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DOSSIÊ: ESTRATIFICAÇÃO NO SÉCULO 21: DESIGUALDADES DE OPORTUNIDADES E TRAJETÓRIAS

The changing structure of school to work transition in Brazil

Mudanças na estrutura da transição escola-trabalho no Brasil

Cambios en la estructura de la transición escuela-trabajo en Brasil

Luciana de Souza Leão¹

orcid.org/0000-0002-7528-4306
lseo@umich.edu

Flavio Carvalhaes²

orcid.org/0000-0002-3782-1326
flavio.carvalhaes@ifcs.ufrj.br

Benjamin Elbers³

orcid.org/0000-0001-5392-3448
benjamin.elbers@nuffield.ox.ac.uk

Thomas DiPrete⁴

orcid.org/0000-0002-9485-3658
tad61@columbia.edu

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Abstract: This paper provides an in-depth analysis of the changing structure and consequences of the links between the educational system and labor markets in Brazil in the past 30 years. Using the linkages methodology proposed by DiPrete et al. (2017) and Elbers (2021), we identify changes in education-occupation linkage that were offset by Brazil's rapid educational expansion, distinguishing between changes in rates and changes in the structure of school-to-work linkages. We find that the overall compositional shift towards higher educational levels did not have substantial effects on occupational allocation, yet the trends for younger and older workers, as well as for workers with different fields of study in the tertiary system, were fundamentally different. Our findings suggest that the features of educational expansion in Brazil – i.e., privatization, field of study concentration, and quality discrepancies – contributed to a weakening of the links between education and occupational systems.

Keywords: Linkages. Education. Occupations.

Resumo: Esse artigo analisa em detalhe as mudanças nas estruturas que conectam o sistema educacional e o mercado de trabalho no Brasil nos últimos 30 anos. Usando a metodologia de linkages proposta por DiPrete et al. (2017) e Elbers (2021), identificamos mudanças na trajetória que conectam educação e ocupação que resultaram da rápida expansão educacional brasileira, diferenciando entre mudanças na composição e na estrutura dessas conexões. Nossos resultados demonstram que o aumento no nível de escolaridade não impactou substancialmente a alocação ocupacional dos trabalhadores brasileiros, mas que houve impactos distintos para trabalhadores de diferentes grupos etários e para trabalhadores com diplomas universitários em áreas de estudo diferentes. Esses resultados sugerem que as características da expansão educacional no Brasil nos últimos 30 anos – i.e., a privatização, concentração de áreas de estudo, e discrepâncias de qualidade – contribuíram para o enfraquecimento das conexões entre o sistema educacional e o mercado de trabalho.

Palavras-chave: Linkages. Educação. Ocupações.

Resumen: Este artículo analiza en detalle los cambios en las estructuras que vinculan el sistema educacional y el mercado laboral en Brasil en los últimos 30 años. Usando la metodología de linkages propuesta por DiPrete et al. (2017) y Elbers (2021), identificamos cambios en la trayectoria entre educación y ocupación que ocurrieron a partir de la rápida expansión educacional brasileña, distinguiendo entre cambios en la composición y la estructura de la conexión escuela-trabajo. Nuestros resultados muestran que el incremento en el nivel de escolaridad no ha impactado sustancialmente la distribución ocupacional de los trabajadores brasileños, pero si ha tenido impactos distintos para trabajadores de diferentes grupos etarios y para trabajadores con diplomas universitarios en base a su campo de estudio. Esos resultados sugieren que las características de la expansión educacional brasileña en los últimos 30 años – i.e., privatización, concentración de áreas de estudio, y discrepancia de calidad – contribuyeron al debilitamiento del vínculo entre el sistema educacional y el mercado laboral.

Palabras clave: Linkages. Educación. Ocupaciones.



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¹ University of Michigan, Ann Arbor, EUA.

² Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brasil.

³ Oxford University, Oxford, Reino Unido.

⁴ Columbia University, New York, EUA.

Introduction⁵

Research on social stratification long has been interested in understanding the dynamic ways in which education and labor markets interact with each other (Shavit and Müller 1998). Often taking a comparative approach, this literature has examined how differences in the characteristics of educational systems (such as their levels of vocational specificity and their standardization) impact patterns of entry into the labor market, as well as occupational outcomes for both younger and older cohorts of workers. The comparative literature, moreover, has made important strides in understanding the consequences of educational expansion for school to work transition patterns, exploring the effects of increased access to tertiary education and how different institutional arrangements of the educational system shape socioeconomic results of various groups in multiple national contexts (Kerckhoff 1995).

The findings of the school to work literature are based mostly in the experience of industrialized societies. In these contexts, once primary and secondary education became nearly universal, scholars started to pay attention to the ways that post-secondary education expansion was accompanied by the differentiation and inequality of educational systems (Wolbers 2007). In common, scholars highlighted the importance for the school to work literature to consider the heterogeneity of educational credentials among workers with the same levels of education, but with specializations in different fields of study (Gerber and Cheung 2008). Yet, despite few exceptions (Reis 2017), we know less about how the link between school and work is affected by educational expansion in countries with different levels of development and institutional characteristics. Even less is known about how the heterogeneity of educational credentials may impact the links between school and occupational structure in these contexts. In this paper, our goal

is to advance existing progress in this direction by investigating how increased access to the tertiary and secondary education shaped thirty years of school to work transition in Brazil.

