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Wage differentials between young adults' cohorts in Brazil

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Abstract

Purpose – This paper seeks to identify whether there was a decrease in the wages of young Brazilian adults of recent birth cohorts in relation to older birth cohorts.

Design/methodology/approach – We applied quantile regression and quantile decomposition models to the historical series of PNADs.

Findings – There was a decrease in the relative wages for males ^{at the top of the wage distribution. But there was an increase in wages for those in the bottom and middle of the wage distribution.}

Originality/value – The result for Brazil differs from the results of the most developed countries. This difference could be attributed to structural changes in the country, such as the education expansion and the increase of female labor participation.

Keywords Youth labor market, Wage differentials, Wage differentials between birth cohorts, Quantile regression, Quantile decomposition

Paper type Research paper

AQ: 7 Introduction

AQ: 8 The deterioration of the labor market for young adults is a well-studied trend in the richest countries (Bae & Kim, 2023; Rothstein, 2023; Fauser & Mooi-Reci, 2024). Several studies for the United States and Europe have shown that in recent decades young people have experienced lower wages, greater instability, and longer times to reach the peak of their earnings curve compared to older cohorts (ILO, 2020; Rothstein, 2023). This trend gained momentum after the 2008 financial crisis (Bell & Blanchflower, 2011; Wachter, 2020) and did not recuperate. Although this is already a concerning situation, the implication for the future generates special discussion in the social sciences. What can be expected of the working life of this generation that faces unfavorable conditions at the beginning of their careers?

Over the last decades, most of middle-income countries have observed an impressive improvement in access to education (Oliveira, 2007), in contrast to the situation in wealthy countries, where the level of education has been relatively stable for decades. Brazil presents a special case for this analysis, as it has undergone a rapid process of increasing schooling among younger generations in the past decades: the mean schooling of young adults went from 4.6 years among to 9.2 years by comparing the birth cohorts of 1948–1952 and 1993–1997 (IBGE, 2017). Is the same process of labor market deterioration for young adults observed in Brazil, given its intense educational transition?

In this paper, we investigate income differentials in the labor market among young Brazilian adults across their birth cohorts. More specifically, the paper investigates whether in Brazil the same process of decline in wages of young adults is observed in more recent generations and what is the role of the increase in schooling on this eventual decline. The paper also analyzes whether these phenomena are observed to the same degree across different socioeconomic groups.



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Background

Young adults have always been a group of greater vulnerability in the labor market. Being at the beginning of their working life, they are exposed to lower wages and greater job instability (Boye & Grönlund, 2018). However, recent generations have experienced worse working conditions compared to previous ones (Atherwood & Sparks, 2019).

There is extensive literature on the long-term effect of economic crises on the career trajectory of young people, known as the “scarring effect”: entering the labor market during an economic crisis, where they experience longer periods of unemployment and greater job instability, would have an effect that would be felt throughout their entire careers (Rothstein, 2023; Wachter, 2020). This literature gained more traction with the 2008 financial crisis, with studies measuring the long-term effect on young adults (Rothstein, 2023; Atherwood & Sparks, 2019). In the Brazilian case, the role of the economic slowdown from 2012 onwards, followed by a persistent crisis from 2015, stands out: young people increased their risk of unemployment, inactivity, and lower wages (Corseuil, Franca, & Poloponsky, 2020; Firpo & Portella, 2024). Research also show that historically more vulnerable populations in the labor market, such as women and black people, suffer these effects more strongly (Mont’Alvao & Costa Ribeiro, 2020; Santos & Coutinho, 2021).

Some studies use evidence of the scarring effect in the labor market for young adults to explain, at least in part, the worsening of working conditions for these more recent generations (Atherwood & Sparks, 2019). However, empirical analysis show that the relative deterioration in the labor market for young adults has been a trend observed for several decades (ILO, 2020). Therefore, it is necessary to investigate more deeply structural changes that may be leading to this result, as it is unlikely that it is only a persistent effect of conjunctural disturbances.

Empirical evidence attribute the worsening of the labor market for recent generations to internal changes in the labor market. Autor and Dorn (2013) point to the role of deindustrialization in the deterioration of wages in Europe and the USA: as industries automated jobs and moved jobs to poorer countries, there was an increase in the proportion of employees in the service sector, which often pays less than industry.

Another possible explanation would be the increasing complexity of working life, which is partly associated with the proportional growth of the service sector. With the increasing complexity of the economy and consumption, new careers have emerged and with them new stages of the working life course. In the past, the same individual spent their life in the same role in a career, while in more complex services, an individual might have to progress professionally to new stages of their career, taking on increasingly complex roles. Consequently, it might take longer to reach higher wages, leading to a relative worsening for younger individuals who have just entered the labor market and are in the early stages of their careers (Boye & Grönlund, 2018; Carrijo, Monsueto, & Cardoso, 2020; Adda & Dustmann, 2023).

Amaral, Queiroz, and Calazans (2015) worked with the hypothesis of cohort size effect. With increasingly larger cohorts, resulting from high fertility in the past, there would be an excess labor supply, and the labor market would respond with lower wages. This is an especially interesting hypothesis for analyzing the role of wage decline within certain subgroups, such as those with higher education. If there are more young people with higher education now than in the past, the relative salary of younger individuals will be lower as the labor market finds equilibrium.

However, there have been other changes in Brazil in recent decades, aside from the growth in education and economic modernization, that may impact the expected outcomes (Firpo & Portella, 2024). In recent years, there has been an increase in job outsourcing, with diffuse impacts on compensation and stability (Campos, 2018). Additionally, there has been a rise in informality among young workers, particularly among self-employed individuals in transport and delivery apps, although this trend has gained more momentum in a more recent period not covered in this paper (Lapa, 2022). There is also the issue of the increasing proportion of young people outside the labor market and the education system (NEET, Not in Education, Employment, or Training): this group is highly heterogeneous in Brazil, entering this

categorization for various reasons, such as preparatory studies, health issues, pregnancy, or caregiving responsibilities (Silva & Vaz, 2020). These transformations may have decreased the wages of young workers or at least reduced the magnitude of the positive effect of education.

Based on these previous studies, this article aims to investigate the labor market for young adults testing the following hypotheses:

H1. More recent cohorts of young adults have comparatively lower wages compared to older cohorts, even with improvement in educational composition; In other words, is a dynamic already identified in developed countries, where younger workers are earning less than previous generations, observed in Brazil?

