reduction of export taxes, and the removal of restrictions on foreign capital flows. As a result, Brazil's external trade and foreign direct investment grew significantly, and the country's economic growth accelerated. The liberalization process was driven by a combination of macroeconomic policies and structural reforms. On the macroeconomic side, the government adopted a number of inflation targeting measures, aimed at curbing the high levels of inflation that had plagued the country for decades. This included reducing the money supply, floating the exchange rate, and introducing a number of other monetary policies. On the structural side, the government implemented a number of reforms to remove barriers to trade, including eliminating import licenses and restrictions, reducing tariffs, and liberalizing foreign direct investment.

The resulting trade liberalization in Brazil led to a dramatic increase in imports and exports. According to a study by Dix-Carneiro and Kovak [2017], this liberalization resulted in an average 30% reduction in tariffs, along with a significant reduction in the number of non-tariff barriers, such as quotas and licensing requirements. This resulted in a surge of foreign direct investment into the country, leading to greater economic growth and development. As noted by Kume [1998], this led to an increase in the exports of Brazilian manufactured goods, especially those related to the technology sector. The reform of the trade system also had a significant effect on the labor market. Before the reforms, the labor market was highly protected and regulated by the government, with restrictions on hiring and firing, wages, and working conditions. The trade liberalization reforms helped to liberalize the labor market, reducing these restrictions and allowing firms to hire and fire more freely. This allowed firms to adjust to changing economic

conditions more quickly, increasing efficiency and productivity.

3 Data

My main empirical analysis uses data on levels of education in 2010 period from census microdata and on levels of employment from RAIS microdata. The choice of the outcome period is determined on the data availability and the geographic unit of analysis is the AMC. The IBGE (Brazilian Institute of Geography and Statistics) defines Comparable Municipal Areas (AMC) as regions bounded by specific cities in Brazil.

Census Microdata. I utilize individual-level information from Brazil's 2010 population census, which provides demographic data including gender, age, and race, as well as socioeconomic characteristics such as educational attainment, employment, occupation, industry categories, labor income, and nonlabor income. One important feature of the Brazilian census is the presence of information about the AMC and year of birth, therefore, using the intensity of exposure to the 1990 Trade Liberalization in a given AMC it is possible to analyze the effects of the policy on the exposed individuals.

RAIS. In my firm level analysis I use the RAIS (Relações Anuais de Informações Sociais) that is an annual survey conducted by to collect information about the country's labor market. It is the most comprehensive database in Brazil, covering virtually all employed and self-employed workers in the formal sector. The survey collects data on employment, salaries, and working conditions, including information on the characteristics of the labor force, wages, job stability, and other labor-related issues. This data provides valuable insights into the performance of the Brazilian labor market and is a key resource for researchers, policy makers, and other stakeholders. From the RAIS data I utilize the information from 1985 to 2010, including active firms and employment total by AMC.

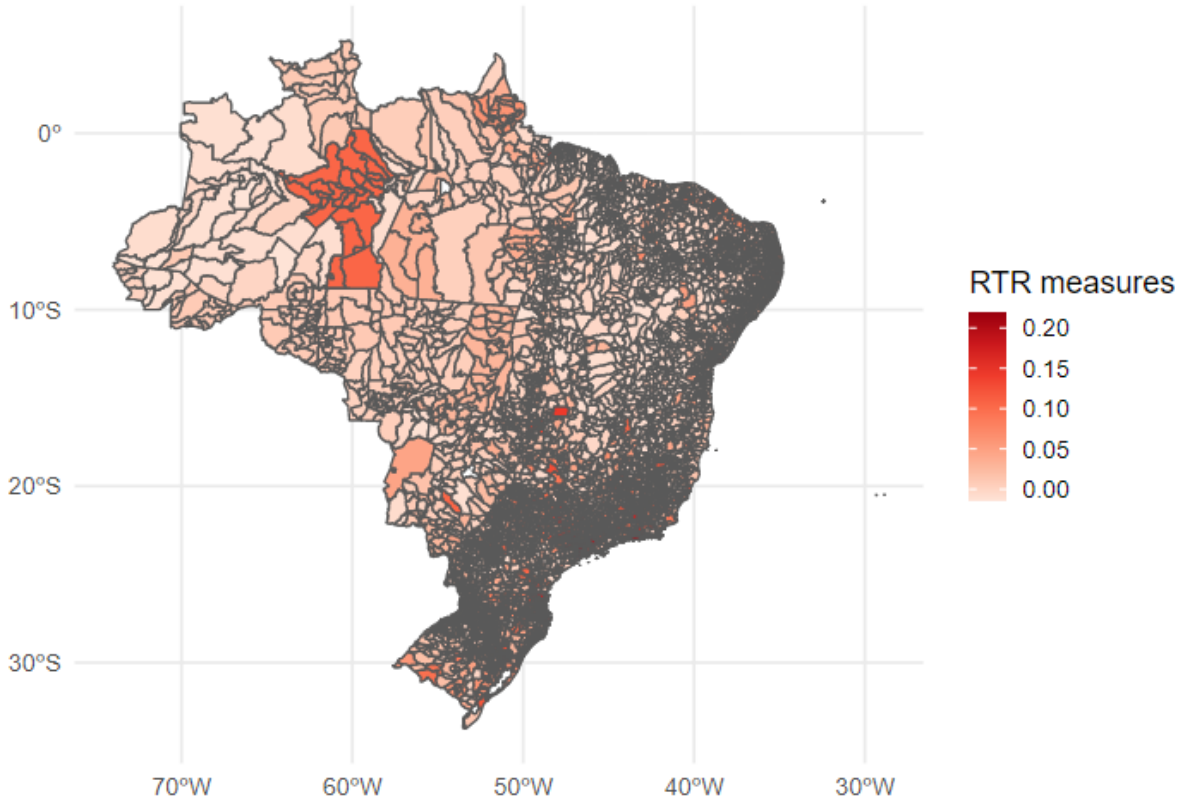
Treatment Definition. In order to effectively assess the consequences of the 1990 trade liberalization policy, it is crucial to establish a comparison between localities that experienced varying levels of impact as a result of the policy change. These comparisons will enable the identification of the differential effects on human capital development and labor market outcomes, contingent on the degree of exposure to the trade liberalization. To facilitate such comparisons, I construct a measure of the intensity of tariff reduction known as the Regional Tariff Reduction (RTR), adapted from the methodology employed by Dix-Carneiro and Kovak [2017]. The RTR is defined as follows:

