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LABOUR INCOME INEQUALITY IN ARGENTINA, BRAZIL, CHILE, COLOMBIA AND MEXICO: 2012–2019[1]

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Abstract

Between 2012 and 2019, labour income inequality rose in Argentina, changed very little in Brazil and declined in Chile, Colombia and Mexico. We have used the recentered influence function (RIF) method to estimate the contribution of changes in characteristics and returns to the change in labour income inequality. Our results suggest that the characteristics effect is small and unequalizing in Argentina, Brazil and Chile. In Colombia and Mexico, the effect is slightly equalizing but noisy. The returns effect is equalizing in all the study countries except in Argentina where it is quite unequalizing.

Keywords: Inequality; labour income; minimum wage; decomposition methods; Latin America.

JEL: D31; D63; I24; J31; O54

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DESIGUALDAD DEL INGRESO LABORAL EN ARGENTINA, BRASIL, CHILE, COLOMBIA Y MÉXICO: 2012-2019[1]

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Resumen

Entre 2012 y 2019, la desigualdad de ingresos laborales aumentó en Argentina, cambió muy poco en Brasil y disminuyó en Chile, Colombia y México. Hemos utilizado el método de la función de influencia recentrada (RIF por sus siglas en inglés) para estimar la contribución de los cambios en las características y rendimientos al cambio en la desigualdad del ingreso laboral. Nuestros resultados sugieren que el efecto de las características es pequeño y desigual en Argentina, Brasil y Chile. En Colombia y México, el efecto es ligeramente igualador pero ruidoso. El efecto de los retornos se iguala en todos los países del estudio, excepto en Argentina donde es bastante desigualador.

Palabras clave: Desigualdad; ingreso laboral; salario mínimo; métodos de descomposición; América Latina.
JEL: D31; D63; I24; J31; O54

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1. Introduction

Labour income inequality declined throughout Latin America in the first decade of this century. During the second decade, the picture is mixed: depending on the country, labour income inequality either did not continue its declining trend or the rate of decline slowed down or even began to rise. While the period of declining inequality has been the subject of numerous studies,[1] analyses for the more recent period are scarcer.[2] This paper attempts to fill this gap.

The period of declining labour income inequality coincided with two overlapping phenomena: the commodities boom, which resulted in high growth in South America, and with leftist presidential candidates achieving electoral victories across the region—a phenomenon known as "the pink tide."[3] An interesting fact, however, is that labour income inequality also declined in countries that did not benefit from the commodity boom (mainly in Central America) and in countries not governed by the left. Research revealed that a key contributor to the decline in labour income inequality was the change in relative returns to workers' characteristics. In particular, the returns to workers with a high-school education or higher versus those with less schooling fell. While there were reinforcing factors behind the fall in returns such as an increase in demand for low-skilled workers during the commodities boom and a more rapid rise in minimum wages under leftist regimes, research suggests that returns declined because skilled workers became relatively more abundant due to the education push in the 1990s.

Since the end of the commodities boom, as indicated, the picture is mixed. What factors are behind this heterogeneity? To respond to this question, it is useful to unbundle the question into steps. We know that labour income inequality is affected by two main factors: the characteristics of workers (for example, education, experience, gender, formal-sector status) and the returns to those characteristics.[4] These are known as the proximate determinants of labour income inequality. Getting closer to the fundamental determinants is a challenge. However, a useful approach that has been utilized in the literature is how demand factors (e.g. technical change, the business cycle, reforms and so on), supply factors (e.g. the change in the composition of the labour force by education, experience, gender, formality and so on) and institutional factors (e.g. minimum wages, the power of unions and so on) have impacted relative returns.[5]

In this paper, we focus on the proximate determinants. We analyse the contribution of changes in characteristics and returns to labour income inequality in Argentina (urban), Brazil, Chile, Colombia and Mexico for the period 2012–2019. We chose these countries because they include the four largest countries by population size (Brazil, Mexico, Argentina and Colombia), countries that were hit by the end of the commodity boom (Argentina, Brazil, Chile and Colombia) or were unaffected by it (Mexico), and countries that experienced a switch from left to nonleft