H2. The potential decline in relative wages of young Brazilian adults is a heterogeneous phenomenon for low and high earnings young workers.

Brazil is a country always highlighted by its high levels of income and social inequality, also observed in the labor market (Engbom & Moser, 2022). By testing this hypothesis, the paper aims to identify whether, in the case of a decline in relative wages across cohorts, this occurred unevenly among young adults from different wage levels.

H3. The increase in education levels among young Brazilians in recent decades has had the effect of increasing relative wages across cohorts.

The increase in education among young Brazilians has occurred at a faster rate and in a shorter period than seen in developed countries (Ribeiro, 2011). Therefore, it is worth investigating the effect of this increase in average education on wages across cohorts.

Methodology

Quantile regression and quantile decomposition

In this paper, we use Mincerian earning equations using quantile regression models to investigate whether being member of an older cohort implies different wages for workers at various points of the income distribution. Wage equations, Mincer (1974), are the traditional models for investigating the wage differential between sociodemographic groups. One of its important developments are the quantile regression (Koenker & Bassett, 1978), for it allows estimating the effect of a variable not only on the average wage but also along the entire earnings distribution. In other words, it is a methodological advance that enables the investigation of whether the effect of a given variable is homogeneous among high and low earners.

In addition to identifying earnings differentials across birth cohorts, it is also interesting to discuss possible explanations for such differentials. The Oaxaca-Blinder decomposition, also known as the Kitagawa decomposition, (Kitagawa, 1955; Blinder, 1973; Oaxaca, 1973) is a classic methodology for explaining wage differentials, allowing the separation of the composition effect and the structure effect of the differential between two sociodemographic groups (Gomes, Souza, Mantovani, & Paiva, 2020; Mancha & Mattos, 2020). The composition effect measures how much of the wage differential between the two cohorts is due to differences in their composition. For example, this effect measures if a younger cohort has a higher average wage than an older cohort due to an increase in average education. The structure effect measures how much of the differential is due to different returns to the same characteristics. For example, this effect measures if higher education was better remunerated in an older cohort compared to a younger cohort.

The Kitagawa-Oaxaca-Blinder method was originally developed for studying differences in average wages. However, the method cannot be directly applied to quantile regressions, as it assumes parameter linearity, and quantile regression does not guarantee this assumption (Firpo, Fortin, & Lemieux, 2009). Fortin, Lemieux, and Firpo (2011) propose a solution to estimate the quantile decomposition through the linearization of the parameters using

Recentered Influence Functions (RIF), thus presenting the first alternative that allows detailed quantile decomposition, like the Kitagawa-Oaxaca-Blinder method. RIF is technique that allows the estimation of the effects of small shifts in a continuous independent variable on a distributional statistic, such as quantiles. When applied to quantiles, RIF regression acts as unconditional quantile regressions, by estimating the effect of the explanatory variable on quantiles of the marginal distribution of the dependent variable. Later, the same authors refined the method by introducing a preliminary step that estimates the weights used in the decomposition using logistic regression ([Firpo, Fortin, & Lemieux, 2018](#)).

Previous research used the quantile decomposition to investigate wage differentials in Brazil ([Frio & Fontes, 2018](#); [Santos & Hermeto, 2019](#)). [Frio and Fontes \(2018\)](#) used the quantile decomposition to study racial wage gaps in Brazil and found higher inequality among higher-earners and that the structure effect of schooling, experience, and job characteristics is the main explanation of this wage gap. Santos and Hermeto (2019) used the quantile decomposition to study regional wage differentials in Brazil and also finds higher gap among higher-earners and the significant role of the structure effect on this gap. This article uses the quantile decomposition proposed by these authors, which can have its results interpreted in the same manner as the original Kitagawa-Oaxaca-Blinder decomposition. The results of the quantile decomposition provide explanations for the possible wage differentials across cohorts of young adults in Brazil, including the role of education in this explanation, thus testing the third hypothesis of the article.

AQ: 9

F1

Data

The primary data source used in this article is the Brazilian Household Survey (PNAD) carried out by IBGE. The paper uses data from 1982, 1987, 1992, 1997, 2002, 2007, 2012 and 2017. Although the 2022 data is already available, we chose not to include it in the analysis so that the effects of the COVID-19 pandemic would not interfere with the results. Despite the survey being carried out regularly since 1976, its first editions did not include variables indicating the individual's race or color. This is an important feature for determining wages in Brazil, which makes using older editions of PNAD without this information incurring a serious bias in the estimates. By using PNAD editions separated by five years, it is possible to reconstruct synthetic birth cohorts from the five-year age groups in each survey. [Figure 1](#) illustrates the database design, highlighting in gray the birth cohorts to be used in the article (those observed in at least two PNADs).

A major challenge in estimating wage equations for synthetic cohorts reconstructed from period surveys is the change in the cost of living over time. Inflation indices do not always capture changes in the value of money over the years, especially in Brazil, where there have been currency changes and periods of hyperinflation. The solution adopted in this work is to standardize wages across all PNADs. For this purpose, we use the price of the basic food basket in the city of São Paulo: the price of the basic food parcel captures changes in the cost of living, and São Paulo has a long monthly series for this variable.

$$W_R = (W_N / P_N) \times P_{2017}$$

Where W_R is the updated real monthly wage in September 2017 values, W_N is the nominal monthly salary declared in the PNAD, P_N is the price of the basic food parcel in the PNAD reference month and year, and P_{2017} is the price of the basic food basket in September 2017. That is, first, how many basic food parcel the monthly salary of that individual would buy at the time of the survey is calculated and then multiplied this number by the value of the basic basket in September 2017.