$$RTR_i = \sum_{j \in J} l_{ij} x (Tariff_{1990,j} - Tariff_{1995,j}) \tag{1}$$

In this equation, i represents the Comparable Municipal Areas (AMC), while j denotes industries.The l stands for the baseline share of each industry within the corresponding AMC. This measure captures the degree to which reductions in tariffs influenced the economic landscape across different regions of Brazil during the trade liberalization reform.

Figure 1 presents a spatial representation of the RTR measure, illustrating the geographical distribution of tariff reductions and providing a visual summary of the extent to which regions were affected by the 1990 trade liberalization. By leveraging the regional variation in exposure to the policy change, this study delves into the analysis of the long-term effects of trade liberalization on educational attainment and labor market outcomes, building a comprehensive understanding of the far-reaching implications of such economic interventions.

Figure 1: Spatial Distribution of the Regional Tariff Reductions (RTR)



Notes. Municipalities are colored based on the regional tariff reduction measure, RTR, as defined in equation 1. Municipalities with greater tariff reductions are shown as darker.

4 Research Design

In order to better understand the effects of education on the labor market, researchers have used the cohort-difference-in-differences (DID) approach. This method allows researchers to compare the labor market outcomes of those who have access to educational opportunities with the outcomes of those who do not. By comparing the returns to education before and after the educational expansion, the DID approach allows us to assess the effect of the increase in educational opportunities on labor market outcomes. I will combine geographic variation with childhood exposure time given by the distance between an individual's year of birth and the introduction of reform. In summary, the empirical strategy is a difference-in-differences configuration that compares cohorts born closer to and further away from the reform in municipalities with low and high exposition to trade shock. The main equation is given by:

$$
\begin{aligned}
Y_{imt} = \alpha \; + \; \beta \; & \textit{Childhood Exposition}_t \times RTR_m \\
& + \; \mathbb{X}'_{imt}\Gamma \; + \; \mu_m \; + \; \eta_t \; + \; \xi_{imt}
\end{aligned}
\tag{2}
$$

where Y_{imtc} refers to the years of education and total earnings results for the individual i born in the AMC m in the year t . The key independent variable is given by the interaction between *Childhood exposure*, defined as the fraction of childhood years exposed to the reform, and *RTR*, defined as *Regional tariff reduction*. The $\mathbf{X}'_{imt}$ vector includes a core set of individual-level demographic characteristics such as gender and race, as well as interactions between state and linear cohort trends. All models will include fixed effects of AMC of birth(μ_m), and birth year (η_t), which account for substantial differences between AMC and general cohort changes in potential determinants of human capital accumulation. The error term ξ_{imt} is grouped at the AMC of birth level to account for possible serial correlation between birth cohorts over time.

The coefficient β measures the Non-parametric version of (2) to examine in detail the effects at different ages of exposure:

$$
\begin{aligned}
Y_{imt} = \alpha \; + \; & \underbrace{\sum_{T=0}^{16} (\boldsymbol{I}_{t=T} \times RTR_m)}_{\text{childhood exposure in years}} \cdot\beta_T + \underbrace{\sum_{T=-10}^{-2} (\boldsymbol{I}_{t=T} \times RTR_m)}_{\text{no childhood exposure}} \cdot\beta_T \\
& + \; \mathbb{X}'_{imt}\Gamma \; + \; \mu_m \; + \; \eta_t \; + \; \xi_{imt}
\end{aligned}
\tag{3}
$$

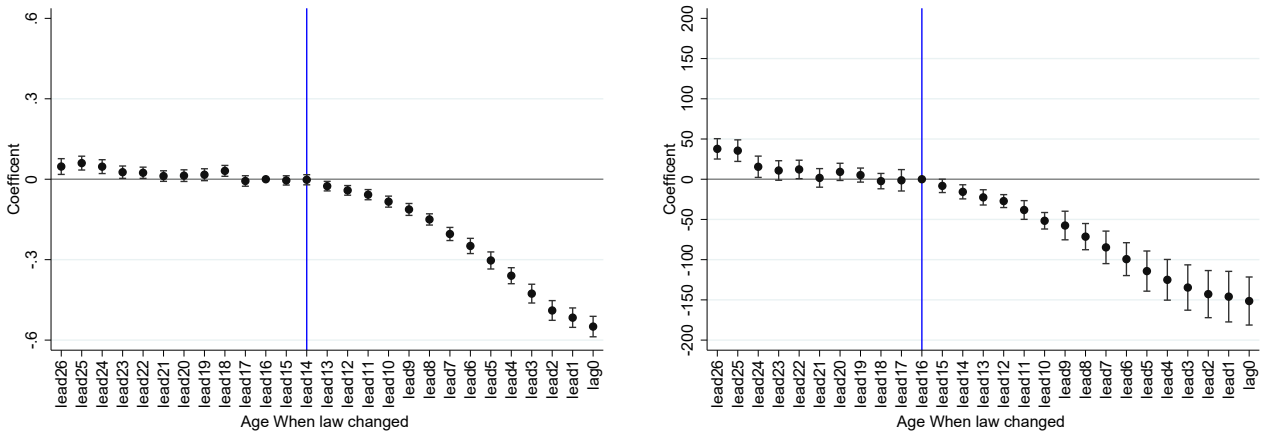
where $\boldsymbol{I}_T(\cdot)$ are time indicators that are equal to 1 if the year in which the individual i completed 16 years minus the year of the policy introduction is equal to T and zero otherwise. Individuals born in the same year as the reform exhibit full childhood exposure, so T equals 16. At the other extreme, T will equal 0 for those cohorts who were 16 years old at the policy change.