Brazil is an interesting case for discussing concepts and mechanisms relevant for the school to work literature because of the heterogeneity of its labor market outcomes and fast-paced educational expansion in the last 30 years (Comin and Barbosa 2011). The country has both a highly diversified industrial and urban sector that coexists with a large informal economy, heavily grounded in the service sector. On the educational side, Brazil experienced important changes in the educational composition of its workforce: whereas older cohorts barely have four years of formal schooling, most younger cohorts have concluded eight years of schooling (Torche and Costa-Ribeiro 2012). Moreover, in the last three decades, the steady expansion of tertiary education in Brazil has amplified the heterogeneity of education and labor markets experiences between older and younger workers within the country (Santos, Lima and Carvalhaes 2020).

In this paper, we examine these trends through an investigation of how the linkages between the education and labor markets changed in Brazil between 1991 and 2010. Specifically, we investigate the changes in how a diverse set of educational credentials connect workers to certain occupations in the last 30 years. We implement this analysis by adopting the *linkages* methodology proposed by DiPrete et al (2017) and Elbers (2021). Together, these papers propose that the analysis of school-to-work transitions should be studied as a segregation problem. These scholars define strong linkage for any specific credential as occurring when individuals with that credential are more strongly clustered in a small set of occupations. Alternatively, weak linkage exists when individuals with that credential typically transition into broader set of occupations (DiPrete et al. 2017). These authors argue that high average linkage

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across the set of educational credentials (i.e., total linkage) constitutes an important characteristic of the links between education and work for the workforce as a whole. Building on the linkages approach, we ask: how have school to work linkages changed in Brazil in the last 30 years, especially because of shifts in the educational distribution? Has total linkage become stronger or weaker and how has this change occurred at the level of specific credentials and occupations? How have these changes impacted younger and older cohort of workers?

Our analysis suggests that at first sight, and despite the rapid educational expansion in the country, there has not been a substantial change in the overall strength of linkage between education and occupation in Brazil, i.e., we do not find a substantial variation in total linkage strength in the last 30 years. However, we do find very different historical trends for higher and lower educational levels that offset each other: in 2010, those with tertiary education were much more tightly linked than their counterparts in 1991, while for those that have secondary education, linkage was weaker in 2010 than they were in 1991. Further, we find distinct historical trends for younger and older workers, with the latter circulating in a smaller set of occupations in 2010 in comparison to 30 years before. Finally, we demonstrate how these changes resulted mostly from compositional rather than structural changes in how education and labor markets are linked. We explain these results in detail below. We start by presenting the main institutional features and changes that happened in the education and labor markets in Brazil in the past 30 years.

School to work linkages in Brazil: institutional arrangements and recent changes

Education: institutional characteristics and recent expansion

Since 1996, the Brazilian education system consists of eight years of elementary school, divided into the initial four years of primary education, the

last four years of lower secondary education, and the three years of upper secondary education or high school (Stanek 2013). Formally, the Brazilian system provides a vocational education option at the upper secondary level, but few students attend these schools (in the age group from 15-20, only 3.1% of students at the upper secondary level attended technical schools in 2007). Individuals that finish the secondary course receive an Upper Secondary Education Certificate, which entitles them to enroll in a tertiary education institution. At the tertiary level, bachelor's courses typically last four years, which then can be followed by a master's Program (2 years) and a doctoral program (4 years).

The small offering of vocational training in Brazil means that the country's educational system has low levels of stratification, since there is no early tracking system in place. In fact, what we observe is quite the contrary: the mandatory requirements for general education are extremely detailed and establish a long list of what all Brazilian students need to study in each grade – in high school, for example, there are fourteen mandatory subjects that all students must take, leaving little space for the development of vocationally-specific components. This institutional arrangement has led scholars to point to a strong academic emphasis in all levels of the educational system in the country, including tertiary education, where there is little space for technical and professional programs (Schwartzman 2012).

Although there are many mandatory requirements for general education, and schools throughout the country must provide the same group of disciplines, the quality of the education offered varies greatly between schools (Alves, Soares and Xavier 2016). Commonly, the great divide is between public and private institutions, which in elementary education represent 85% and 15% of the system, respectively. The standardization of the quality of educational provision is thus very low. In Table 1, below, we use the standard comparative categories used by the school to work literature to classify Brazil's educational system.

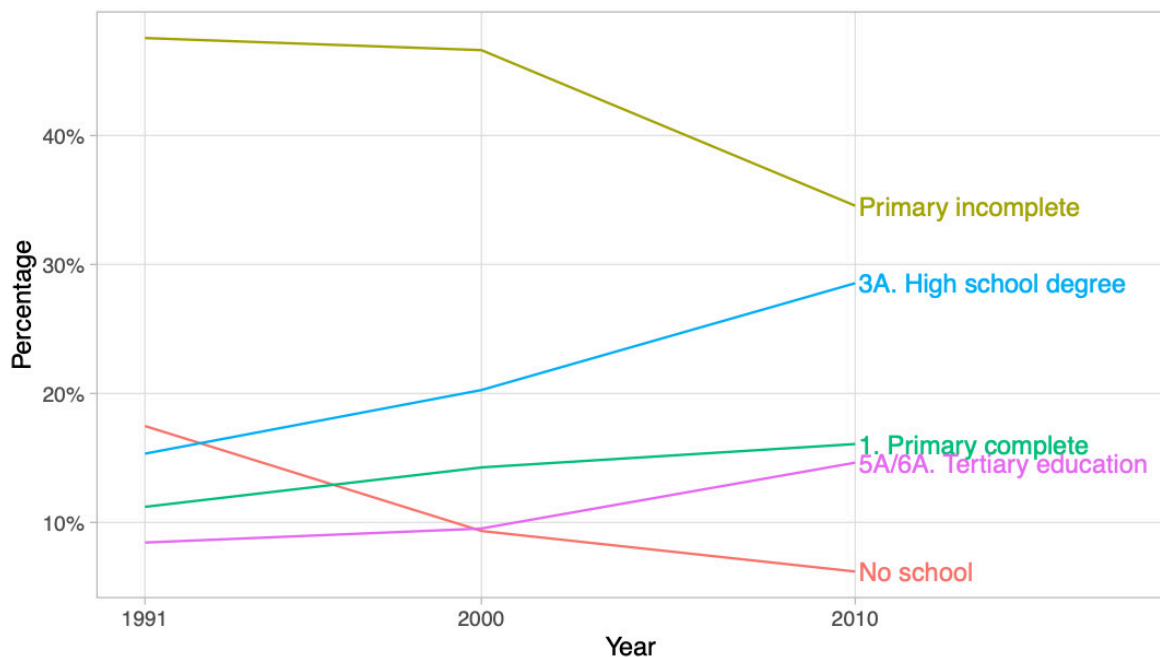
Table 1 – Institutional characteristics of the educational system in Brazil