Since our focus is on young adults, we use only individuals aged 15 to 39 in the analysis. There is no consensus on the age limits of what is referred to as "young adults." This paper selects the population aged 15 to 39 years as it is understood to represent the first half of the

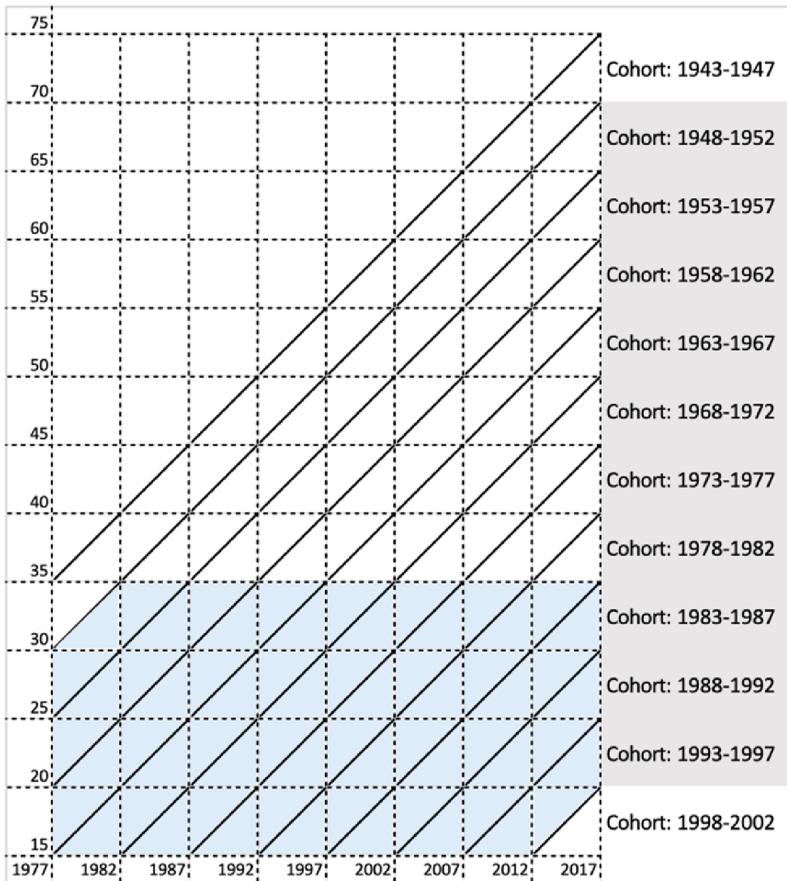


Figure 1. Birth cohorts from PNADs, Brazil. **Source:** PNAD 1977–2012 e PNAD Contínua 2017 ([IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017](#))

working life in Brazil (with the second half being from 40 to 64 years) and because it provides a larger sample of workers to be analyzed. We included age of the individuals in the models as dummy variables for each specific age, so as not to pre-determine the shape of the function that relates wage and age. For each pair of compared cohorts, the model only includes individuals from the age groups present in both cohorts. That is, if the database of cohort A included individuals aged 15 to 39 and cohort B included individuals aged 15 to 34, then the model only included individuals aged 15 to 34 from both cohorts and so on.

For the wage regressions, we considered only employed individuals with an hourly wage greater than zero. Therefore, an important methodological limitation of this paper is the vulnerability of the results to abrupt changes in the factors influencing entry and exit from the labor market. A significant change in the factors leading to inactivity and unemployment across cohorts could result in biases in the outcomes, either underestimating or overestimating the explanatory power of some variables in the model.

Due to the substantial increase in women's participation in the Brazilian labor market in recent decades, the changes that men and women experienced at work were likely very different ([Pazello, 2006; Muniz & Veneroso, 2019](#)). For this reason, the results of this article are estimated separately for each sex.

To measure socioeconomic differentials, we divide the sample into ten deciles of per capita family income. This variable captures the relative position of the socioeconomic conditions of young adults' families each year, thus being less subject to changes in interpretation over time, which would happen if we used variables such as mother's education or household head's education. Education is a sensitive variable to use over time when its meaning changes over time, either due to changes in the educational system or changes in the educational composition of the population. Thus, in each PNAD, we grouped the variable of years of schooling into five categories: up to 3 years of schooling, 4 to 7 years of schooling, 8 to 10 years of schooling, 11 years of schooling, and 12 or more years of schooling.

As control variables for employment characteristics, we included information on whether individual contributes to social security (indicative of participation in the formal labor market) and the sector of economic activity (standardized across the PNADs). The race or color variable was dichotomized into whites (and Asians) and blacks (and browns and indigenous people).

Results

This section presents the results of the study, starting with descriptive statistics on changes in the labor market for young Brazilian adults in recent decades. [Table 1](#) shows the descriptive statistics for the synthetic cohorts. It should be read carefully since for younger cohorts only individuals of younger ages are present, and for older cohorts only individuals of older ages are present, depending on the data available for the cohort. This is the reason why the proportion of economically active individuals, employed individuals, and individuals employed in the formal sector are so low in the cohort born between 1993 and 1997, as these are very young individuals with a more unstable labor market.

T1

[Table 1](#) highlights the considerable increase in education among younger cohorts: from 4.6 years of study for the cohort born in 1948–1952 to 9.2 years of schooling for cohort born in 1993–1997. More recent cohorts are still of an age where they can continue their education, this increase may be even greater. This increase in education in Brazil should be analyzed alongside urbanization and changes in the composition of activity sectors ([Figoli, 2006](#); [Firpo & Portella, 2024](#)). In addition to public policies focused on expanding education for children and adolescents, a more urban labor market concentrated in professions that demand more training may have required the population to have a higher level of education – a significant reduction in the proportion of employees in the agricultural sector.

We also highlight the decrease in the population that declared themselves as white or Asian over the cohorts: from 60% in the cohort of 1948–1952 to 41% in the cohort of 1993–1997. This movement is well described in the literature by the change in how Brazilians perceive their own race, with more people declaring themselves as black, brown, or indigenous, especially in recent decades ([Carvalho, Wood, & Andrade, 2004](#); [Miranda, 2015](#)).

F2

[Figure 2](#) shows the evolution of age-specific labor force participation rates across cohorts. Among men aged 25 and older, participation rates have remained constant across cohorts. In other words, there has been little change in the trend of nearly all men entering the labor market by the age of 30. Thus, the decline in participation rates at younger ages can be interpreted as a delay in entering the labor market. The decreasing participation rates at younger ages are a result of increased time spent in education, whether due to child labor prevention policies of recent decades or a cultural shift regarding the age norm for transitioning from school to work among Brazilian families ([Ribeiro, 2014](#); [Carrijo et al., 2020](#)).

It is noted that young people from wealthier families have lower participation rates at younger ages, while young people from poorer families have lower participation rates at older ages. This reflects two different realities in the same country: young people from wealthier families can delay entering the labor market, pursue education for longer, and secure better jobs; young people from poorer families must start working earlier, and their incomplete education relegates them to a more unstable labor market ([Tomás, Oliveira, & Rios-Neto, 2008](#)).