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1 See, for example, Azevedo, Inchauste and Sanfelice (2013); Cornia (2013); De la Torre, Levy Yeyati and Pienknagura (2013); Lopez-Calva and Lustig (2010); Lustig, Lopez-Calva and Ortiz-Juarez (2013); Messina and Silva (2021); Rodriguez-Castelan, Lopez-Calva, Lustig and Valderrama (2022).
2 See, for example, Firpo et al. (2021) for Brazil and Zapata-Román (2021) for Chile.
3 By 2009, 11 of the 17 countries had a leftist president (Feierherd et al., 2021).
4 In this paper we use the terms education and schooling interchangeably.
5 For example, in the case of Mexico, Campos-Vazquez et al. (2014) apply the Bound and Johnson (1992) method to disentangle demand from supply-side factors.

governments (Argentina and Brazil), a shift from nonleft to left (Chile and Mexico), and no regime change (Colombia). We chose 2012 as the start date because it marks the end of the commodities boom and 2019 as the end because it is the most recent year before the highly disruptive labour market effects of the COVID-19 pandemic in 2020.

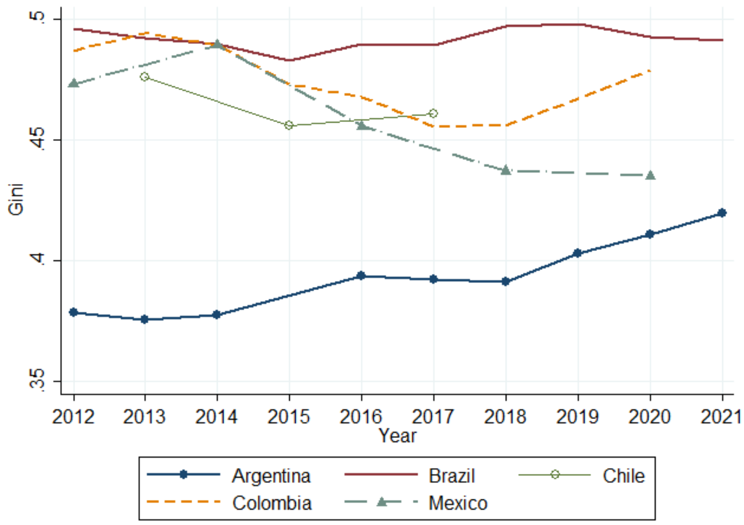
Comparing the end-to-end Gini coefficients, between 2012 and 2019, labour income inequality rose in Argentina while it changed very little in Brazil; and in Chile, Colombia and Mexico it declined. To estimate the contribution of changes in characteristics and returns to the change in labour income inequality we apply the ‘recentered influence function’ (RIF) method proposed by Firpo, Fortin and Lemieux (2009). We estimate the respective contributions overall and disaggregated by characteristic. The characteristics included in our analysis are schooling (education), age (as a proxy for experience), employment in the formal or informal sector (defined by whether the worker contributes to the social security system or not) and gender. Our first question is whether the changes in all characteristics combined and the returns to those characteristics were equalizing, unequalizing or neutral. Next, we do this for each characteristic separately.

Our results suggest that the characteristics effect is small and unequalizing in Argentina, Brazil and Chile. In Colombia and Mexico, the effect is slightly equalizing but noisy. The returns effect is equalizing in all except in Argentina where it is quite unequalizing. Among the variables included in the analysis, education is of particular interest considering the results for previous periods. For the characteristics effect, schooling is unequalizing in Brazil, Chile and Colombia. That is, the ‘paradox of progress’ is still present: because of the convexity of returns, a decline in education inequality is unequalizing. In Argentina and Mexico, however, this effect is more ambiguous so the paradox may be petering out. Regarding the returns effect, changes in returns to schooling were equalizing but very small in Argentina; equalizing but not monotonically in Brazil; very slightly and not monotonically equalizing in Chile; and, equalizing but minimal in Colombia. Of note, for Mexico, even though small, changes in returns to schooling were unequalizing. For all the countries, the unexplained effect is significant, which means that other factors not included in this exercise are affecting labour inequality outcomes. This calls for further research.