This study proposes a cohort difference-in-differences strategy to assess the long-term effects of the 1990 trade liberalization reform. The approach relies on the assumption that, in the absence of the trade liberalization, cohorts born close to and far away from the reform in AMC's with different levels of exposure would show similar trends. This allows me to take into account potential differences between AMC's that are less or more affected by the reform due to observable or unobservable factors, as long as these differences do not vary over time. I also use AMC-of-birth fixed effects to account for any unobserved AMC-specific, time-invariant determinants of adult outcomes that are related to the cross-AMC measure of exposure intensity. To reduce the risk of confounding relations with pre-existing trends across AMC's, this study makes use of differential trends parameterized as a function of baseline AMC-level covariates. By doing this, any potential correlation between the adoption of the reform and spurious trends is minimized. The parameter of interest is identified only from AMC-specific differences in childhood exposure to the reform after controlling for shocks common to all birth cohorts in a state, and for differential AMC-specific trends connected to initial conditions.

5 Main Results

In this section, I present the primary findings of my analysis, which delve into the connection between childhood exposure to the 1990 Brazilian Trade Liberalization and the subsequent educational attainment and income outcomes experienced by those affected. The event-study results, depicted in Figures 2 and 3, provide a comprehensive illustration of the relationship under investigation. The figures capture the impact on total years of education and total earnings, as well as the probabilities of being employed and self-employed for the exposed individuals. The evidence drawn from these figures indicates a consistently negative relationship across the variables. Specifically, cohorts who experienced exposure to the trade liberalization at a younger age demonstrated lower levels of educational achievement, lower income, and decreased likelihood of being employed when compared to their counterparts who were less exposed during their childhood. These initial findings suggest that the effects of the trade liberalization policy persist into adulthood, shaping the educational attainment and labor market outcomes of those exposed during their early years.

Figure 2: Long-Run Effects on Years of Schooling: 2010 Census

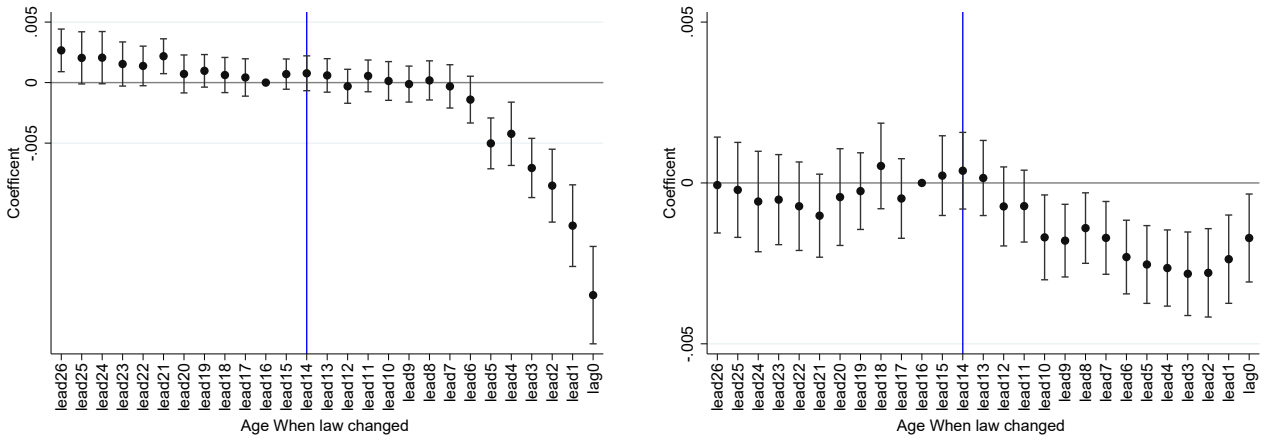


(a) Years of Education

(b) Total Earnings

Notes. This figure plot estimates by year that individuals completed an age of 15 years relative to the trade liberalization year using the specification 2. The unit of analysis is a municipality. Figure (2a) presents results for years of education and figure (2b) presents results for total earnings. Standard errors are clustered at the AMC level. The dots show 95-percent confidence intervals for each estimate.

Figure 3: Long-Run Effects on Years of Schooling: 2010 Census



(a) Probability of being employed

(b) Probability of being self-employed

Notes. This figure plot estimates by year that individuals completed an age of 15 years relative to the trade liberalization year using the specification 2. The figure (3a) presents results for the probability of being employed and figure (3b) presents the probability of being self-employed. The dots show 95-percent confidence intervals for each estimate.

Table 1 provides aggregate estimates for three key outcomes, following the specification outlined in Equation 1. Column (1) and (7) reports estimates based on a specification that does not include any control variable and any demographic charachteristics, thus displaying the unconditional correlation between the childhood exposure to the RTR and changes in years of education and log of total earnings.The coefficient of interest is estimated at -0.2015, with a standard error of 0.0175 for years of education and -0.0411 for log of total earnings. In column (2) and (8), I introduced the demographic characteristics. These controls are important in the context of Brazil given the dynamics of employment by race and sex. The estimated coefficients decline somewhat in magnitude but are now more precise and remain highly statistically significant, reflecting the substantial reduction in sampling variation. In column (3) and (9) presents the results form my preferred specification, which adds the outcome pretrend variable as an additional control. larger. These estimates imply that a one standard deviation increase in RTR exposure is associated with a decline in 0.2063 years of education and this effect represents a decline of approximately 4 percent of the log total earnings.

