Education, Labor Earnings and the Recent Decline in Income Inequality in Brazil

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1. Introduction

Brazil is well-known for its high and persistent levels of income inequality. Throughout its economic history since the 1960s, under different conditions regarding policies and politics, income inequality remained high, and well above Latin American standards. However, since 1997 inequality measured by the Gini coefficient has been declining steadily, accelerating the pace after 2001.

This recent decline was not unique to Brazil, but rather a Latin American phenomenon affecting most countries in the 2000s. Among seventeen countries for which Gini coefficients are available and compatible, thirteen presented declining income inequality in the recent period. For this group of countries which includes Brazil, the average change in the Gini coefficient corresponding to household per capita income was -0.63% yearly, thus well below the -1.07% average change in Brazil. Although all along the 2000-2009 period Brazilian coefficients had remained higher than the Latin American average, their steeper decline has resulted in the convergence towards the region's average, respectively 0.537 and 0.503 in 2009. Table 1 presents estimates for the most populous countries in the region, revealing a favorable dominant trend towards less inequality, which contrasts with the evolution taking place in Asia, where fast economic growth in India and China has been parallel to increased levels of income inequality.

Table 1
Declining Income Inequality in Latin America
Selected Countries (2000-2010)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Circa 2001</th>
<th>Circa 2010</th>
<th>% Yearly change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>0.522 (2001)</td>
<td>0.433 (2010)</td>
<td>-1.89</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.588 (2001)</td>
<td>0.537 (2009)</td>
<td>-1.08</td>
</tr>
<tr>
<td>Chile</td>
<td>0.552 (2000)</td>
<td>0.519 (2009)</td>
<td>-0.66</td>
</tr>
<tr>
<td>Colombia</td>
<td>0.567 (2001)</td>
<td>0.579 (2007)</td>
<td>0.35</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.538 (2000)</td>
<td>0.505 (2008)</td>
<td>-0.77</td>
</tr>
<tr>
<td>Peru</td>
<td>0.540 (2001)</td>
<td>0.491 (2009)</td>
<td>-1.13</td>
</tr>
<tr>
<td>Venezuela</td>
<td>0.441 (2000)</td>
<td>0.435 (2006)</td>
<td>-0.23</td>
</tr>
</tbody>
</table>

Source: SEDLAC

It is often argued that the main source of Brazilian outlier income inequality is the underlying inequality in the distribution of education. Based on empirical evidence from the National Household Survey, this paper shows how in recent years education has influenced labor income in two ways: firstly, via increased schooling; and, from 2001 on, also by means of reduced dispersion of number of years of schooling among workers. As a result, the wage gap of workers with different levels of schooling was reduced. From 1997 to 2009, reduced labor income inequality accounted for 2/3 of reduced total income inequality in Brazil (Soares, 2010).

Estimates by Lustig, Lopez-Calva and Ortiz-Juarez (2011) based on SEDLAC data for 17 countries. Among these, Brazil presented the 4th highest per capita Gini, lower than those of Guatemala, Honduras and Bolivia.
This paper is organized as follows. The next section presents a brief historical background of income inequality in Brazil and discusses the relative backwardness of the educational level of the Brazilian population, when compared to countries with a similar level of development. Although this disadvantage still persists, progress in level of schooling has been central to the favorable trend towards reduced income inequality. Section 3 reviews the theoretical and empirical basis for asserting the key role of the educational variable for income inequality in Brazil. Section 4 focuses on the period since 1997 and discusses how the gradual increase in years of schooling for the population as a whole trickled down to affect the distribution of education among workers, leading to the decline in returns to education. The concluding remarks in Section 5 refer to the potential role of education to further reduce income inequality in Brazil.