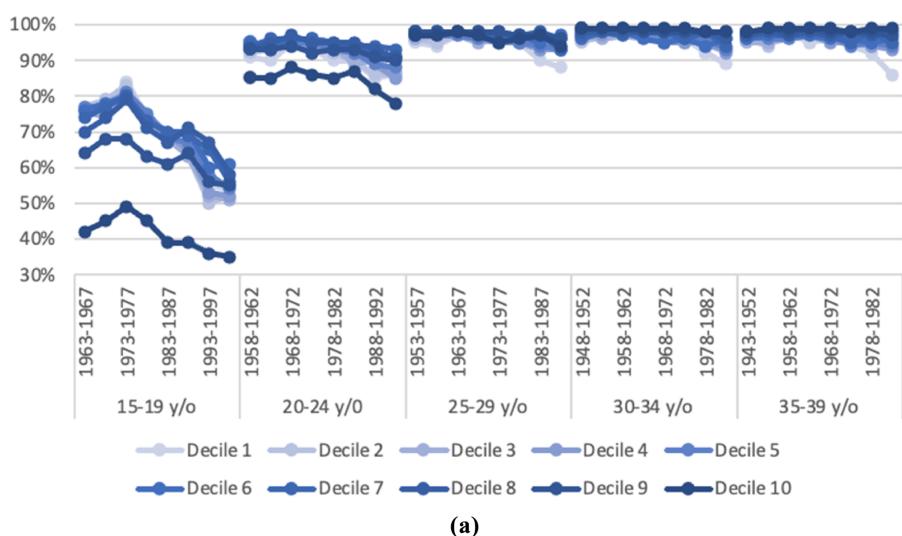
Table 1. Descriptive statistics by birth cohort – Brazil, 1982–2017

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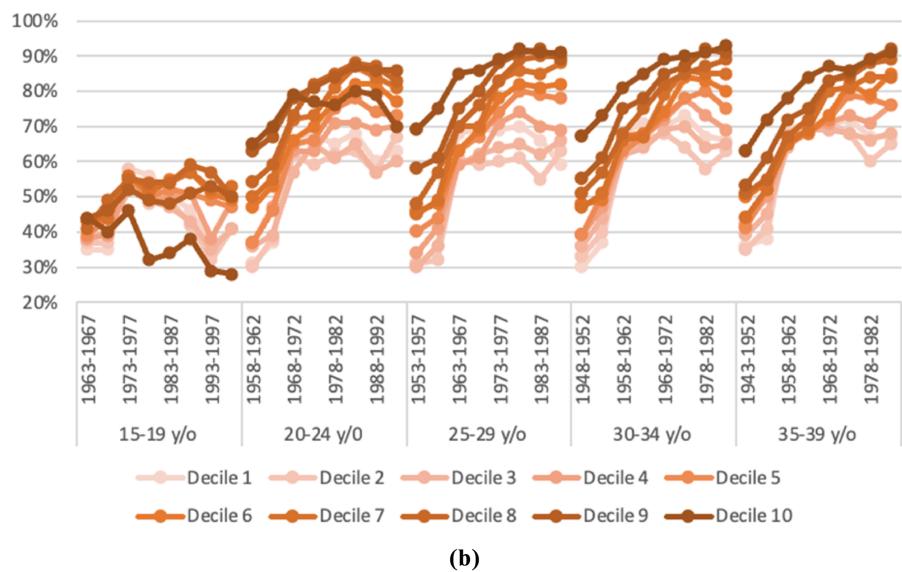
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	Birth cohort									
	1948–1952	1953–1957	1958–1962	1963–1967	1968–1972	1973–1977	1978–1982	1983–1987	1988–1992	1993–1997
% Men	49%	48%	48%	49%	49%	49%	49%	50%	50%	51%
% White	60%	60%	59%	56%	53%	50%	48%	47%	45%	41%
Age	Min	30	25	20	15	15	15	15	15	15
	Max	39	39	39	39	39	39	34	29	24
	Mean	34.39	31.95	29.41	26.80	26.96	26.99	25.80	23.32	20.85
Schooling		4.6	5.5	6.0	6.1	6.6	7.3	8.3	9.1	9.2
Region	Metropolitan urban	36%	36%	34%	32%	32%	32%	32%	32%	32%
	Metropolitan non-urban	42%	44%	46%	48%	50%	52%	52%	54%	53%
	Rural	22%	20%	20%	20%	18%	16%	15%	14%	15%
% in labor market		73%	76%	77%	76%	79%	82%	80%	78%	72%
% employed		71%	73%	74%	72%	75%	77%	73%	69%	62%
% formal job		43%	43%	40%	33%	34%	36%	36%	34%	30%
Economic sector	Agricultural	20%	20%	20%	21%	19%	17%	14%	13%	13%
	Manufacturing industry	17%	17%	16%	16%	16%	15%	15%	15%	13%
	Construction	8%	8%	8%	7%	7%	7%	7%	8%	8%
	Other industries	2%	2%	1%	1%	1%	1%	0%	1%	0%
	Commerce	11%	11%	12%	14%	16%	17%	19%	21%	24%
	Services	17%	18%	20%	20%	20%	20%	18%	17%	21%
	Transports and communication	3%	4%	4%	4%	4%	4%	5%	5%	4%
	Social services	5%	7%	8%	8%	8%	9%	9%	7%	6%
	Public administration	11%	9%	7%	6%	5%	4%	4%	4%	3%
	Other sectors	5%	4%	4%	4%	5%	6%	8%	8%	6%

Source(s): PNAD 1977–2012 e PNAD Contínua 2017 (IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017)



(a)



(b)

Figure 2. Labor market participation rate by sex, age, birth cohort, and per capita household income decile – Brazil. **Source:** PNAD 1977–2012 e PNAD Contínua 2017 ([IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017](#))

Among women, there is a notable increase in labor force participation rates, consistent with previous studies (Leme & Wajnman, 2000; Codazzi, Pero, & Albuquerque Sant'Anna, 2018; Muniz & Veneroso, 2019). It is also possible to observe that young women from wealthier families delay entering the labor market delayed at younger ages and have higher participation

rates at older ages, probably because they have access to a more stable labor market in comparison women from low-income groups.

Among women from poorer families, we observed a decline in their participation rates in the more recent cohorts. This is a result that requires further investigation, but it could be related to the fact that these women are restricted to more precarious jobs and face higher rates of unemployment and consequent inactivity (Barros & Silva, 2020).