2. Labour income inequality in Latin America 2000–2019: A brief overview

Between 2000 and 2019, the evolution of labour income inequality in Latin America can be divided into two distinct periods. Between the early 2000s and 2012/13, labour income inequality declined quite significantly throughout the region (Azevedo et al. 2013; Messina and Silva 2021; Tornarolli, Ciaschi and Galeano 2018; Busso and Messina 2020; Lustig 2020; Fernández Sierra and Serrano 2022). Since the end of the commodities boom until right before the COVID-19 pandemic, the picture is mixed. Figure 1 shows the evolution of labour income inequality from 2012 onwards for Argentina (urban), Brazil, Chile, Colombia and Mexico. Between 2012 and 2019, labour income inequality rose in Argentina while it changed very little in Brazil. Comparing the end-to-end Gini coefficients, labour income inequality declined in Chile, Colombia and Mexico.

Figure 1: Evolution of labour income inequality, 2012–2021



Sources: Authors' calculations using microdata for each country.
Notes: Sample restricted to individuals 18 to 65 years old. Sample restricted to workers with positive labour income.

Labour income inequality is affected by two main factors: characteristics of workers (for example, education, experience, gender, formal-sector status) and the returns to those characteristics. Research suggests that the increase/decrease in labour income inequality in Latin America is usually associated with the rise/fall in returns to education: that is, in hourly wage differentials by education level.[6] In the majority of countries where inequality declined during the 2000s, the ratio of returns to primary, secondary and tertiary education, relative to no education or incomplete primary education, also decreased.[7] During the period of decreasing inequality, the reduction in returns to education was associated in part with increased access to education in the previous years. In turn, workers with no education, or incomplete primary education, became scarce relative to workers with complete primary and above (and for almost every country, workers with secondary education became relatively more scarce compared to workers with post-secondary education (see Battiston, Garcia-Domench and Gasparini, 2014).[8]

[6] Barros, De Carvalho, Franco and Mendonca (2010); Gasparini and Cruces (2010); Lopez-Calva and Lustig (2010), Gasparini and Lustig (2011); Campos-Vazquez, Esquivel and Lustig (2014); De la Torre et al. (2013); Rodriguez-Castelan et al. (2016, 2022) and Messina and Silva (2021).

[7] Messina and Silva (2021) also found that the education premium between workers with tertiary education and those with secondary decreased, but—as expected—to a lesser extent than when comparing the former to workers with a primary education or less.

[8] According to Battiston, Garcia-Domench and Gasparini (2014) between 1990 and 2009, the number of years of formal education attained by the labour force population increased on average by 1.5 years (the minimum increase was 0.7 years in Panama and the maximum increase was 2.9 years in Brazil). The authors identify, however, two distinct subperiods during this time. The first subperiod occurs from 1992 to 2002, in which the gap in average years of education between the top and bottom quintile of the labour income distribution widened in the region. However, between 2002 and 2009, this gap decreased. Most likely, this differentiation was associated with changes in access to education in the previous decade for different income categories. During the 1980s' debt crisis, there was an educational expansion that was not favorable for those in the lowest quintile. But the opposite occurred in the 1990s, in which the governments of the region made an effort to provide universal access to primary education, expanding access to education for those in the lowest quintile.

What was the contribution of the changes in the distribution of education (characteristics effect)? Although the distribution of the average years of education became more equal, this change had an unequalizing effect (Gasparini, Galiani, Cruces and Acosta, 2011). This counterintuitive result has been referred to as the 'paradox of progress' and is the consequence of the convexity of returns. When returns to education are convex (that is, they increase with the level of schooling), the relationship between educational inequality and income inequality follows an inverted-u pattern: as educational inequality decreases, income inequality initially increases and then begins to decrease (see Bourguignon, Ferreira and Lustig (2005) for a formal explanation). At some point, as the gap in years of education declines, the paradoxical effect disappears. As suggested by Battiston et al. (2014), the unequalizing effect during the 2000s decade was already smaller than that of the 1990s, which seems to indicate that this process has already begun.

In addition to the reduction of the education premium, Rodriguez-Castelan et al. (2016, 2022) found that the decrease in the "experience premium" further contributed to the fall in labour income inequality. When controlling for other observable factors, the gap in labour income between workers with more work experience relative to those with less experience decreased on average 50 percent.[9] It is important to note, however, that the authors found that the reduction in salary gaps between both workers with distinct levels of education and experience and between workers with different geographical locations explained only a relatively small part of the decline in labour income inequality. Instead, approximately half of the observed decline was due to a reduction in the labour income differentials for workers who share similar observable characteristics (that is, residual inequality). This topic is worthy of deeper analysis to identify which other factors—such as changes in the composition of employment—are behind this phenomenon.