	Vocational Specificity	Standardization	Stratification
Brazil	Very low (General education)	Low (Public vs Private; Regional)	Very low (No early tracking)
USA	Low	Low	Low
Germany	High	High	High

Source: Own elaboration.

Even when compared to other Latin American countries, Brazil is a country characterized by a very late educational expansion process and by low overall educational attainment of its population. Up to the 1980s, investments in education were sparse and led to timid advances (Ribeiro 2011). From the 1990s onwards, many important educational reforms increased the pace of educational expansion, in all levels, virtually

eliminating inequality of opportunity in lower levels of the system (Marteleto et al. 2012). Since 1995 education also expanded considerably at the tertiary level, so that the number of students grew after a period of stagnation in the 1980s. Between 1995 to 2015, the number of enrollments increased from 1.8 to 8 million (Senkevics 2021). Yet while the educational expansion has been impressive, as we can see in Graph 1 below, in 2010 most of the workforce in Brazil still was concentrated in lower educational levels.

Figure 1 – Educational Distribution of the Workforce in Brazil, 1991-2010

Source: IBGE – Censuses 1991, 2000, 2010, microdata.

One big trend revealed by this graph is in the rate of Upper Secondary completion. The workforce in Brazil is becoming less concentrated in primary levels of education and moving towards high school completion, which in 2010 characterized 30% of the working population. A second trend is

the growing share of the workforce that possesses tertiary education, which reached a historical high of 15% in 2010. Over the last 30 years, the tertiary system expanded largely due to a combination of massive public investments in university access policies, as well as a vertiginous increase in the

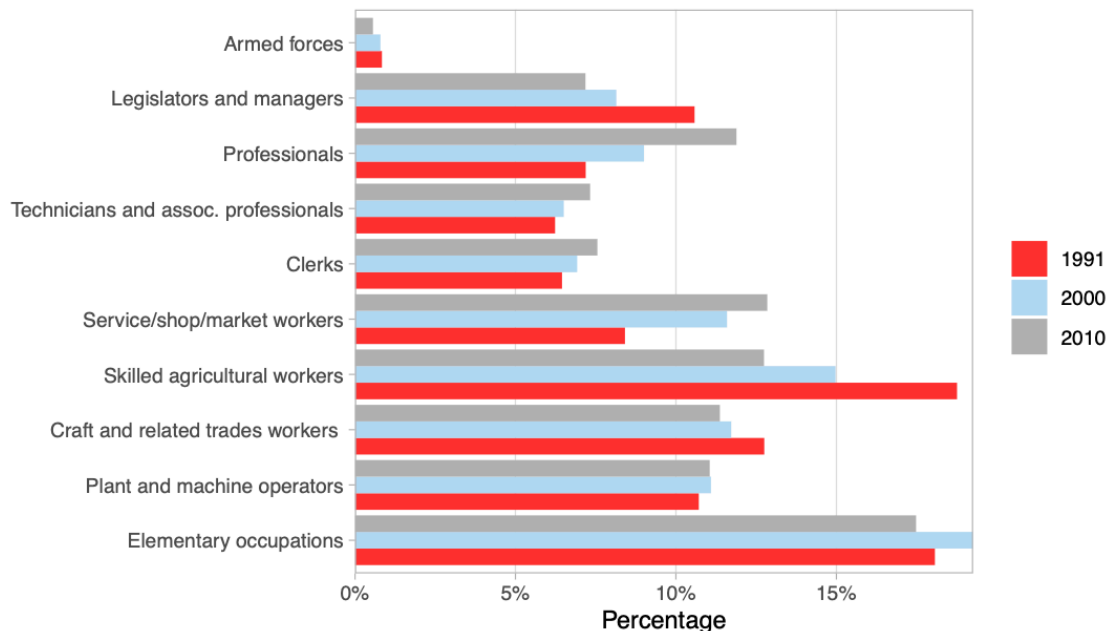
number of private colleges (Schwartzman and Cox 2009). However, this impressive expansion masks a dubious qualitative trend: most of the expansion has taken place via private low-cost colleges (Salata 2018), which commonly offer evening courses in three restricted fields of study: Business, Law, and Teaching (Carvalhaes and Ribeiro 2019). In the last several years, the federal government has tried to increase access to public institutions (which are associated with better quality), but the tertiary system is still dominated by for-profit institutions that since the 1980s represents, on average, 75% of enrollments (Balbachevsky 2013).