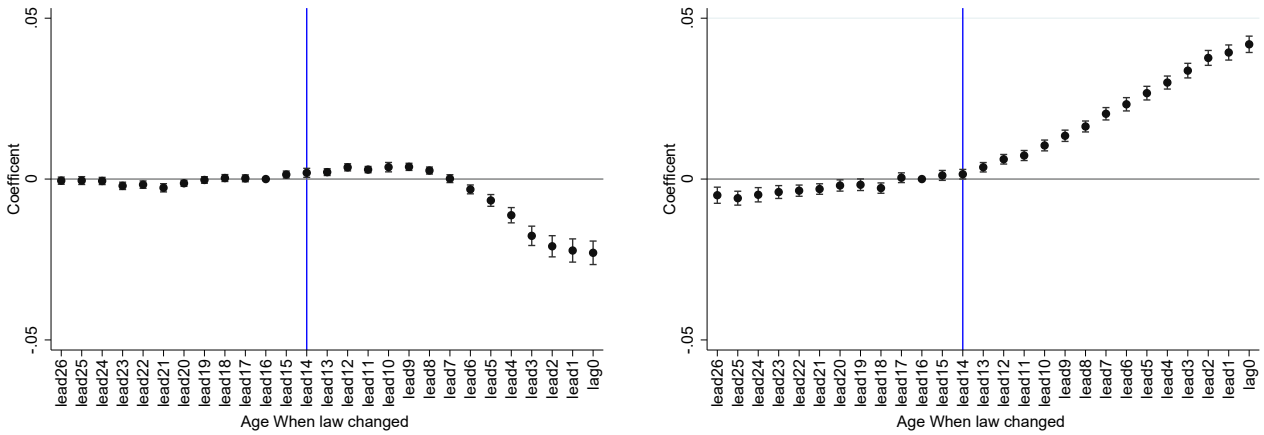
Table 1: The long-run effect of childhood exposure to the trade liberalizaton on educational and labor market outcomes

	Years of education			Total earnings			Log Total Earnings		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Childhood exposure	-0.2015	-0.2004	-0.2063	-91.9165	-90.9578	-77.3083	-0.0411	-0.0395	-0.0392
	[0.0175]**	[0.0173]**	[0.0133]**	[8.9845]**	[8.8901]**	[5.9783]**	[0.0023]**	[0.0023]**	[0.0025]**
N	6834305	6832784	6832784	4792463	4792459	4792459	4792463	4792459	4792459
R-squared	0.5951	0.7299	0.7346	0.4265	0.5404	0.5470	0.6598	0.7237	0.7248
Demographic Characteristics	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
State Linear Trend	No	No	Yes	No	No	Yes	No	No	Yes

*Notes.*This table presents the results from estimating different versions of specification 2. The unit of analysis is AMC. Column (1), (4) and (7) estimates a model without any control variable. Column (2), (5) and (8) estimates a model with the Demographic Characteristics, race and gender. The columns (3), (7) and (9) adds a State Linear Trend. All columns have birth year and AMC fixed effects. Standard errors shown in parentheses are clustered at AMC level. ($^*p \leq 0.01$, $^{**}p \leq 0.05$, $^*p \leq 0.1$).

Finally, in figure 4, I present the event-study estimates of the exposition to the trade liberalization on the probability that the individual has less that 12 years of education or zero years of education. From the figure 4 it's possible to notice that for the cohorts more exposed there is a reduction of around 2% in the probability that the children finish more that 12 years of education and around 5% increase in the probability of the children have zero years of education. From this figure is also possible to notice that although the effect for more than 12 years of education is concentrated in children exposed when they had from 0 to 6 years, the effects on the probability of have zero years of schooling affect children exposed from 0 to 14 years in 1990.

Figure 4: Trade Liberalization Exposition on the probability of having less than 12 years of Education and No Education



(a) More than 12 years of education

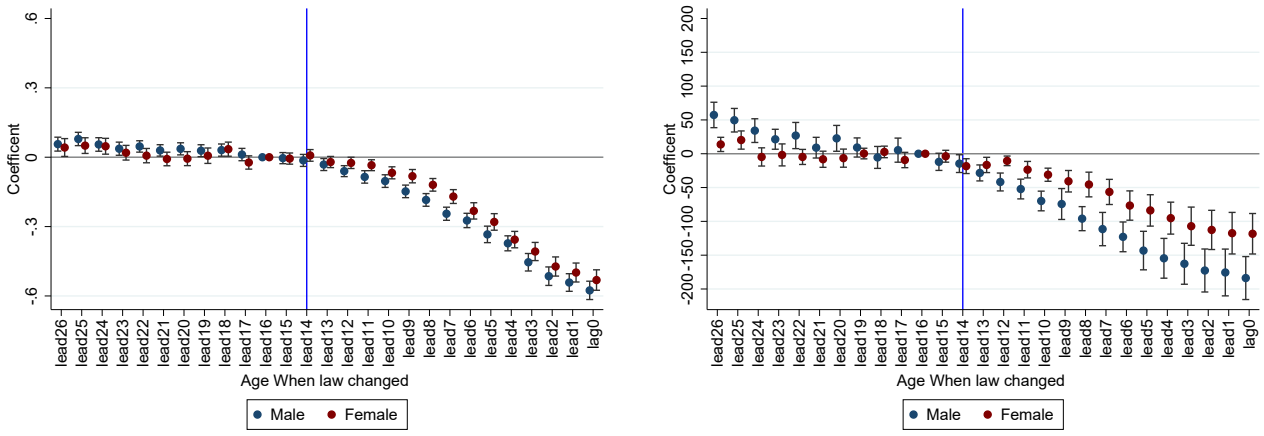
(b) Zero reported years of education

Notes. This figure plot estimates by year that individuals completed an age of 15 years relative to the trade liberalization year using the specification 2. The figure (4a) presents results for the probability of having More than 12 years of education, figure (4b) of having no education. Standard errors are clustered at the AMC level. The dots show 95-percent confidence intervals for each estimate.