2. Historical Background

The successful 1994 monetary stabilization plan, the last of many previously failed attempts to bring down skyrocketing inflation, put an end to a long period of low growth. Under the new macroeconomic conditions, poverty and inequality found favorable ground to emerge in Brazil's national agenda and public policy debate. The interaction between growth, inequality and poverty became a central issue at a time when average per capita incomes had reached US$4,800, thus placing Brazil among middle-income countries, according to the UNDP classification. The critical question was not income itself, which in average could guarantee an adequate level of living for the entire Brazilian population, but its unequal distribution: the poorest 50% of the population accounted for the same share of total income - around 13% - as the richest 1%. Thus, the high poverty rate recorded after the introduction of the Real Plan - 33% of the total population - was to be imputed to a pattern of extremely unequal income distribution: the Gini coefficient for per capita household income was 0.60 between 1993 and 1997 (Rocha, 1997).

High income inequality is not new to Brazil. It has been situated at critical levels since microdata from the Demographic Census began to be used for calculating it. The Gini coefficient, already high at 0.504 in 1960, continued to rise during the period of rapid economic growth known as the Brazilian miracle, from the late sixties to 1980: it evolved from 0.561 in 1970, to 0.592 in 1980 (Hoffmann, 2001). Inequality remained high in the span from 1980 to the monetary stabilization in the mid-nineties, a period of macroeconomic turbulence, high inflation and low growth. In 1990, the Gini coefficient reached its peak at 0.607. Thus, both in the era of robust economic growth and during the years affected by stagflation, the critical issue of income inequality not only persisted but, in fact, monotonically worsened.

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2 Respectively 13.1% and 13.9% of total income. This refers to the distribution of individuals with positive incomes (IBGE / PNAD, 1995).

Towering inflation, which reached an annual rate as high as 2,477\% in 1993,\(^4\) certainly played a key role in increasing inequality since the lesser paid workers, and more generally, individuals at the lower end of the earnings distribution, were unable to protect their incomes from price corrosion, while access to indexed financial assets guaranteed the real value of higher incomes. Once inflation was controlled, the structural determinant behind income inequality became evident: it was associated to the functioning of the labor market and derived mainly from the relative scarcity of qualified manpower. At the basis of this phenomenon was an educational system secularly plagued by lack of school vacancies and high drop-out rates at all levels of schooling.

**Figure 1**

Illiterate Population and Illiteracy Rate  
Brazil – 1940-2010

It is well-known that the educational levels of the Brazilian population have been historically low: in 1900 the illiteracy rate was still as high as 65\%, while it averaged 11\% in the US. Also, indicators for education in Brazil have always been much more adverse even to those of countries with per capita incomes similar to Brazil’s. The evolution of literacy rates along the twentieth century in Brazil well sums up the late and slow pace of educational progress (Figure 1). Despite the continuous decline of the rate, the illiterate population increased to reach 19.2 million in 1990. Demographic

\(^4\) Consumer’s Price Index – IPCA/IBGE – which is used as the official inflation rate.
factors had ambivalent effects on this evolution. On the one hand, the rate of population growth had been falling steadily – from 2.6% per year in 1960 to 1.17% in 2010. On the other hand, the aging population made it harder to reduce average indicators. Although there were some much publicized, but rather inefficient initiatives to eliminate illiteracy among adults, education was generally neglected. It is consensual that the adverse situation we face today is due to long-term low political priority and government inefficiency in facing the educational challenge.

The slow pace in reducing illiteracy kept Brazil as an outlier in the international scenario regarding education. Although over the 2000-2010 decade illiteracy rates were halved in Brazil, progress in the twentieth century had been rather sluggish. Comparing the situation in this regard for a few countries in 1950 and recently, it is obvious that despite the recent decline, improvements in Brazil came too late. The country was unable to catch up with those presenting the lowest illiteracy rates in Latin America. Also, in the same period, Korea progressed much more quickly although from a less adverse point of departure.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Illiteracy Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected Countries - 1950 and 2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1950</td>
</tr>
<tr>
<td>Brazil</td>
<td>51</td>
</tr>
<tr>
<td>Argentina</td>
<td>13</td>
</tr>
<tr>
<td>Mexico</td>
<td>37</td>
</tr>
<tr>
<td>Chile</td>
<td>22</td>
</tr>
<tr>
<td>Korea</td>
<td>38</td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
</tr>
<tr>
<td>North Korea</td>
<td></td>
</tr>
<tr>
<td>Source: UNESCO and World Bank</td>
<td></td>
</tr>
</tbody>
</table>