Labor market: occupational distribution and main institutional features

For the past 30 years, Brazil's workforce has been mostly concentrated in urban areas (94%) and distributed across the following activities: 42% in service activities, 19% in industrial activities,

18% in farming, 13.6% in trade and 8.3% in other activities.⁶ As can be seen in Figure 2 below, both in 1991 and 2010, the largest share of the workforce in Brazil were classified as Elementary workers (18% and 17%, respectively). However, the country did experience relevant changes in its occupational structure in the past 30 years: Since 1991, Brazil increased the share of Professionals, from 7% to 12%, and of Service workers, from 8% to 13%, with a significant decrease in the number of skilled agricultural workers, from 19% and 13%. These trends were different for older and younger cohort of workers: while in 2010 workers in the age groups 24-39 were mostly concentrated in Elementary occupations (18%), they also tended to have positions as Service Workers (14%) and Professionals (13%). Workers that were 55 years old or more, conversely, were mostly skilled agricultural workers (24%), followed by elementary occupations (15%).

Figure 2 – Occupational distribution of the workforce, 1990-2010



Source: IBGE - Censuses 1991, 2000, 2010, microdata

⁶ Departamento Intersindical de Estatística e Estudos Socioeconômicos (Dieese). 2011. *Anuário dos trabalhadores: 2010/2011*. São Paulo. Acessado em 3 mar. 2020, https://www.dieese.org.br/anuario/2011/ANUARIO_TRABALHADORES_2010_2011v.html.

In terms of the institutional characteristics of the Brazilian labor market, its mix of formal regulations and informal practices has led some analysts to characterize it as a segmented, or dual labor market (Schneider 2013). For formal workers, a series of rights is guaranteed by law, such as a minimum wage, pensions, and a maximum of 44 hours workweek. Meanwhile, informal workers are not protected by the labor legislation and can negotiate more flexible and cheaper contracts; yet this also makes them more vulnerable (Cardoso 2016). Although estimates of the size of the informal labor market in Brazil vary, a commonly cited figure is the one used by the International Labor Organization, which estimates that 42.2% of non-agricultural employment was informal in Brazil in 2012.

Furthermore, this high level of informality is combined with high turnover rates. Approximately one-third of the labor force changes jobs every year, which translates to extremely low job tenure (Monte 2017). This dynamic has important consequences: it creates low incentives for employers to invest in-house training, but it also means that there are several informal workers waiting to fill any opening for a formal job (Maloney 1997). Finally, in addition to the interaction of intense labor market regulation and high informality levels, weak unionization is another distinctive feature of the Brazilian labor market. Unions depended on state funding up to 2017 and seldom bargained independently with employers' association. In this sense, although we observe a fairly high union density of 25% in Brazil in the period covered by this research, unions were regarded as ineffective in their collective bargaining processes. Their focus was more on political aspects – securing workers' rights and in passing specific labor legislation – than on wage bargaining (Schneider 2013).

Hypothesis for school-to-work linkages

Considering these institutional characteristics of the education and labor markets in Brazil, what can we expect in terms of school to work linkages? First, since Brazil is characterized by low levels of vocational specificity in early educational levels and by the lack of educational tracking, we

expect the linkages between school to work to be weak, i.e., knowing one's educational credential would inform little of where they end-up in the occupational structure. Yet, considering the unequal access to opportunities in the educational system, stronger linkage could characterize the situation of workers at the bottom of the educational distribution, if they are segregated into a small set of elementary occupations, such as in agriculture. Finally, among workers with a higher education degree, the existing literature has shown that they tend to have, on average, stronger linkage to the labor market (DiPrete et al. 2017). Yet, for the case of Brazil, where there is so much inequality in the type of college workers have access to as well as in the opportunities connected to distinct fields of study, we expect to find great variance in linkage strength among this group of workers.

Our measure of school-to-work linkage, as is typical for segregation measures, is sensitive to changes in the distribution of educational degrees or occupations. For instance, if workers with a higher education degree have high linkage, and then the number of such graduates increases, school-to-work linkage would increase mechanically as a consequence of educational expansion. Since we are interested in studying the impact of educational expansion on the ways that education and labor link, it is therefore useful to separate changes in school-to-work linkages into a *compositional component* (referring to changes in the educational and occupational distributions), and a *structural component*, referring to changes in the association between educational credentials and labor-market destinations (Elbers 2021). Previous work has shown that in France and Germany, educational expansion led to lower structural linkage (Elbers, Bol and DiPrete 2021). For the Brazilian case, while there has been strong educational expansion in the period that we study, this expansion has been at more elementary levels of the educational distribution compared to industrialized nations. The question is therefore whether educational expansion at educational levels typically associated with stronger linkage

was offset by weakening structural linkage (i.e., controlling for educational level), or whether structural linkage in Brazil has increased concomitant with educational expansion.

Methods and data

To understand the ways that school to work linkages have changed in Brazil with the onset of education expansion, we examine the strength of the association between detailed educational and occupational categories, which we call "linkage" (DiPrete et al. 2017). For any given school-leaving credential, strong linkage occurs when school leavers holding that credential cluster in a relatively small number of labor market positions. When field of study is taken into account, the clustering should be even stronger.