6 Heterogeneities

In this section, I explore the heterogeneities in the effects of the trade liberalization by gender and race. Figures 5 and 6 illustrate the event-study graphs for the subgroups, with Figure 5 focusing on gender differences and Figure 6 on racial differences. From Figure 5a, it is possible to observe that the impact of the Trade Liberalization on years of schooling appears to be similar for both men and women, suggesting that the policy may have worsed educational opportunities across genders. However, figure 5b presents a slightly different picture, revealing that the effects on total income seem to be stronger for men than for women. This finding indicates that while educational losses were experienced by both genders, the financial consequences may have been more pronounced for men. When examining heterogeneities by race (Figure 6), the results are present for whites and for non-whites. For both, the patterns observed in the graphs align with the main results, suggesting that the effects of the Trade Liberalization on years of schooling and total income are consistent for these demographic groups. However, the findings for the non-white population are stronger.

Figure 5: Long-Run Effects on Adult Outcomes
(By Gender)

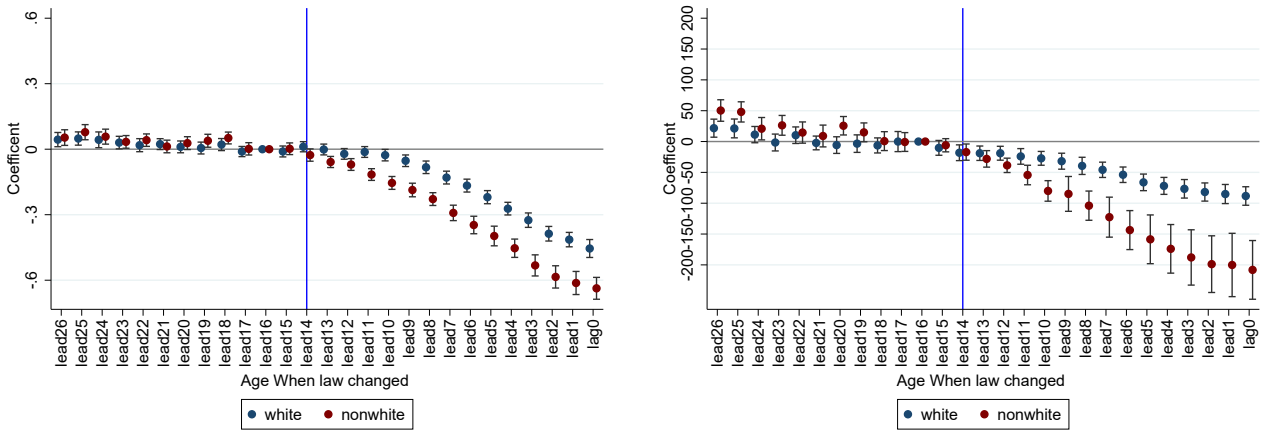


(a) Years of Education

(b) Total Earnings

Notes. This figure plot estimates by year that individuals completed an age of 15 years relative to the trade liberalization year using the specification 2. Figure (5a) presents results for years of education and figure (5b) presents results for total earnings. This model includes fixed effects for gender. Standard errors are clustered at the AMC level. The dots show 95-percent confidence intervals for each estimate.

Figure 6: Long-Run Effects on Adult Outcomes
(By Race)



(a) Years of Education **(b)** Total Earnings

Notes. This figure plot estimates by year that individuals completed an age of 15 years relative to the trade liberalization year using the specification 2. Figure (6a) presents results for years of education and figure (6b) presents results for total earnings. This model includes fixed effects for race. Standard errors are clustered at the AMC level. The dots show 95-percent confidence intervals for each estimate.

The results are also reported in table 2 and 3 which explores the same variables by gender and race, respectively. For both male and female in table 2 , the outcomes shows that exposure to trade shocks in childhood can lead to lower educational attainment and lower wages but the effect seems to be higher for mens in all three main outcomes (years of education, total earnings and log of total earnings). In table 3, a similar analysys can be done, but the outcomes effects seems to be driven by non-white population.

Table 2: The long-run effect of childhood exposure to the trade liberalizaton on educational and labor market outcomes by gender

	Years of education		**Total earnings**		**Log Total Earnings**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
	(1)		**(2)**		**(3)**	
Childhood exposure	-0.2418	-0.1788	-104.4944	-48.2472	-0.0486	-0.0287
	[0.0140]**	[0.0145]**	[7.3727]**	[5.0137]**	[0.0027]**	[0.0028]**
N	3391970	3440814	2756249	2036210	2756249	2036210
R-squared	0.7595	0.7095	0.5694	0.5215	0.7825	0.6769
Demographic Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
State Linear Trend	Yes	Yes	Yes	Yes	Yes	Yes

Notes. This table presents the results from estimating different versions of specification 2 by gender. The unit of analysis is AMC. All columns estimates a model with the Demographic Characteristics and State Linear Trend. All regressions includes birth year and AMC fixed effects. Standard errors shown in parentheses are clustered at AMC level. (*$p \leq 0.01$, **$p \leq 0.05$, *$p \leq 0.1$).