Lasting and high illiteracy rates inevitably influenced the advancement at all ensuing levels of schooling. As a result, average years of schooling remained low by international standards. Estimates for cohorts born in the mid-20th century, from 1930 to 1970 (Table 3), show that Brazilians born in 1930 had in average only 2 years of schooling, vis-à-vis neighboring Chile and Argentina, where the average was over five and seven years respectively. Countries such as the US and Korea presented much more favorable outcomes.

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5 In 2011, illiteracy rates among youngsters aged 15 to 17 was 1.2%, while for those aged 50 years and over reached 18.6% (IBGE, PNAD 2011).
6 Brazil carried out some initiatives aimed at reducing illiteracy among adults, generally mobilizing non-professional monitors. Around 7.3 million adults participated in the Movimento Brasileiro de Alfabetização (MOBRAL) in the seventies. It is consensual that these literacy campaigns were inefficient even in reducing illiteracy rates among their specific clientele (UNESCO, 2006).
### Table 3
Average years of schooling, by cohorts

<table>
<thead>
<tr>
<th>Cohorts</th>
<th>Brazil</th>
<th>Latin America</th>
<th>Korea</th>
<th>U.S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>1940</td>
<td>3.5</td>
<td>5.5</td>
<td>7.5</td>
<td>12.5</td>
</tr>
<tr>
<td>1950</td>
<td>5</td>
<td>6.5</td>
<td>9</td>
<td>13.7</td>
</tr>
<tr>
<td>1960</td>
<td>6</td>
<td>8</td>
<td>10.5</td>
<td>13.5</td>
</tr>
<tr>
<td>1970</td>
<td>6.2</td>
<td>8.2</td>
<td>11.8</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Source: Menezes Filho (2001)

Increased schooling for younger cohorts was necessarily slow in affecting levels of schooling for the population as a whole. Increasing the average level of schooling was further delayed by insufficiency of vacancies and high dropout rates at the primary school level (Figure 2).\(^8\) It was only from the mid-1990s on, when universal access to primary schooling was guaranteed, that the segment of the population with over eight years of schooling began to expand significantly.

**Figure 2**
Distribution of population by years of schooling (%)

![Figure 2](image)

Source: IBGE, PNAD (several years)

Firstly, the expansion in high school and college education was similar, then, the number of college graduates began to expand more rapidly. As a result, the average number of years of formal education increased from 5.7 years in 1997 to 7.3 years in 2007\(^9\), doubling the rate of growth experienced in the previous decade, 1987-1997.\(^10\)

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\(^8\) Primary or elementary school corresponds to the first eight years of schooling, say from 6 to 14 years of age. High school corresponds to three additional years of schooling.

\(^9\) See Menezes Filho, Fernandes and Pichetti (2007). Ipea (2010) has obtained lower estimates for average years of schooling from the same database (PNAD).

\(^10\)
Concerning the evolution of years of schooling, it is important to emphasize a positive Brazilian characteristic: the successful reversal of the gender gap in education as early as the 1980's, thus achieving a goal that remained a developmental challenge for many countries at the beginning of the 21st century. Departing from a very low and disadvantaged position in the beginning of the XXth century - in 1912, female students in Brazil corresponded to only 23% of students enrolled in secondary school and 1.4% in college - they increased their level of schooling faster than their male counterparts, reversing the gender gap in education sometime in the 1980's.

3. Declining inequality and the role of education

After the 1994 monetary stabilization plan, an unusually favorable set of factors that took place from the mid-1990s onwards led to a steady reduction in income inequality.