For the post-commodity boom period, we know much less about the role played by the characteristics and returns effects.[10] This article attempts to fill this gap. Using the RIF method, we estimate the contribution of returns and characteristics effects to the observed change in labour income inequality. We do this at the aggregate level as well as for each specific characteristic: schooling, age, formal/informal employment and gender.

[9] The categories used for years worked are: 0 to 5, 6 to 10, 11 to 20, 21 to 30, and 31+; the category of reference is from 0 to 5 years. See also Messina and Silva (2019).

[10] It seems that the reduction of the schooling premium is not as important as the reduction in the returns to experience (Campos-Vazquez et al. 2016; Firpo et al. 2021). Nonetheless, changes in occupational patterns affect inequality depending on each country's context. For instance, in Chile the movement of workers toward less-routine occupations has contributed to increasing inequality, while in Brazil this shift has an equalizing effect (Zapata-Román 2021; Maurizio and Monsalvo 2021; Firpo et al. 2021).

3. Data

We use household survey data from Argentina, Brazil, Chile, Colombia and Mexico and restrict the population to individuals 18 to 65 years old. Since we only analyse labour market results, we focus on labour income at the individual level (rather than per capita household income). Income is usually reported as net-of-taxes, and for some countries labour income includes both monetary and in-kind payments (Brazil, Chile and Colombia).[11]

For Argentina, we use the Encuesta Permanente de Hogares (EPH) for every year between 2012 and 2021. This survey is representative at the urban level only (roughly close to one-third of the total population).[12] For Brazil, we use Pesquisa Nacional por Amostra de Domicílios Contínua (PNAD) for every year between 2012 and 2021.[13] For Chile, we use the Encuesta de Caracterización Socioeconómica Nacional (CASEN) for 2013, 2015 and 2017.[14] For Colombia, we use the Gran Encuesta Integrada de Hogares (GEIH) for every year between 2012 and 2020. Finally, for Mexico we use the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) for every other year between 2012 and 2020.[15] A more comprehensive description of the data as well as basic descriptive statistics can be found in the supplementary materials available online.[16]

Figure 2 shows the evolution of the characteristics of the labour force included in our analysis. All five countries show an increase in mean years of schooling over time (panel A). That is, educational upgrading continued throughout the period under study. The share of formal workers (panel C) was roughly constant for Argentina, Brazil and Chile and increased somewhat in Colombia and slightly in Mexico. Female labour force participation (panel D) increases somewhat in Argentina and Mexico, remains roughly the same in Brazil, and falls a bit in Colombia.

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[11] Labour income in Chile includes consumption of own production (agricultural products).

[12] The survey is collected quarterly; we aggregate the information to annualize it.

[13] This survey interviews households more than one time in the same year. As a result, any given quarter includes households that have been interviewed for the first time and households that have been interviewed in previous quarters. We use the annual version of the survey, which only includes the first time a household is interviewed. In 2015, PNAD modified the questions related to income. However, the labour income used in our analysis corresponds to the question that was not subject to change: 'usual income' (ingreso habitual), which is codified as V403312.

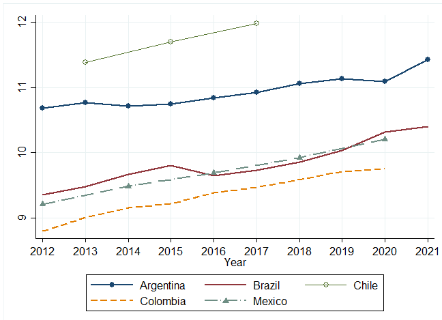
[14] Although also available for 2020, we do not use the survey because the data producers report that this survey may not be comparable to previous years.

[15] ENIGH was subject to a change starting in 2016 in the interview protocol to eliminate false zero income cases. While this introduced issues of comparability when using total income, labour income is likely to be affected relatively less. However, the latter has not been empirically confirmed yet and remains a subject of future research.