Table 3: The long-run effect of childhood exposure to the trade liberalizaton on educational and labor market outcomes by race

	Years of education		Total earnings		Log Total Earnings	
	White	Non-White	White	Non-White	White	Non-White
	(1)		(2)		(3)	
Childhood exposure	-0.1433	-0.2899	-42.4638	-114.7132	-0.0379	-0.0418
	[0.0140]**	[0.0159]**	[3.0407]**	[9.6626]**	[0.0023]**	[0.0031]**
N	3610659	3222125	2409700	2382759	2409700	2382759
R-squared	0.7149	0.6872	0.5703	0.5483	0.7436	0.6557
Demographic Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
State Linear Trend	Yes	Yes	Yes	Yes	Yes	Yes

Notes. This table presents the results from estimating different versions of specification 2 by race. The unit of analysis is AMC. All columns estimates a model with the Demographic Characteristics and State Linear Trend. All regressions includes birth year and AMC fixed effects. Standard errors shown in parentheses are clustered at AMC level. ($^*p \leq 0.01$, $^{**}p \leq 0.05$, $^*p \leq 0.1$).

7 Mechanism

In order to assess the potential impact of changes to the Trade Liberalization on workers' employment and earnings, I will explore how the implementation of the Brazilian 1990 trade liberalization affected parental income. To test this, I will use contemporary data on the levels of log total income taken from the RAIS database. As the RAIS contains information about workers, it is possible to identify individuals exposed and assess the effect of the policy on their variables. To estimate the effect of the policy on contemporary variables, I will use the following difference-in-differences equation:

$$Y_{st} = \alpha \ + \ \beta \ \textit{Post-1990} \times \textit{RTR}_m \ + \ \mathbb{X}'_{st}\Gamma \ + \ \mu_m \ + \ \eta_t \ + \ \xi_{st} \tag{4}$$

In this equation, the Y_{ist} refers to the contemporary outcomes of interest for an AMC m in year t. My main independent variable is given by the interaction between a *Post 1990* indicator and the *RTR*. In the vector $\mathbf{X}'_{st}$ I will include baseline 1990 characteristics that I interact here with linear year trends. All estimations include AMC and year fixed effects (μ_m and η_t). The error term ξ_{st} is clustered at the AMC level to account for possible serial correlation of the same state over time.

7.1 Parental financial resources

The Brazilian government adopted trade liberalization reforms in the early 1990s that sought to reduce barriers to international trade. These reforms resulted in a decrease in the tariffs on certain imported goods, as well as the removal of restrictions on foreign direct investment. This had the effect of increasing competition for firms and industries located in Brazil, leading to a decline in formal employment in these areas as shown in figure 7. As changes in the trade

exposition can impact workers' employment and earnings, parental financial resources appear to be the likely mechanism behind my findings. To test whether the change in the law actually had effects on parental outcomes of children, I used contemporary information on the levels of log total income extracted from the RAIS. As the RAIS has information about families, which allows us to directly assess the effect of the policy on the variables of the relatives.

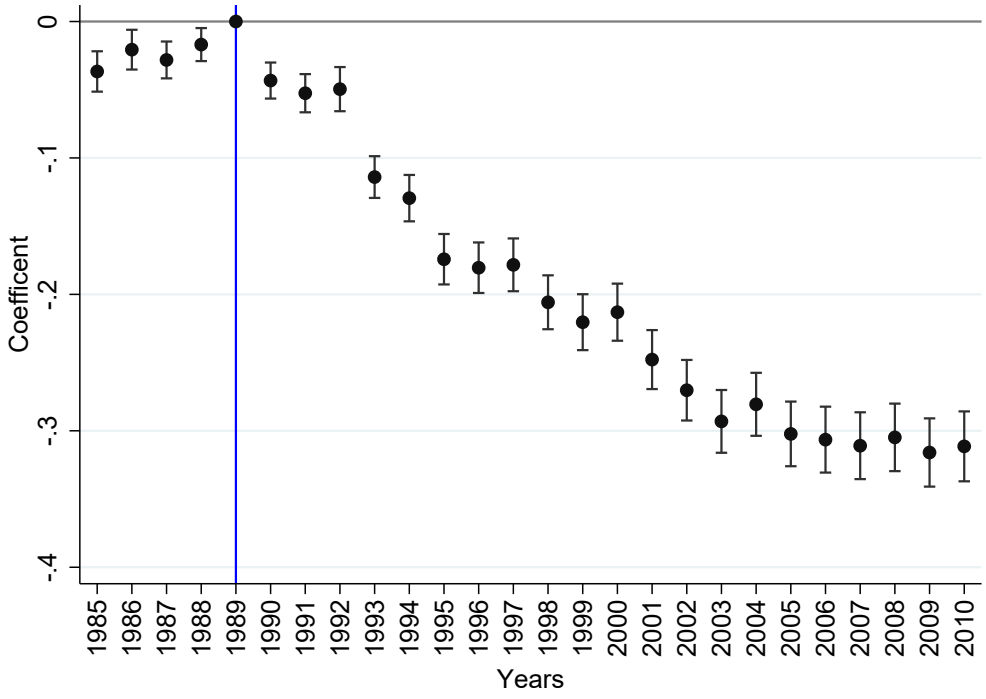
Employment and Active firms. Table 4 presents the results of employment and active firms at the time of the trade shock. The results are also presented at the AMC level and contais AMC and year fixed effects in all the specifications. In this paper, I show that the reduction of tariffs and removal of quotas in international trade, which began in the 1990s, caused an immediate and sharp decline in formal employment in exposed industries. This decline in formal employment caused an increase in poverty and unemployment in the areas home to exposed industries, leading to a decrease in household income and an increase in the difficulty of accessing quality education for children. The findings of this paper suggest that trade liberalization reform has had a long-term negative effect on the educational outcomes of children in areas home to exposed industries in Brazil.