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10 Between 1987 and 1997 the average years of schooling only increased by an additional 0.7 years (Barros et al, 2010).

11 Promoting the access of women to formal education, as well as increasing the duration of schooling and reducing the gender gap in terms of years of schooling are still among the central goals of the international development agenda. Both the World Education Forum (Dakar, 2000) and the Millennium Summit (New York, 2000) stated that gender equality in education is to be achieved no later than 2015.

12 Using Census data, Beltrão and Alves (2004) analyzed the elimination of the gender gap. Average years of schooling were 3.4 for men and 3.2 for women in 1980. In 1991, the gender inequality was reversed in favor of women (4.2 years for women and 4.1 years for men). For young cohorts, the reversal was attained much earlier: for those 10 to 14 year old, in 1940.
Whatever the income variable used, this has been a consistent trend since 1997 (Figure 4). Demographic determinants such as the declining trend in fertility levels and the changes in household structure had repercussions on the dependency ratio and adult participation in the labor market (Wajnman, et al., 2006), affecting poverty and income inequality favorably. At the same time, the income gap between regions, and between rural and urban areas, was closing (Medeiros et al, 2006) due to decentralizing productive trends and to the successful modernization of the agricultural sector. The increases in the coverage and in the value of social security and welfare transfers also had positive impacts. Non-contributory rural social security was central in reducing the poverty rate among the elderly in Brazil to half the average global poverty rate (Rocha, 2009). Furthermore, new cash transfers created in the nineties, which were consolidated under the Bolsa Familia program in 2003, played a role: on account of the large number of beneficiaries, good targeting and other implementation advantages, they had a relatively powerful redistributive effect.

Figure 4

However there is broad consensus that the progress on the educational front constitutes the main determinant behind the reduction of income inequality in Brazil. As a matter of fact, the importance of schooling as a key explanatory factor for income inequality in Brazil has been recognized since empirical research using micro data from household

13 Figure 2 uses the Gini coefficient to show the inequality trend for four different income variables. They present different levels of inequality, but the same consistent declining trend. The inequality associated to per capita household income, which reflects the household sharing of all incomes received by all its members is the one to best reflect social well-being associated to monetary income.
surveys began to be used in Brazil in the early 1970s. Langoni (1973) argued that the substantial increase in income inequality detected between 1960 and 1970 was due to the shortage of qualified labor needed to satisfy the requirements of Brazil’s accelerated economic growth in the late 1960s. Subsequent research based on the National Household Survey (PNAD) went on to identify education as a key explanatory variable in the determination of labor income. Using different cohorts from the 1985 PNAD, Lam and Levison (1991) showed how the reduction of educational inequality affected labor-income inequality. Analyzing the different determinants of income inequality in Brazil, Barros and Mendonça (1997) argued that the contribution made by education with respect to labor income inequality was considerably greater than that of other factors such as labor market segmentation, and discrimination or other individual worker characteristics.

These early diagnoses fit in well with the evidence that the decline of income inequality since 1997 has been a sustainable trend. Menezes-Filho (2001a) estimated that education levels alone could explain 40% of the overall labor income inequality and 26% of family income inequality. Ramos (2006), employing a model to decompose the labor income inequality index for the 1995-2005 period, showed that educational differences among workers accounted for one third of income inequality. He also showed that differences in schooling among individuals remained an important explanatory variable throughout this period, during which labor income inequality was already declining.

Thus, there is a well-established link between education and income inequality, the connection being as follows:

a) The level and distribution of education is the main determinant of the level and the distribution of labor income. That is, labor income inequality reflects labor force inequality in schooling. The higher the shortage of qualified manpower, the higher the premium to the most qualified workers, thus increasing labor income inequality;

b) Since labor income accounts for ¾ of family income in Brazil, its degree of inequality is crucial for determining the degree of inequality of per capita family income. This is the variable that encompasses income and consumption solidarity within the household, thus best reflecting the impact of income inequality in the well-being of society as a whole.