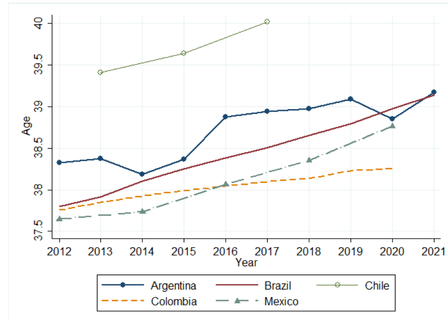
[16] We analyse the determinants of inequality changes using the labour income as it appears in the surveys, ignoring issues of underrepresentation or underreporting. See Campos Vazquez and Lustig (2020) and Larrañaga, Echecopar and Grau (2022) for papers that analyse income inequality trends corrected with administrative data for Mexico and Chile, respectively.

Figure 2: Evolution of characteristics

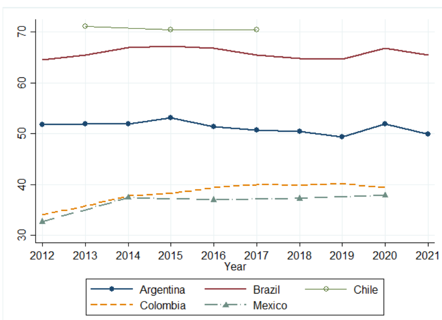
A. Average years of schooling Average age



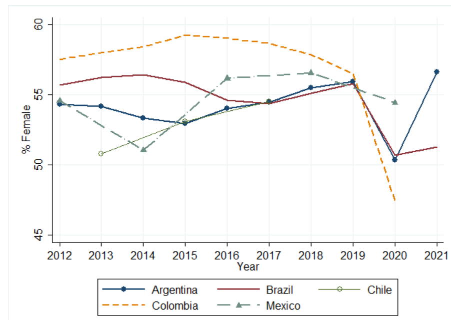
B. Average age



C. Percentage of formal-sector workers



D. Percentage of females that work as a share of female population



Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to individuals 18 to 65 years old.

4. Methodology[17]

Labour income inequality is affected by two main factors: (i) the distribution of both observable and unobservable characteristics of workers (education, experience, gender, etc.) and (ii) the returns to those characteristics. Workers' characteristics are affected by 'fate' (gender, race, talent and so on), household decisions (e.g. to enroll or not enroll in post-secondary education) and policy (e.g. expanding access to education). Returns to households' characteristics depend on market forces (i.e. demand and supply of workers of different skills and experience) and institutional/policy factors (e.g. minimum wages and the unionization rate).

Research on the proximate determinants of labour income inequality relies on decomposition techniques to distinguish the contribution of characteristics from the contribution of returns.

[17] This section draws heavily on Campos-Vazquez et al. (2014).

Many decomposition procedures are employed in the literature.[18] Most of them are variations of the Oaxaca-Blinder decomposition.[19] In this paper, we follow the same approach: we employ the RIF procedure proposed by Firpo et al. (2009) to decompose effects into characteristics, or composition, and return effects.[20]

The RIF procedure is very similar to the typical Oaxaca-Blinder decomposition procedure, the traditional decomposition at the mean.[21] The main difference is that the dependent variable is replaced by the RIF.[22] Firpo et al. (2009) demonstrate that the RIF procedure is equivalent to a simple unconditional quantile regression. They show that $E[RIF(v,y) \mid X]=X\beta^{v}$, where the coefficient β^{v} represents the marginal effect of X on the dependent variable statistic v.[23] The main difference of RIF from the basic Oaxaca-Blinder decomposition is that because of its statistical properties, the RIF approach allows you to decompose the contributions for the entire distribution rather than just using the mean. Moreover, the RIF approach has an advantage (over other methods that permit decomposition for the entire distribution) in that it does not suffer from path dependency.[24]

The analysis starts by calculating the difference in average labour income for each quantile between the initial and end years in 1-percent segments (that is, from the 1st to the 99th percentile). The difference can be graphed in the form of growth incidence curves for labour income. Then, one estimates the RIF regression for each quantile and for the initial and end years. Once the parameters β^{v} are estimated, we proceed to apply the basic Oaxaca-Blinder decomposition for each quantile (1st–99th percentile). That is, one must calculate $\hat{v}(Y_t) - \hat{v}(Y_s) = \hat{\beta}_s^v(\bar{X}_t - \bar{X}_s) + \bar{X}_t(\hat{\beta}_t^v - \hat{\beta}_s^v)$, where t is the final year and s is the initial year.[25] Note that the $\bar{X}$ terms are for the entire sample, as in the traditional Oaxaca-Blinder. The term $\hat{\beta}_s^v\left(\bar{X}_t - \bar{X}_s\right)$ refers to the characteristics effects, and the term $\bar{X}_t\left(\hat{\beta}_t^v - \hat{\beta}_s^v\right)$refers to the return or price effects of the observable and unobservable characteristics included in X (which is why this term is often referred to as the 'unexplained component').