To measure the strength of the link between education and occupation, we employ a multigroup segregation measure, as introduced by DiPrete et al. (2017). A natural entry point to the measure is the quantity

$$L_g = \sum_j p_{j|g} \log \frac{p_{j|g}}{p_j}. \quad (1)$$

where g indexes a given educational credential, and j indexes occupations. L_g measures how strongly the educational credential g links to the labor market. To calculate L_g , we require estimates of $p_{j|g}$, the conditional occupational distribution for the educational credential g , and p_j , the occupational distribution of the entire labor force. It is required that $\sum_j p_j = \sum_j p_{j|g} = 1$. If the entire conditional occupational distribution for an educational credential g is identical to the overall occupational distribution in the labor force, arguably, this credential does not lead to any linkage: the educational credential provides no information about the occupations of workers. On the other hand, if the conditional occupational distribution for an educational credential g is very different from the overall occupational distribution in the labor force, then the educational credential leads to strong linkage: In this case, the educational credential helps predicting the

occupation of a worker. This is the intuition that is captured in the formula for L_g .

To arrive at a summary measure of linkage for the entire labor force, we take a weighted average of L_g across all educational credentials:

$$M = \sum_g p \cdot g L_g. \quad (2)$$

The weights are given by the sizes of the educational categories, and naturally $\sum_g p \cdot g = 1$. In our case, the educational credentials are Isced educational categories. For higher education, we replace educational categories with fields of study to also capture the additional linkage that is introduced by fields of study. The resulting measure is called the Mutual Information Index M (Theil and Finizza 1971; Mora and Ruiz-Castillo 2011).

As discussed above, may increase or decrease depending on changes in the marginal distribution of educational or occupational categories. This means that changes in over time can arise through different mechanisms: either because of a change in the marginal distributions without any structural changes, or through a change in the structural association between educational credentials and occupations. To separate the two components, we rely on a procedure fully described in Elbers (2021). Due to space constraints, the full methodology cannot be explained here, but the basic idea is to create counterfactual scenarios in which (a) the margins are fixed, but the association structure is allowed to vary, and (b) the association structure is fixed, but the margins are allowed to vary. The counterfactual M values of these scenarios are then used to isolate the change that is due to changing margins and the changing association structure.

To run these analyses, we use data from the 1990, 2000 and 2010 Brazilian Censuses. We divided workers into five educational levels: access to schooling, the completion or not of primary education, as well as obtaining secondary and tertiary degrees. More specifically, we coded "No School" workers who had never been to school, "Primary Incomplete" those who attended the educational system but did not complete primary

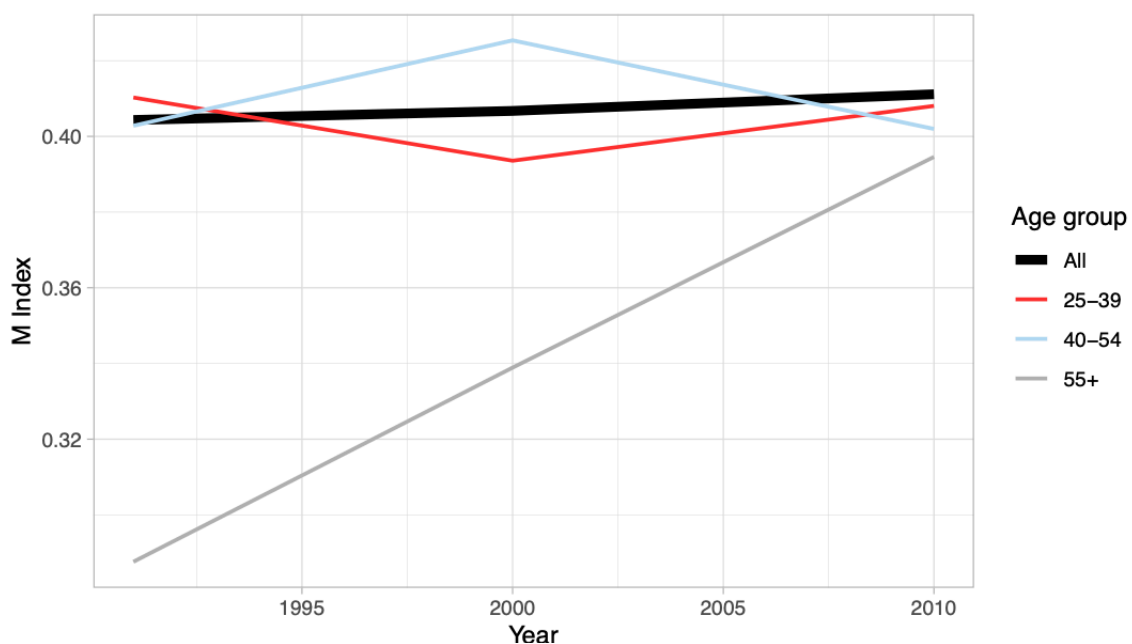
education, "Primary complete" includes graduates of primary education and those that started high school but left it, and "High School diploma" and "Tertiary Education" includes workers that finished and obtained these levels of education. We coded Fields of Study following the Census definition. Occupational classifications were harmonized using both the three-digit and one-digit International Standard of Occupations (Isco-88).