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14 A well-known academic controversy: Langoni’s views were in opposition to those of researchers such as Hoffmann and Duarte (1972), who blamed the military government’s control of trade unions for the fact that there were gains associated with the exceptional growth in manufacturing. Although growth benefited all workers, it mainly benefited those at the top of the income distribution scale, most of whom tended to be better qualified/educated.

15 Ramos (2008) applied the Shorrocks methodology to disaggregate the Theil T index, using a set of seven variables: age, education, gender, race, job position, region and category of activity or business.
4. Education and Labor income

Empirical evidence based on data from different countries shows that not only is education the key variable to explain income inequality, but more specifically that the distribution of education affecting labor income inequality is closely linked to the average number of years of schooling: typically the dispersion of the distribution of education only starts to decline after the population has reached an average of 7 years of schooling.

Low levels of schooling in Brazil (section 2) have been a real obstacle to reducing income inequality, especially because educational improvements initially benefited everyone: the education distribution curve, roughly unaltered, shifted to the right. However, with the rise in the average level of education, dispersion in the years of schooling began to decline from 2001 onwards, in line with the statistical evidence asserting that this tends to occur at around 7 years of schooling.  

As a consequence, the average wage gap among workers with different levels of education was effectively reduced. In other words, returns to education – defined as the percentage change in labor income resulting from additional years of schooling - began to decline in a sustained way.

The returns to education in Brazil have historically been high – in fact, the country has been viewed as an outlier in Latin America in this regard. Average returns between 1981-1997 fluctuate around 15% for each additional year of education in Brazil, with a maximum of 16% in 1988 and a minimum of 14% in 1992. Alternatively, the returns for Argentina, Chile and Mexico averaged 9%, 11%, and 12% in the same years (Menezes-Filho, 2001b). However, from 1997 on, the average returns to education declined in Brazil at an unprecedented pace: annual average returns per year of schooling fell from 14.5% in 1997 to 12.2% in 2005. Furthermore, this recent trend presents a sustainable decline, without the fluctuations that had characterized the previous periods.

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16 Ram(1990) provides empirical evidence from several countries. Concerning the Brazilian case, for 1997-2007 Barros et al. (2010) show the inverted U-shaped relationship between the dispersion of the distribution of education among workers (measured as standard deviation of years of schooling) and the average number of years of schooling. The peak of the curve was reached in 2001, corresponding to a standard deviation of 4.5 and an average of 7 years of schooling, according to the authors' estimates.

17 We refer here to wage differentials as a measure of returns to education, which are generally estimated using Mincer's equations. Private returns to education are best assessed using the internal rate of return. Barbosa Filho and Pessoa (2008) estimated IRR by years of schooling in Brazil.

18 The structure of the Brazilian education system is as follows by number of years of completed schooling: 0-4 years = primary (first phase); 5-8 years = primary (second phase); 9-11 years = secondary (high school); and 12 years and over = college. Studies on income distribution usually consider the intervals 0-3 years, 4-7 years and 8-11 years because substantial increases in labor income have been recorded for the final year of each cycle. As a matter of fact, income for workers who have completed the final year of each cycle is closer to the income of those with schooling level corresponding to the subsequent cycle than to income of workers who have not completed the same cycle. The differentials of labor income by levels of schooling were also estimated by Menezes-Filho (2001b) for 1981-2005 and by Barros et al (2010) for 1995-2007.