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[18] See the excellent review by Fortin et al. (2011).

[19] We can divide the decomposition into four groups: (i) reweighting procedures (DiNardo et al. 1996), (ii) residual-imputation procedures (Almeida dos Reis and Paes de Barros 1991; Juhn et al. 1993), (iii) quantile decomposition procedures (Machado and Mata 2005) and (iv) RIF procedures (Firpo et al. 2009).

[20] This decomposition has been applied to Brazil (Firpo et al. 2021), Chile (Zapata-Román 2021) and Mexico (Campos-Vazquez et al. 2014).

[21] See Firpo et al. (2009) and Fortin et al. (2011) for more details of the RIF procedure.

[22] The $RIF(v,y)$ is defined as the recentered influence function with the distributional statistic of interest $v(Fy)$ and observed wage y. Then it can be shown that $RIF(v,y)= v(Fy)+IF(v,y)$, where IF denotes the influence function such that $\int RIF = v(F_y)$. . For the case of quantiles, it can be shown that the influence function is equal to $(Q_\tau, Y) = \frac{\tau - 1\{Y \leq Q_\tau\}}{f_Y(Q_\tau)}$.. Each statistic $v(Fy)$ refers to a specific quantile in the distribution of Y, the Gini coefficient or the variance.

[23] For example, if v represents quantile 0.50, then $\beta^{v=0.5}$ represents the effect of X on the wage quantile 0.50. It can also be applied to scalar indicators of inequality such as the Gini or the variance. In order to estimate the RIF regression, we first estimate the sample $\widehat{RIF}(v,y)$.. In practice, we follow the ado file *rifreg* in Stata published by Fortin et al. (2011) and provided by N. Fortin (sites.google.com/view/nicole-m-fortin/data-and-programs). The RIF-dependent variable is estimated using kernel methods. We use the following explanatory variables: dummy variables of female, urban and education categories, and a cubic polynomial in age. We also estimate a more flexible model that includes interactions among all variables, but the difference in explained and unexplained components was minimal.

[24] For discussion and application of such methods and their limitations, see Bourguignon et al. (2005).

[25] See equation 35 in Fortin et al. (2011).