Results: 30 years of linkages measures

We start with a baseline analysis of total linkage strength (M) by year for the whole labor force, as well as for three age groups (25-39), (40-55) and (55+). We do this to make clear the historical trajectory in our segregation measure M , as well as to highlight the differing impacts of educational and occupational changes for distinct age groups. As mentioned above, Brazil is characterized by a concomitant expansion of secondary and tertiary education, which makes it important to address the heterogeneous patterns of school to work transition and how they impact older and younger workers in different ways. Figure 3 shows that total linkage strength has remained constant at approximately 0.4 in the three decades we

analyze. The breakdown by age group reveals two different trajectories: For the group of workers aged 55+, total linkage was noticeably lower compared to younger workers in 1991, but this difference has almost entirely vanished by 2010 when older workers were more tightly clustered in a smaller set of occupations. For the two younger cohorts, we see small changes in overall linkages through time. This finding indicates that Brazil, at first sight, has a similar pattern to what Elbers, Bol and DiPrete (2021) found for the cases of Germany and France: younger workers who have just begun their careers tend to link more strongly than older workers. In fact, the relative stability of linkage strength for the age groups between 25-54 suggests a relative stability of educational institutions across these two younger cohorts, despite changes in educational composition. It is, however, surprising that the age groups 25-39 and 40-54 have very similar linkage strength, and that in 2010 the differences between all age groups have almost entirely vanished. This suggests that linkage changes are not only driven by educational expansion, but also by changing labor market conditions that affect older workers.

Figure 3 – Linkage over time (1991-2010), by age-group



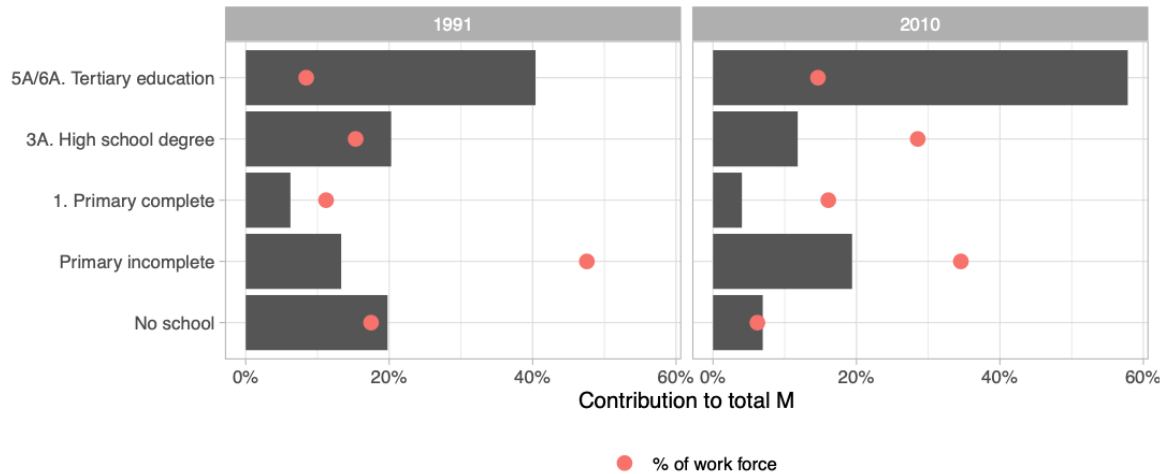
Source: Brazilian Census, own calculations.

Next, we decompose total linkage by educational level to investigate where the linkage strength in Brazil originates from in 1991 and in 2010. As explained in the methods section, total linkage strength can be written as a weighted average of local linkage scores for each educational category, where the weights are given by the size of the educational category. More concretely, the linkage score of an educational credential indicates how much clustering there is in terms of occupational destinations, conditional on education. The higher the local linkage score, the greater is the proportion of workers with that educational credential who are in the most common occupational destinations for that credential.

The full decomposition of local linkages scores for each combination of educational level and field gives 21 scores, one for each level-field.

For a more parsimonious presentation, in Figure 4, we sum the contribution of level-fields to the total M by using five educational levels. What this figure demonstrates is that although total linkage strength remained virtually constant between the three decades, the *sources* of linkage strength have changed, especially with respect to lower levels of education. Figure 4 is also useful to visually build the intuition about the difference in composition and structure in our measure of linkage: an educational level can be very small but have a high impact on total linkage strength (as is usually the case with tertiary education). Or the opposite can be true: many workers might hold a particular credential, such as high school diploma, without this educational level having a large impact on total linkage strength.

Figure 4 – Decomposition of M by educational level, 1991 and 2010



Source: IBGE -Censuses 1991, 2010, microdata

Figure 4 shows that, in 1991, 40% of the total linkage strength was contributed by tertiary education even though only 8% of graduates had obtained a college degree or higher in that year. In contrast, while almost half of Brazilian workers obtained a primary level of education, this level contributed only 13% of the total linkage strength. Finally, workers with no education and with high school completion represented 17% and 15% of the educational composition in 1991 respectively

and contributed 20% each to the total linkage strength. What stands out here is that tertiary educated workers had very high linkage, while primary educated had very low linkage in 1991.

In 2010, the relative contribution of each educational level changed considerably. While 15% of workers had a college credential or higher in 2010, 58% of the total linkage strength originated from tertiary education. Hence, while the proportion of tertiary-educated workers

almost doubled, the contribution to the total M by this much larger component of the work force did not grow in pace. For primary-educated workers, the situation is reversed: while their proportion of the workforce has declined, this level contributes relatively more to total linkage strength, representing now 20% of M. Finally, while fewer workers had no education (6%) and more workers had high school completion (29%), these levels now contributed less to total linkage strength, respectively 7% and 12%. We interpret the lower linkage score of high school education in 2010 as signaling a lower relevance of this credential in the labor queue, with workers more scattered across the occupational structure.