Table 4: Contemporary Effects

	ln Total Employment		**Ln Active Firms**		**Ln Employment by Active Firm**	
	(1)		**(2)**		**(3)**	
Childhood exposure	-0.1941	-0.1400	-0.0688	-0.0437	-0.1103	-0.0839
	[0.0078]**	[0.0076]**	[0.0051]**	[0.0051]**	[0.0066]**	[0.0060]**
N	94734	94734	94734	94734	94727	94727
R-squared	0.9284	0.9344	0.9761	0.9790	0.6588	0.6770
AMC and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State Linear Trend	No	Yes	No	Yes	No	Yes

Notes. This table presents the results from estimating equation 2 for labor market outcomes. The unit of analysis is the AMC and outcome variables come from The Relação Anual de Informações Sociais (RAIS). All columns estimates a model with the AMC and Year fixed effects. Standard errors shown in parentheses are clustered at AMC level. (*$p \leq 0.01$, **$p \leq 0.05$, *$p \leq 0.1$).

Figure 7: Trade Liberalization Exposition on log-changes in Total Employment

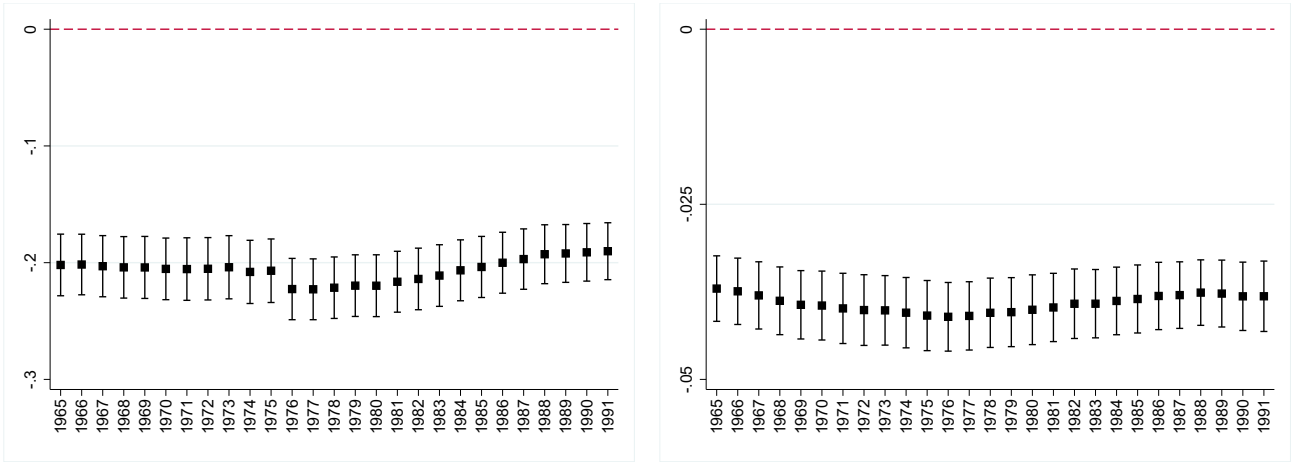


Notes. This figure plots β_t (and 95 percent confidence intervals) from estimating equation 2. The variable RTR always reflects tariff reductions from 1990 to 1995. All regressions include states fixed effects, and partial- and post-liberalization regressions include the 1985-1990 outcome pretrend. Negative estimates indicate larger declines in the employment rate in areas with greater tariff reductions. Standard errors are clustered at AMC level.

8 Robustness

To ensure the validity of my results, I conduct a set of robustness analyses that will assess the sensitivity of the estimates to different specifications. Firstly, I assess the sensitivity of my estimates to outliers by omitting one birth cohort at a time and eliminating one state at a time. Secondly, and I also perform a permutation test randomizing my measure of exposure between the treated 1000 times, therefore, creating placebo treatments. These tests are presented in figures 8, 9, and 10. From these tests is possible to notice that, first my results are not driven by anys specific birth year or state. Finally, Figure 10 plots the empirical distribution of placebo effects of the regional tariff reductions on Years of education and Total Earnings Rates. To conduct this test, I randomly assign placebo RTR exposures and rerun my baseline specification 2 using these placebo measure. This procedure is repeated 1000 times. The share of the absolute placebo coefficients that are larger in magnitude than the "true" coefficient can be taken as a measure of how likely are the results to arise by chance. The randomization process is made separately for each AMC. As is possible to notice from these figures, my results are hardly produced due to randomness of the data.

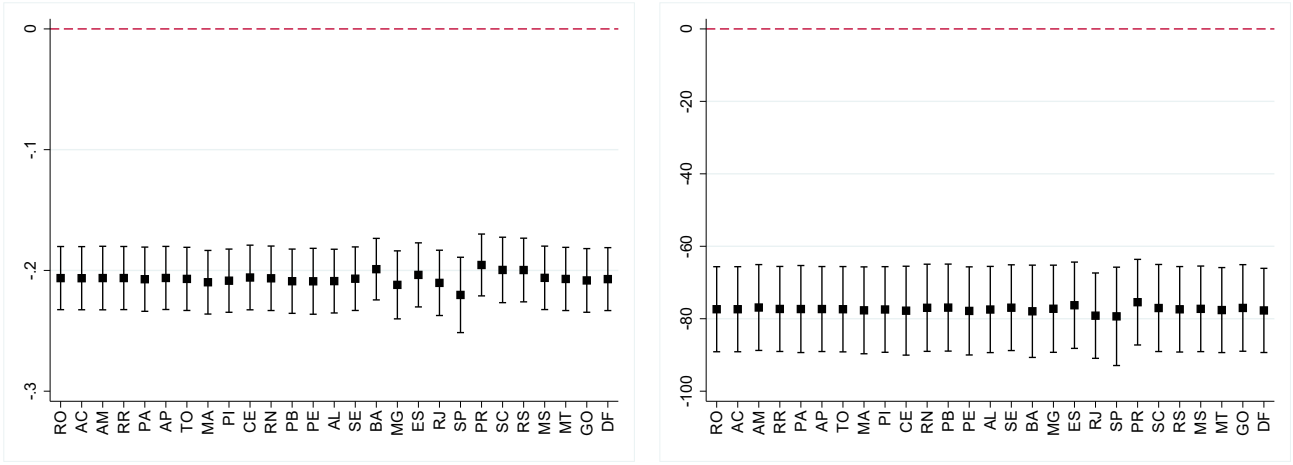
Figure 8: Regional Tariff Reduction and changes on Years of education and Total Earnings Rates (Exclusion of years)