F3 Figure 3 shows the evolution of labor earnings distribution across cohorts. These results are noteworthy because, at first glance, they contrast with the decline in wages of young adults observed in developed countries in recent decades. On the contrary, we find a relative increase in wages of those earning less and stability among those earning more. The increase in wages at the lower end of the distribution could be due to the real increase in the minimum wage in recent decades and the reduction in the informal labor market, which would have caused even the lowest wages to rise in recent decades.

F4 When controlling for other variables in the application of the econometric model, the relative change in wages shows an interesting result. The complete results of the econometric models with respective statistics are presented in the Appendix. Figure 4 reveals that among young men with higher wages, there was a relative decline in earnings in more recent cohorts. For example, among the top 5% of earners, the cohort born between 1953 and 1957 had wages 20% higher than the baseline cohort (1968–1972), but the 1988–1992 cohort had wages 12% lower than the same baseline cohort. The effect of birth cohort on wages forms a gradient across the earnings curve, indicating that there was indeed a relative increase in the wages of young people with lower wages, especially in more recent generations. For instance, among the bottom 10% of earners, while the 1958–1962 cohort earned 4% less than the baseline cohort, the 1988–1992 cohort earned 30% more than the baseline cohort.

The results for intermediate classes are likely a combination of the scenarios at these two extremes: the increase in the wages of the poorest due to the real increase in the minimum wage and the reduction of the informal labor market (Scalioni Brito & Lessa Kerstenzky, 2019; Firpo & Portella, 2024), and the decline in the wages of the richest due to factors discussed in the literature review section, such as the delay in reaching the peak of their earnings curve over their lifetime.

The improvement of women's situation in the labor market in recent decades has been so relevant that among women with higher wages, the same intensity of relative wage decline observed among men is not evident. Among women with lower wages, there was a much stronger increase in wages than that observed among men. This result is probably explained by the fact that these women started from a worse condition, where they were more exposed to more precarious jobs and very low wages, such as domestic work.

The results suggest that there is not a relative decline in the wages of young people across cohorts, as noted in developed countries. On the contrary, in the more recent cohorts, there was a relative increase in the wages of these young adults who earn less and relative improvements in the conditions they are in the labor market for the years in the study.

F5 To better understand the situation of younger individuals in the labor market, we move to the differential decomposition analysis to understand the determinants of the change in wage dynamics. The complete results of the decomposition models with respective statistics are presented in the Appendix. Figure 5 shows the result of the decomposition of the total wage differential. Each unit of logarithm of hourly wage represents an impact of 2.72 Brazilian reais of 2017 on the hourly wage, equivalent to an impact of 471 Brazilian reais of 2017 on the monthly wage of an individual working 40 hours a week. The total difference reproduces the same trend already identified in Figure 4.

The results show that changes in the attributes of young Brazilian adults, the composition effect, had a considerable effect in increasing the wages of those earning less in more recent cohorts. The composition effect seems to be very important explaining the increase in wages of higher-earning workers compared to older cohorts. That is, the results suggest that there was a time lag in the period during which young people of different wage levels benefited from the

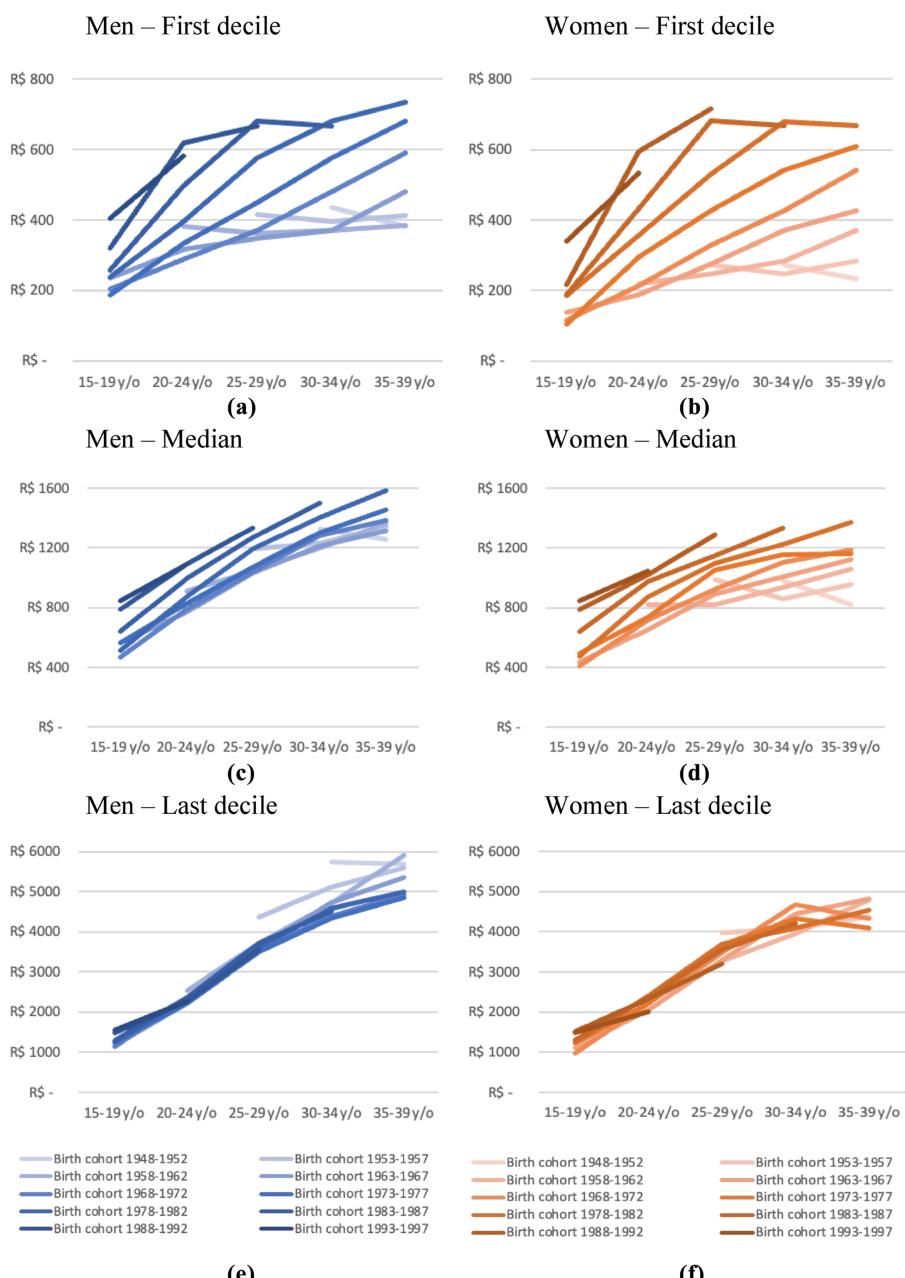
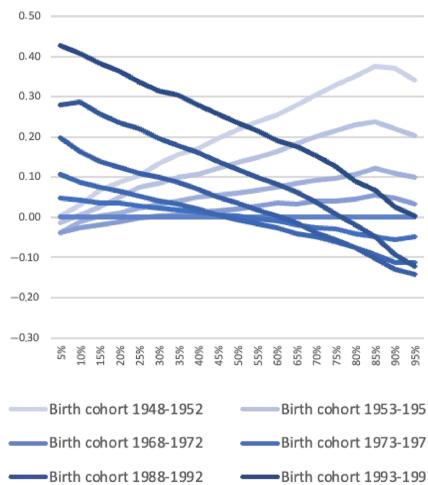