Figure 4 also reveals the key role of fields of study to understand how school and work link in Brazil. As noted above, Brazil had more workers with a university degree or higher in 2010 (15%) than in 1991 (8%) and this level contributed more to total linkage strength in 2010 (58%) than it did in 1991 (40%). Yet, this overall trend masks the great variance that distinct fields of study have in linking workers to the labor market, as well as how their size changed in time. Table 2 reports the proportions of graduates for the six largest fields of study as a share of those that are tertiary educated, the local linkage score of each field of study, as well as their contribution to total M in 1991 and 2010.

Table 2 – Field of study proportion and linkage strength, 1991 and 2010

<i>Field</i>	% of Tertiary		Local Linkage		Contribution to M (%)	
	1991	2010	1991	2010	1991	2010
<i>Business, Accounting</i>	20.0	20.8	1.13	1.03	4.7	7.6
<i>Teaching and Training</i>	11.2	20.0	1.82	1.55	4.2	11.0
<i>Arts, Social Sciences</i>	16.1	13.2	1.41	1.18	4.7	5.6
<i>Computer Sci, Engen</i>	11.7	10.0	2.27	1.75	5.5	6.2
<i>Law</i>	11.2	9.6	2.30	2.29	5.4	7.8
<i>Health, Nursing</i>	2.2	6.3	3.96	2.07	1.8	4.6

Source: Brazilian Census, own calculations

Table 2 shows that educational expansion in higher education led to a more restricted set of fields of study among college-educated workers. While in 2010, 47% of the workforce with a bachelor's degree graduated in Business, Teaching and Law, this value was only 34% in 1990. What especially stands out is the increase in the proportion of graduates in Teaching, which increased from 11% in 1991 to 20% in 2010. In 2010, this field of study by itself contributed 11% to the total linkage strength in Brazil.

Sources of change: marginal and structural components

As seen in Figure 3, total linkage has remained remarkably stable between 1991 and 2010. Figure

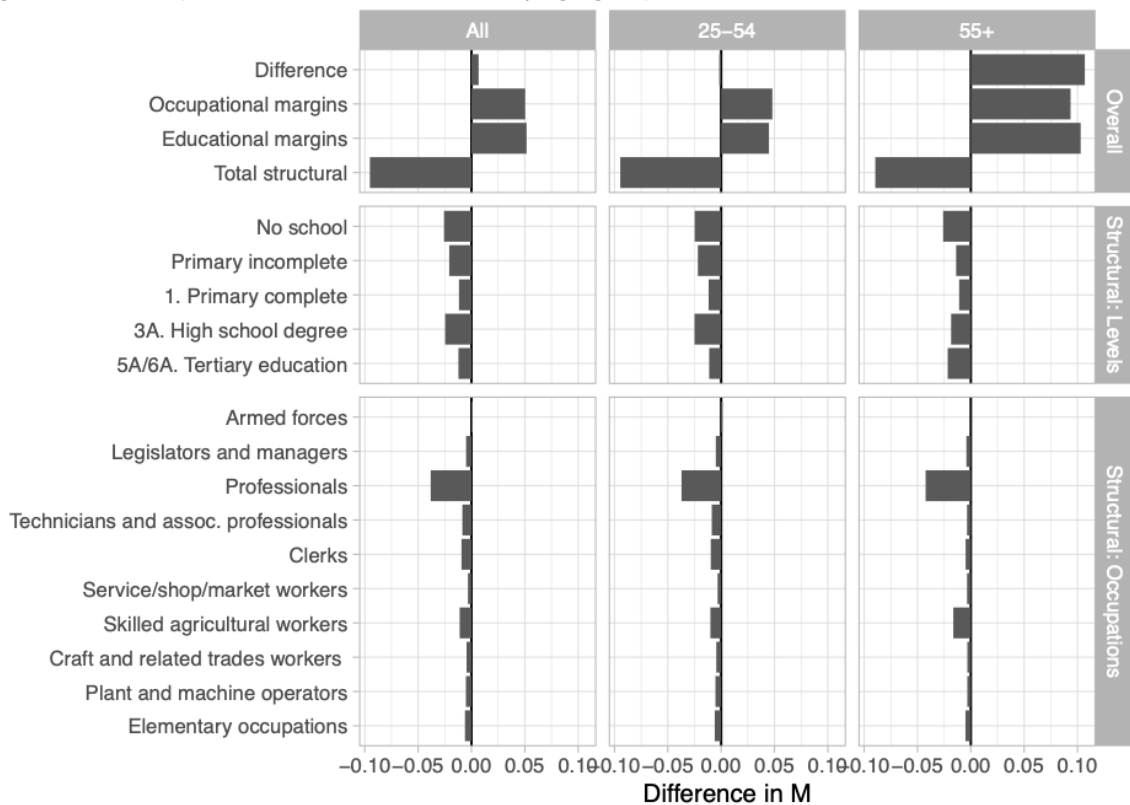
4 and Table 2, however, reveal that this relative stability masks very distinct trends for different educational credentials and for younger and older workers. Below, we further investigate this trend in M by presenting how the total changes we observe results from compositional (margins) or structural changes. The goal of this analysis is to distinguish mechanical changes, which arise from changes in the composition of workers due to educational expansion and shifts in the occupational structure, from structural changes which inherently affect the link between school and work. For instance, if tertiary education expands and local linkage scores stay identical, then this tertiary expansion will have a mechanical effect on the M index, although the link between the educational system

and the occupational structure was unaffected. The increase in the M, instead, was produced by a shift in the “educational margins.” Similarly, shifts in the occupational structure can have mechanical effects (“occupational margins”). We call those changes that cannot be attributed neither to shifts in the educational nor the occupational margins “structural” change. When studying school-to-work linkages longitudinally, the structural component best captures whether the link between school and work changed fundamentally.