(a) Years of Education **(b)** Total Earnings

Notes. The figure shows the robustness of the results to excluding one year of analysis. The estimated coefficients and confidence intervals at 95 percent are reported. Each estimated coefficient and confidence interval emanate from a single estimation. The number on the x-axis indicates the rank of the years according to the years of education (8a) and Total earnings (8b) .

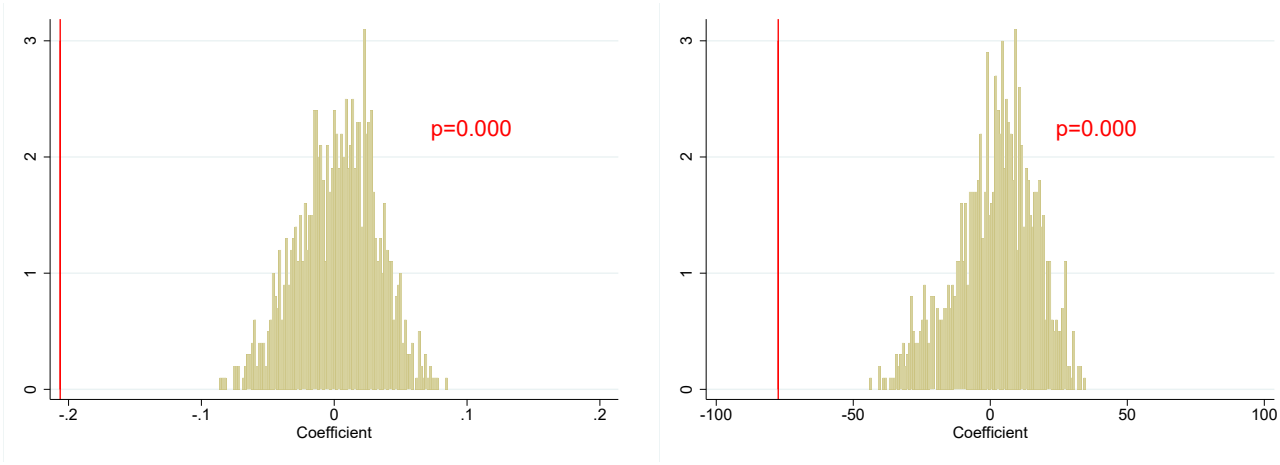
Figure 9: Regional Tariff Reduction and changes on Years of education and Total Earnings Rates (Exclusion of states)



(a) Years of Education **(b)** Total Earnings

Notes. The figure shows the robustness of the results to excluding one state of analysis. The estimated coefficients and confidence intervals at 95 percent are reported. Each estimated coefficient and confidence interval emanate from a single estimation. The number on the x-axis indicates the rank of the states according to the years of education (9a) and Total earnings (9b) .

Figure 10: Regional Tariff Reduction and changes on Years of education and Total Earnings Rates (Permutation Test)



(a) Years of Education

(b) Total Earnings

Notes. This figure plots the empirical distribution of placebo effects of the regional tariff reductions on Years of education and Total Earnings Rates. To conduct this test, I randomly assign placebo RTR exposures and rerun our baseline specification 2 using this placebo measure. This procedure is repeated 1000 times. The share of the absolute placebo coefficients that are larger in magnitude than the "true" coefficient can be taken as a measure of how likely are the results to arise by chance. The randomization process is made separately for each AMC.

9 Conclusion

In conclusion, this paper offers insights into the long-term consequences of the 1990 Brazilian Trade Liberalization on human capital development and labor market outcomes for subsequent generations. Utilizing a cohort difference-in-differences approach and examining various channels through which trade liberalization may exert its influence on later life outcomes, I demonstrate that exposure to the policy in childhood is associated with adverse effects on both educational attainment and economic prospects for those affected by the changes. Specifically, I find that individuals who were children at the time of the reform experienced significant declines in their years of education and total earnings in adulthood, suggesting that the negative impact of this policy may be long-lasting and even span multiple generations.

The analysis also unravels the potential mechanisms behind these observed impacts, with a focus on the role of parental financial resources in mediating the intergenerational transmission of economic prospects. I show that the trade liberalization reform had an immediate and notable effect on parental income and employment, constraining the available resources for investing in their children's education and development. This finding is crucial, as it highlight the importance of considering the broader social and economic context in which policy changes occur, as these contextual factors can greatly amplify the unintended consequences of such interventions.

My study contributes to the existing literature on both trade liberalization reforms and early life investments, highlighting the importance of taking into account the long-term and intergenerational impacts when designing and assessing economic policies. By shedding light on the potential negative consequences of trade liberalization on human capital development and labor market outcomes, this research reinforce the need for policymakers to adopt a more comprehensive perspective on the costs and benefits associated with such policies. Moreover, my findings emphasize the critical role that early life investments play in shaping future outcomes, reinforcing the importance of considering these investments when evaluating the merits of economic policies and interventions. Ultimately, this study calls attention to the necessity of conducting thorough policy evaluations that encompass both the short-term and long-term implications for communities and individuals, ensuring that the benefits of trade liberalization are distributed more equitably and that vulnerable populations are not disproportionately affected by the potential drawbacks of these reforms.

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