Figure 3. Monthly salary (40 weekly hours) by gender, age and birth cohort – Brazil. **SOURCE:** PNA&D 1977–2012 e PNA&D Contínua 2017 (IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017)

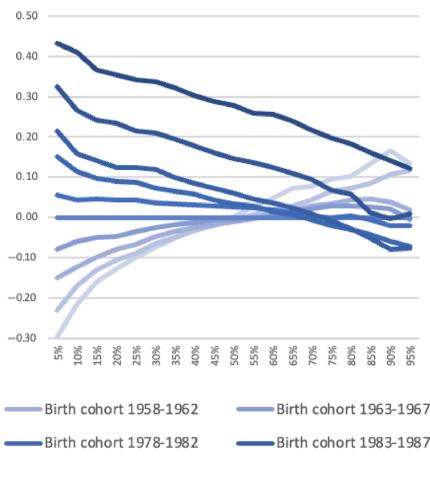
composition effect. At the same time, the return on each attribute, the structure effect, led workers at the bottom of the distribution to have higher wages in recent cohorts and workers at the top to have lower wages in more recent cohorts.

Men



(a)

Women



(b)

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Figure 4. Birth cohort effect on wages by hourly wage percentile – (base: cohort 1968–1972) – Brazil. **Source:** PNAD 1977–2012 e PNAD Contínua 2017 ([IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017](#))

F6 Figure 6 presents the results of the composition effect by group of covariates, addressing the question: how much of the wage differential is explained by the composition differentials of each group concerning these covariates? In other words, if the returns for each covariate were fixed for all cohorts, Figure 6 shows what the wage differential would be (relative to the reference cohort, 1968–1972) due to changes in the composition of each cohort in terms of personal characteristics, education, regional characteristics, and job characteristics. Each unit in Figure 6 is equivalent to a differential of 471 Brazilian reais of 2017 in the monthly wage of an individual working 40 hours a week.

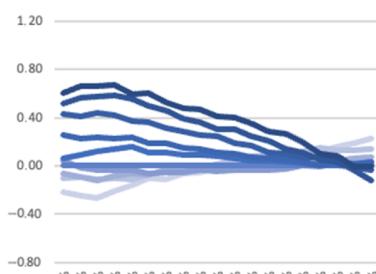
Personal characteristics (age, age squared, and race/color) have a proportionally small effect on the wage differential between cohorts. Changes in the age composition of the young people working in each cohort and at each point of the distribution explain the variations.

Education is the main component of the composition effect. Over the cohorts, it is the higher-earning young individuals who benefited the most from the increase in education, with almost all this wage gain from the education composition effect occurring for older cohorts. This result would be associated with a slower increase in the education level of young people, which benefited those better positioned in the labor market. Among lower-earning young individuals, the wage gain associated with the education composition effect is concentrated in more recent cohorts. In this group, this result would be the effect of the rapid universalization of basic education in Brazil in recent decades.

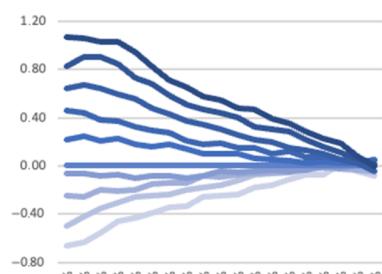
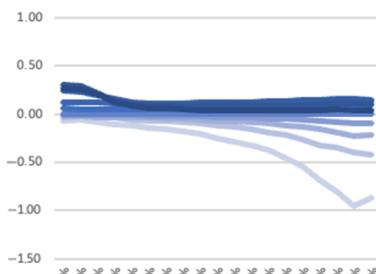
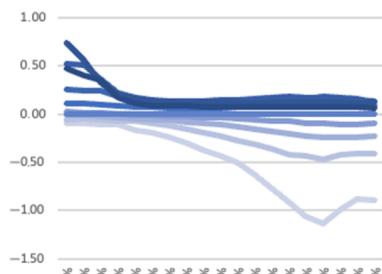
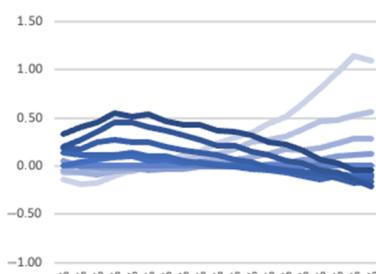
The composition effect of regional characteristics (region of residence and if living in an urban area) and employment characteristics (formality and economic sector) played a small role in explaining income differentials between cohorts. The greatest effect is among lower-earning workers, especially women, reflecting the increased degree of formality of this group in the labor market.