Figure 5 decomposes the change in observed

linkage between 1991 and 2010 into three main components: occupational margins, educational margins, and structural change. The structural component is then further decomposed, once by educational levels, and once by occupations. This information is presented in the lower two panels. We present the decomposition for all workers in the left-most column, and present age-specific results for two age groups: 25-54 and 55+. Compared to Figure 3, we no longer distinguish the age groups 25-39 and 40-54, as these have very similar trajectories.

Figure 5 – Decomposition of M (1991-2010) and by age group



Source: IBGE - Censuses 1991, 2010, microdata

Starting with the first column, the decomposition reveals that the small increase of M in time is the product of several underlying changes that offset each other: while the shifts in the marginal educational and occupational distributions have contributed to an increase in linkage strength, the structural component is, in fact, negative: once we control for changes in the marginal distributions, the association between educational outcomes and occupational destinations has

weakened. The same conclusions can be drawn if we study only the relatively younger workers. The general pattern is also identical for older workers, however, the marginal distributions have changed much more for this group. If only the marginal distributions would have changed, the M for this group would have increased by 0.20, which is a large potential increase considering that the M for this group was 0.29 in 1991. However, the older workers were also affected by a large

structural decline, which partially offsets the large increases that are due to the changing marginal distributions.

Two main conclusions can be drawn from this analysis: First, the lack of change in the total M measure hides large transformations in the organization of school and work in Brazil. Educational expansion and occupational upgrading have shifted the educational and occupational distributions in the direction of higher linkage. However, the structural decline has, at the same time, weakened the association between school and work, which means that for most workers, the educational credential has become less predictive of their occupation. Second, the age-specific pattern in linkage that was observed in Figure 3 can now be explained as a product of educational expansion, which especially affected the older workers. The older workers have “caught up” with the younger workers in terms of linkage strength, but this is a product of the changing marginal distributions.

The negative component of structural change is almost identical in size across the age groups. The second panel decomposes the structural component in terms of educational credentials. This analysis shows that structural declines affected all educational levels, suggesting that labor market positions in general were less strongly tied to specific educational credentials. An alternative decomposition of the structural component is shown in the bottom panel, where we present results for occupational major groups. This shows that a large part of the decline is due to the Isco major group “Professionals.” Especially for this group, then, the educational distribution of workers has become more diverse.

Final remarks

Has educational expansion in Brazil helped

workers to prepare better for the labor market? Our findings reinforce the point made by many stratification scholars that improving educational outcomes in Brazil will involve much more than just a change in the quantity of education (Salata 2018). It will also need to address educational quality and inequality in the specific fields of study that distinct social groups have access to. In this paper, our main goal has been to construct quantitative measures for thirty years of school-to-work transitions for Brazil that would allow for a detailed understanding of the heterogenous impact of educational expansion for occupational outcomes. As such, we demonstrated that educational expansion in Brazil is leading to an overall weaker association between educational credentials and occupational destinations, but that this trend is very different for younger and older workers, and for workers with distinct educational credentials.

One limitation of our study is that it is insensitive to how gender stratifies linkage strength. In Brazil, women have more years of schooling than men, mainly due to higher completion rates in secondary and tertiary education (Beltrão and Alves 2009). Yet, women are segregated in occupations with lower labor market returns and clustered in fields of study that lead to lower returns (Silveira and Leão 2021). We hope that the methods and findings of this paper will provide a promising research direction to better understand the processes generating gender wage gaps and occupational segregation in Brazil.

Finally, our findings can be read through a lens of Brazil's educational policy choices and their impacts on the occupational structure. For example, the concentration of workers in Teaching in 2010 reflects public policies that made access to Teaching/Pedagogy cheaper and a mandatory credential for many new positions created with educational expansion.⁷ Likewise, the growing privatization and low diversification of the higher education sector in the country (Balbachevsky, Sampaio and

⁷ Sampaio, Helena. 2011. O setor privado de ensino superior no Brasil: continuidades e transformações. *Revista Ensino Superior Unicamp*, 14 out. 2011. Acessado em 3 maio 2020, <https://www.revistaensinosuperior.gr.unicamp.br/artigos/o-setor-privado-de-ensino-superior-no-brasil-continuidades-e-transformacoes>.

Andrade 2019) encouraged the expansion of low-cost diplomas as opposed to high costs one. Our paper has demonstrated how these trends have limited the impact of educational expansion on occupational outcomes.

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Luciana de Souza Leão

Ph.D. in Sociology from Columbia University, New York, EUA, and M.A. in Sociology from the Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, RJ Brasil. Assistant Professor of Sociology at the University of Michigan, Ann Arbor, EUA.

Flavio Carvalhaes

Ph. D. and M.A. in Sociology from Instituto Universitário de Pesquisas do Rio de Janeiro (IUPERJ), Rio de Janeiro, RJ, Brasil. Professor of Sociology at the Federal University of Rio de Janeiro (UFRJ), Brasil, and Co-Director of the Network for the Study of Inequalities (Nied).

Benjamin Elbers

Ph.D and M.A. in Sociology from Columbia University, New York, EUA. Postdoctoral Prize Research Fellow in Sociology at Nuffield College at the Oxford University, Oxford, UK.

Thomas DiPrete

Ph.D. in Sociology from Columbia University. Giddings Professor of Sociology, co-director of the Institute for Social and Economic Research and Policy (Iserp), co-director of the Center for the Study of Wealth and Inequality at Columbia University, New York, EUA.

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