Table 4
Labor Income Differentials by Levels of Schooling for Selected Years*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(4 to 7) / (0 to 3)</td>
<td>1.46</td>
<td>1.47</td>
<td>1.46</td>
<td>1.31</td>
</tr>
<tr>
<td>(8 to 11) / (4 to 7)</td>
<td>1.64</td>
<td>1.50</td>
<td>1.43</td>
<td>1.38</td>
</tr>
<tr>
<td>(12 +) / (8/11)</td>
<td>2.65</td>
<td>2.93</td>
<td>3.05</td>
<td>2.78</td>
</tr>
<tr>
<td>(12 to 14) / (8 to 11)</td>
<td>1.73</td>
<td>1.85</td>
<td>1.74</td>
<td>1.54</td>
</tr>
<tr>
<td>(15 or more) / (12 to 14)</td>
<td>1.89</td>
<td>2.07</td>
<td>2.21</td>
<td>2.28</td>
</tr>
</tbody>
</table>

Source: PNAD/IBGE (microdata)
* Corresponds to urban males working for at least 20 hours per week.

The decline in the average return to education after 1997 reveals differences in evolution depending on the number of years of schooling attained. Considering the usual cutoffs to denote schooling cycles, labor income differentials declined from 1997 onwards for individuals with primary and secondary education (11 years of schooling), while the gap between college and secondary education continued to widen—a trend noted since 1981, which finally reversed in 2009 (Table 4). Regarding college education specifically (lower panel of Table 4), between up to three years (12 to 14 years of schooling) and four years or more (15 or more), the differentials at that level were still rising in 2009. Despite the expansion of college education, the trend in increasing average returns was not reversed, given that complete college education continued to be restricted to a relatively limited group of workers.²⁰ Despite the overall downward trend in income differentials, workers with a college degree earned an average of six times more than workers with less than four years of schooling in 2009.

Table 5
Population* by Levels of Schooling for Selected Years

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(4 to 7)/(0 to 3)</td>
<td>0.99</td>
<td>1.19</td>
<td>1.22</td>
<td>1.26</td>
</tr>
<tr>
<td>(8 to 11)/(4 to 7)</td>
<td>0.68</td>
<td>0.93</td>
<td>1.05</td>
<td>1.33</td>
</tr>
<tr>
<td>(12 +)/(8 to 11)</td>
<td>0.29</td>
<td>0.27</td>
<td>0.27</td>
<td>0.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of schooling (1,000 persons)</th>
<th>1997</th>
<th>2002</th>
<th>2004</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 3 years</td>
<td>43,468</td>
<td>39,202</td>
<td>38,675</td>
<td>36,201</td>
</tr>
<tr>
<td>4 to 7 years</td>
<td>43,187</td>
<td>46,730</td>
<td>47,026</td>
<td>45,678</td>
</tr>
<tr>
<td>8 to 11 years</td>
<td>29,462</td>
<td>43,280</td>
<td>49,467</td>
<td>60,591</td>
</tr>
<tr>
<td>12 or more years</td>
<td>8,582</td>
<td>11,747</td>
<td>13,492</td>
<td>19,786</td>
</tr>
</tbody>
</table>

*10 year-olds and over

²⁰ Differently from other countries, college education in Brazil corresponds to at least four years of schooling.
Because the population group with at least some college education was relatively small at the beginning of the period (around 7%) and its expansion rate was roughly the same as that of the population with secondary schooling till the mid-2000s (Table 5), a bottleneck in skilled labor was created, delaying the reduction of income differentials favoring workers with some college education.

Despite the relatively slow progress in schooling among the Brazilian population as a whole, improvements that took place recently had a direct and more accentuated effect on the composition of the labor force. The share of less skilled workers - i.e. those with fewer than 8 years of education - in the total labor force declined from 62.7% in 1997 to 36.3% in 2011, while workers with at least secondary education have rapidly increased their share: these better-qualified individuals represented 46.3% of the total labor force in 2011, a marked increase from 23% in the mid-1990s (Figure 5).

![Figure 5](image_url)

**Figure 5**
Distribution of Workers by Years of Schooling (%), 1996-2011

In order to understand the changes in income distribution that resulted from changes in earnings by workers’ level of schooling, it is useful to examine the situation at opposing ends of the labor force spectrum. On the one hand, workers with college education; on the other hand, workers with less than eight years of schooling.