F7 Figure 7 presents the results of the structure effect divided by group of covariates. If the composition of each covariate were fixed for all cohorts, the results show what the wage differential would be (relative to the reference cohort, 1968–1972) due to changes in the remuneration of each cohort in terms of personal characteristics, education, regional

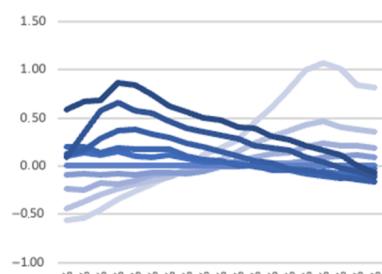
Total difference – Men

(a)
Composition effect – Men

Total difference – Women

(b)
Composition effect – Men(c)
Structure effect – Men(d)
Structure effect – Women

(e)



(f)

Figure 5. Total effect, composition and structure on the wage differential between birth cohorts by hourly wage percentile – (base: cohort 1968–1972) – Brazil. **Source:** PNAD 1977–2012 e PNAD Contínua 2017 (IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017)

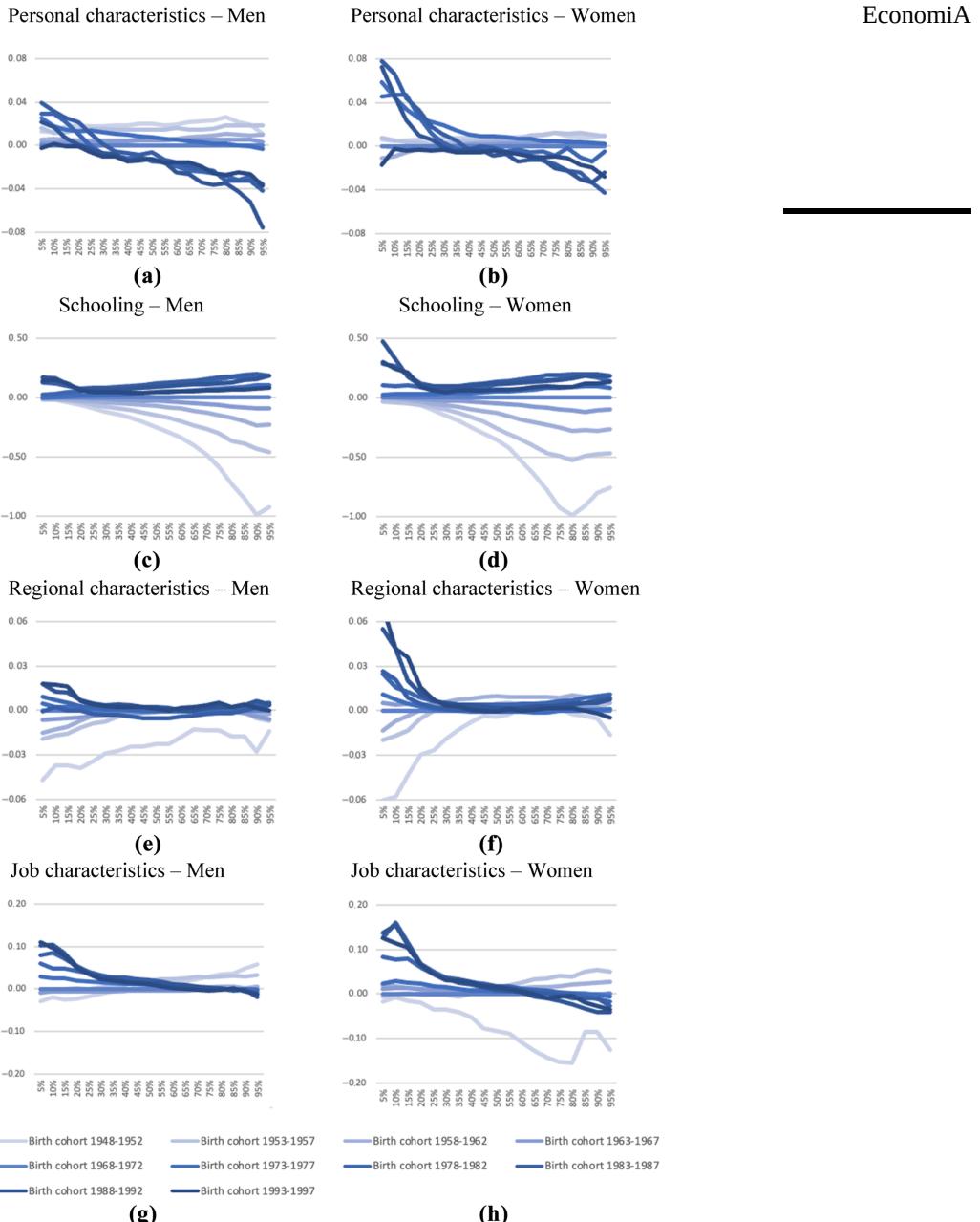
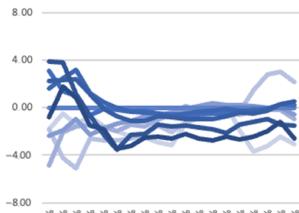


Figure 6. Composition effect on the wage differential between birth cohorts by hourly wage percentile and covariate group – (base: cohort 1968–1972) – Brazil. **Source:** PNAD 1977–2012 e PNAD Contínua 2017 (IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017)

Personal characteristics – Men

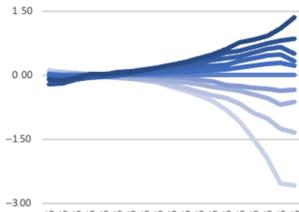


(a) Schooling – Men

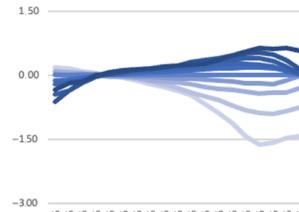
Personal characteristics – Women



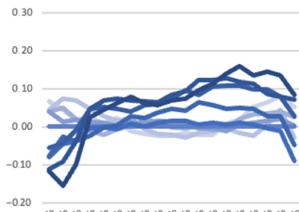
(b) Schooling – Women



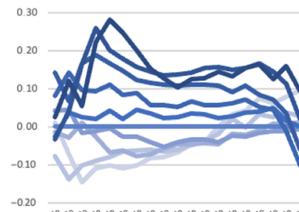
(c) Regional characteristics – Men



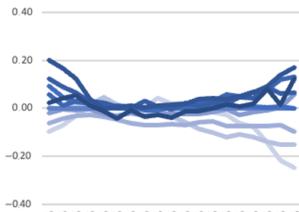
(d) Regional characteristics – Women



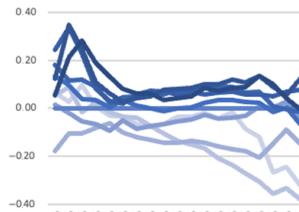
(e) Job characteristics – Men



(f) Job characteristics – Women



(g)



(h)

Figure 7. Structure effect on the wage differential between birth cohorts by hourly wage percentile and covariate group – (base: cohort 1968–1972) – Brazil. **Source:** PNAD 1977–2012 e PNAD Contínua 2017 (IBGE, 1977, 1982, 1987, 1992, 1997, 2002, 2007, 2012, 2017)

characteristics, and job characteristics. Each unit in [Figure 6](#) is equivalent to a differential of 471 Brazilian reais of 2017 on the monthly wage of an individual working 40 hours a week.

The structure effect of personal characteristics is very high, meaning it has great explanatory power for the earnings differentials across cohorts, although it is negative. It is only not predominant because it is counterbalanced by the effect of the constant, which measures the part of the differential explained by the difference in wage levels. The structure effect of personal characteristics mainly captures differentials in how at younger ages, individuals are remunerated differently across cohorts. Brazilian young people are entering the labor market later, which is also associated with less experience ([Reis, 2015](#)). Thus, all else being equal, an individual of age x in an older cohort would have been in the labor market longer than an individual of age x in a more recent cohort, and consequently, would have more experience. Therefore, age would contribute to a negative structure effect, meaning it causes more recent cohorts to have relatively lower wages.

It is worth highlighting the results for the race variable. Whites and Asians earn more than other groups at all wage levels when analyzing the wage dynamics within each cohort with the results of quantile regression. However, these differentials decrease in more recent cohorts, as already shown by [Frio and Fortes \(2018\)](#). In the quantile decomposition, the composition effect of the race variable is negligible because there was little change in the racial composition of the population analyzed. The structure effect, on the other hand, had a significant effect: as the racial wage gap decreased in more recent cohorts, it contributed to higher wages in these more recent cohorts, given that Blacks, Browns, and Indigenous people earn more in these younger cohorts.

The structure effect of education was greater the higher the worker's position in the wage distribution curve. Since there is a strong positive correlation between education and wages, it is expected that workers at the top of the distribution are more educated and have more room for wage variation across cohorts.

In contrast, less educated workers would have their wages tied to indicators such as the minimum wage, preventing significant variations over time. [Amaral et al. \(2015\)](#) discuss that the increase in the proportion of highly educated workers would lead to a decrease in the wages of these workers due to an oversupply. This phenomenon is not observed here because these are very young workers, and any potential effect of increased education would be felt at older ages when more advanced job positions are reached. Moreover, the cohorts used in this article are very recent, making it too early to detect the effect of the increased proportion of young people with higher education that has occurred in Brazil in recent decades.

The structure effect of regional and employment characteristics, once again, shows a small magnitude. However, it is noteworthy how this effect seems to have been more important in increasing the wages of women in more recent cohorts. This might be a result of the urbanization process, which moved women from poorly paid positions in family agriculture in the past to relatively better positions in urban centers, and the progressive reduction of gender differentials in the labor market ([Souza Silveira & Siqueira Leão, 2020](#)), resulting in women being better remunerated for the same characteristics they had in the past.

Conclusion

This article investigated whether a decline in wages for young adults from more recent cohorts has been observed in the Brazilian labor market, as already observed in developed countries. Using PNAD data, a cross-sectional survey, we construct ten synthetic cohorts of young adults in Brazil and tested the earnings differentials across birth cohorts. Furthermore, we applied the analysis across the wage distribution curve to obtain more realistic results in a country with a high degree of social inequality like Brazil.

We did not find strong evidence to support the first hypothesis presented, the occurrence of a relative decline in the wages of young adults in Brazil. Empirical evidence for the decline in developed countries is well-documented in the literature and is attributed to factors such as the

increasing complexity of career paths (Boye & Grönlund, 2018; ILO, 2020). Although these phenomena are also observed in Brazil, the country has undergone profound changes in recent decades that make its labor market different from that of central countries, such as rapid processes of education, urbanization, and the increased value of women in the labor market (Jaume, 2021; Firpo & Portella, 2024), what might explain our results.

The results provide strong evidence for our second hypothesis, the heterogeneity of trends in the decline or increase of relative wages for Brazilian young adults. The results show that distinct realities coexist in the same country. Higher-earning young individuals experienced stagnation or even a slight decline in their wages across cohorts, while lower-earning young individuals experienced a strong relative growth in their wages over the cohorts. Besides the increase in labor formalization, which enabled more vigorous wage increases for the poorer, Brazil's economic modernization in recent decades may have contributed to a general increase in wages (Firpo & Portella, 2024), preventing the same phenomenon of wage deterioration observed in developed countries. Furthermore, the increase in the participation and permanence of women in the labor market led to a strong increase in their relative wages across all social classes (Barros & Silva, 2020), which could be explained by the fact that they came from a worse position in the labor market in the past, with greater instability and lower chances of career advancement.

Finally, we find mixed evidence for the third hypothesis, whether the effect of increasing average education in Brazil could lead to a relative increase in wages over the cohorts. The results show that, for all the population subgroups analyzed, the composition effect of education had a positive impact on wages over the cohorts. That is, the increase in the proportion of young adults with higher education in more recent cohorts, all else being equal, would lead these cohorts to have higher relative wages. However, due to methodological limitations, it was not possible to identify whether there was a decline in the return on education in younger cohorts. Results from other studies, such as Amaral *et al.* (2015), suggest that it is likely that there is a structure effect of education in Brazil, contributing to relatively lower wages for younger cohorts. It can be argued that this effect would be greater for higher-earning young individuals, as they were already a highly educated group in past cohorts and would experience a decline in the return on their education over time due to the increased supply of this more qualified labor.

Nevertheless, it is not possible to attribute the entire weight of the structure effect to education, which in the Brazilian case caused higher-earning young adults to have a relative wage decline in more recent cohorts, while lower-earning young adults experienced a relative increase. There are other factors that are difficult to measure and consequently test, such as the increasing complexity of career paths, as in more recent cohorts, as individuals need to go through more stages to reach the peak of their careers (Boye & Grönlund, 2018). Therefore, the most urgent research agenda following this article is to better measure these factors to disentangle all the components of the structure effect, thus moving towards a broader understanding of the changes in the labor market for young adults in Brazil.

In conclusion, it is pointed out that the main finding of this paper is that the same trend of wage deterioration for young adults observed in developed countries is not observed in Brazil, and the transformations the country has undergone in recent decades lead to distinct realities within its population. The research agenda on this topic is also relevant for other middle- and low-income countries because of the significant consequences that an unstable labor market for young adults can have throughout their lives, such as for retirement and family formation.

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Supplementary material

The supplementary material for this article can be found online.

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