Considering the 2002-2009 period, let us firstly focus on the rapidly increasing group of workers with college education (plus 69.1% expansion in the period). The composition

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21 See also Figure 2 in Section 2.
of workers with college education has become growingly biased towards jobs with relatively lower earnings, both those jobs requiring college education (such as teaching, plus 87.8%), as well those which do not require college education (such as college graduates working as administrative clerks, plus 126.5%). However, this bias does not explain the decline in the real value of average labor earnings for college graduates (less 12.9% from 2002 to 2009), since it has taken place for all types of occupations under analysis, that is, those requiring a college degree (less 10.3%), as well as those which do not (less 15.3%).

As a matter of fact, three effects at play - that is, increased supply of college graduates, higher elasticity of substitution between high school and college graduates, and changes in the occupational composition of college graduates – have contributed to reduced returns to schooling and to lower earnings inequality. However substitution and composition effects were relatively mild, making the increased supply of college graduates the most important factor for declining returns to schooling between college and high school graduates and, more generally, to reduced labor earnings inequality.

Figure 6
Average Earnings by Years of Schooling – 1997-2009 (2009 =100)  

Source: Rocha (from PNAD microdata)

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Barros and Reis in a study conducted in the late 1980s had already argued that substitution elasticity between workers of different educational levels was unlikely to generate a positive effect on labor income inequality in the long-term.

See Lopez-Calva and Rocha (2012).

Average earnings by educational level at September 2009 prices: under 3 years of schooling - R$437.21; 4-7 years - R$612.22; 8-11 years R$731.73; 12 years and over - R$ 1,597.41. Source: PNAD / IBGE (microdata). Exchange rate in September 2009: US$/RS = 1.8
Less educated workers, that is, those with less than eight years of schooling, have also 
had a key role in the reduction of labor income inequality, which took place through 
two channels. This is so because income differentials by educational level were affected 
by smaller losses in earnings (1997-2003 period) and by stronger gains in earnings 
(2003-2009 period) for unskilled workers. A price effect was at work since average 
labor income for these groups presented a more favorable trend than that for more 
skilled workers, thus contributing to reducing labor income inequality all along the 
1997-2009 period (Figure 6). Additionally, the number of low-educated people, both as 
a percentage of the population and of the labor force as a whole has fallen. Specifically, 
the share of low educated workers – that is, those with less than eight years of schooling 
- decreased in Brazil, going from 50.5% in 1997 to 43.0 % in 2009.

Except for the substitution effect - that is, the changing composition of labor force that 
took place because of the increased supply of more qualified manpower -, educational 
variables were not directly responsible for the relative gains at the bottom of labor 
earnings distribution. A shortage of workers ready to take certain non-specialized jobs is 
often mentioned as a possible explanation for those exceptional earning gains for the 
less educated workers. However, considering the variation in the number of workers and 
in their respective real earnings for the most important low skilled occupations over the 
2002-2009 period, there is no empirical evidence that a specific shortage – say, in the 
frequently mentioned construction sector – might be the cause behind the relatively high 
earning increases for less skilled workers.25

Government policies directed at increasing the minimum wage are certainly the main 
determinant for low-skilled workers gains in earnings. Since the advent of monetary 
stabilization, the minimum wage has increased continuously, its value growing in real 
terms by 79% over the 1997-2009 period.26 From the point of view of income 
distribution, Brazilian and international experts agree that increases in the value of the 
minimum wage reduce labor income inequality, though posing the risk of negative 
impacts on unemployment rates and level of formalization27 (Foguel, 2006). However, 
since the early 2000's, increases in the real value of the minimum wage not only had 
obvious positive effects on earnings distribution, but did not reverse the favorable trends 
towards lower rates of unemployment and a growing share of formal occupations in the 
labor market.

25 Lopez-Calva and Rocha (2012) examined nine low-skilled jobs, with at least 200 workers with less 
than three years of schooling in 2002, which accounted for 90.6% of workers at this educational level.
26 From September 1997 to September 2009, using the consumer's national price index (INPC/IBGE).
27 In Brazil formal employees are those who have a labor card signed by the employer, which entitles 
them to rights such as paid holidays, an additional wage at the end of the year, as well as the usual social 
security protection and benefits. Formal employment in total employment increased from 67.5% in 1997 
Conclusion

The sustainable decline of income inequality in Brazil from 1997 onwards results from the favorable conjunction of several factors. However, since labor income accounts for three-fourths of family income, the workings of the labor market, which reduced inequality of labor income, was responsible for two thirds of the Gini coefficient decline in the 1997-2009 period (Soares, 2010). Behind the decline of earnings inequality was the increased pace of improvement in the level of schooling of the population, and, since 2001, the reduced dispersion in the distribution of years of schooling among workers. The fact that returns to education still remain high by international standards is evidence of the potential of education to further reduce income inequality and income poverty in Brazil. There is still a wide spectrum of possibilities to use education as a basic tool to progress towards these aims.

First, average years of schooling at 7.5 in 2009 remained low by international standards. In particular there is much room to expand high school and college education to younger generations, reducing important educational gaps even for those relatively young, that is, up to 30 years of age.  

Second, although school vacancies are no longer an important bottleneck, the quality of education remains critical. PISA results for 2009 showed that over 50% of Brazilian students presented low proficiency in reading, mathematics and science. For students that concluded eight years of schooling, the average obtained was as low as 401/800, although progress was made from the 368 average in 2000. Access to quality education for all and special tutorial schemes to compensate for the disadvantages presented by children from poor families have the potential to reduce income inequality among individuals with the same level of schooling.

Third, expansion of quality infant education would have two positive effects. The earlier head start for children from poor families would partly compensate for disadvantages associated to their socioeconomic background. Also, day-care centers would free mothers to engage in the labor market, thus contributing to increasing their family income and to reducing poverty.

These possibilities are much more easily listed than implemented and there is certainly a long way to go. As a matter of fact, concern with quality education is relatively recent in  

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28 In 2009, only 45% of individuals aged 25 to 30 years have completed high school. Source: IBGE /PNAD.
29 Comparing PISA results from 2000 and 2009, Soares and Nascimento (2011) conclude that despite the increase in the numbers of students eligible for the PISA over the period, Brazil's score evolution was positive, both in absolute terms as relatively to the group of countries for which results are available for both years.
Brazil. The institution of standardized measurement of learning outcomes\textsuperscript{30} has still to become an effective tool for pedagogical improvements and parental/social control of educational services. Also, there is the time-consuming process involved in improving teachers’ skills and school organization, as well as in changing programs and introducing more efficient pedagogical techniques.

This paper showed that both the educational improvements and the policy of increasing the real value of the minimum wage were essential to reducing inequality in the labor market, and, thus, overall income inequality. However it is consensual among specialists that the government policy towards the minimum wage has exhausted most of its redistributive potential as far as the labor market is concerned.\textsuperscript{31} Thus to focus on universal quality education becomes the strategic choice. Firstly, because, considering Brazilian backwardness in this particular field, it is the variable now presenting the best prospect for maintaining the income inequality downward trend. Secondly, because through its effects in terms of increased labor productivity, education may partly compensate for the serious productive bottlenecks - particular in infrastructure - that have contributed to the low rates of economic growth in Brazil since 2011.

**References**


\textsuperscript{30} The so called *Prova Brasil* measures learning outcomes across around 40 million primary and high schools students.

\textsuperscript{31} In Brazil, the minimum wage also plays the role of being the floor for retirement and social assistance benefits for poor elderly and disabled persons.

IBGE, *Pesquisa Nacional por Amostra de Domicílios*, several years.

IBGE, *Population Census*, several years.

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