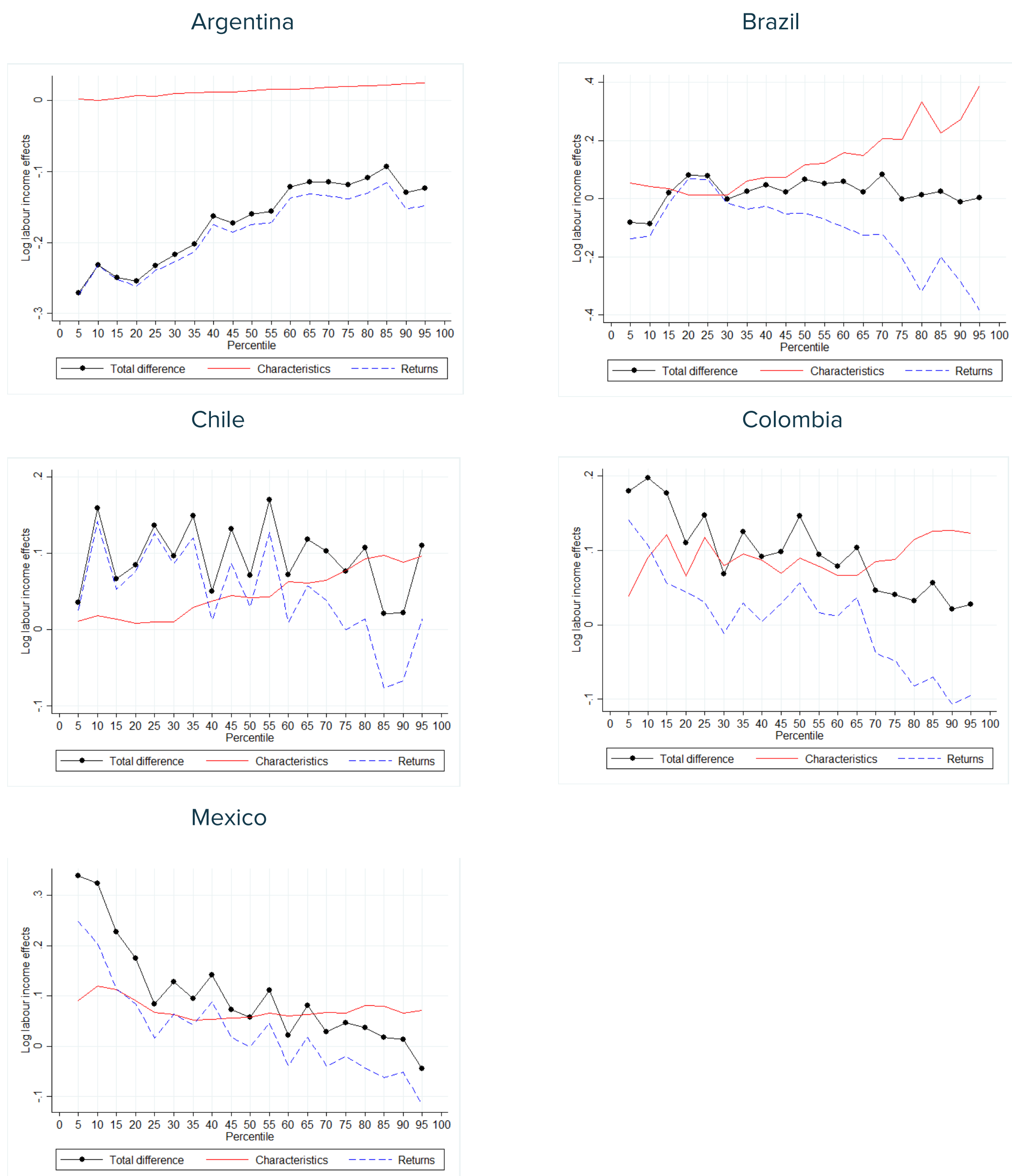
Using the wage distribution in the initial year (for each decomposition) as a reference, one can decompose all labour income growth incidence curves into two distinct curves: the characteristics component and the returns component. The position of these two curves reveals the extent to which the contribution of characteristics and returns results in a rise (positive quadrant) or fall (negative quadrant) of labour income across the distribution. In turn, the slope of these curves reveals the extent to which the component is equalizing (downward sloping), neutral (flat) or unequalizing (upward sloping). If the curves are not monotonically downward or upward sloping or flat, the interpretation of the contribution becomes more ambiguous.

In turn, the contribution of the changes in characteristics (assuming returns stayed constant) and the changes in returns (assuming characteristics remained constant) can be disaggregated into the contributions of each of the characteristics modeled in the analysis and a residual that incorporates the contribution of all the characteristics that were not explicitly included. One can show the disaggregated effects graphically as well. Here we chose to use bar graphs. The position and slope of the bars across the distribution reveal the contribution through the characteristic and return effects. In the case of characteristics, if the bar is on the positive/negative quadrant, the change of that characteristic (assuming returns remain constant) results in an increase/decrease of labour income for that particular quantile. The slope reveals the extent to which the change in that specific characteristic is equalizing (downward sloping), neutral (flat) or unequalizing (upward sloping). As with the aggregate curves, the slope may not be monotonic in one direction and hence the interpretation becomes more ambiguous. The interpretation is analogous for the disaggregated returns effect (assuming characteristics remain constant).

5. Decomposition results

Figures 3, 4 and 5 show the main results of the RIF decomposition. In Figure 3 we plot the observed change (log labour income) or the growth incidence curve between 2012 and 2019 (connected line), as well as the difference explained by characteristics (solid line) and the difference explained by returns (dashed line). In all the countries we have observed that had returns that remained constant, labour income would have increased across the distribution. However, in Brazil and Chile labour income would have grown much more for higher income workers. In Argentina, Colombia and Mexico the gains are more balanced across the distribution. Nonetheless, most of the observed changes in labour income are due to a change in returns rather than characteristics (the dashed and connected lines mimic each other across the distribution).

Figure 3: Decomposition results, 2012–2019



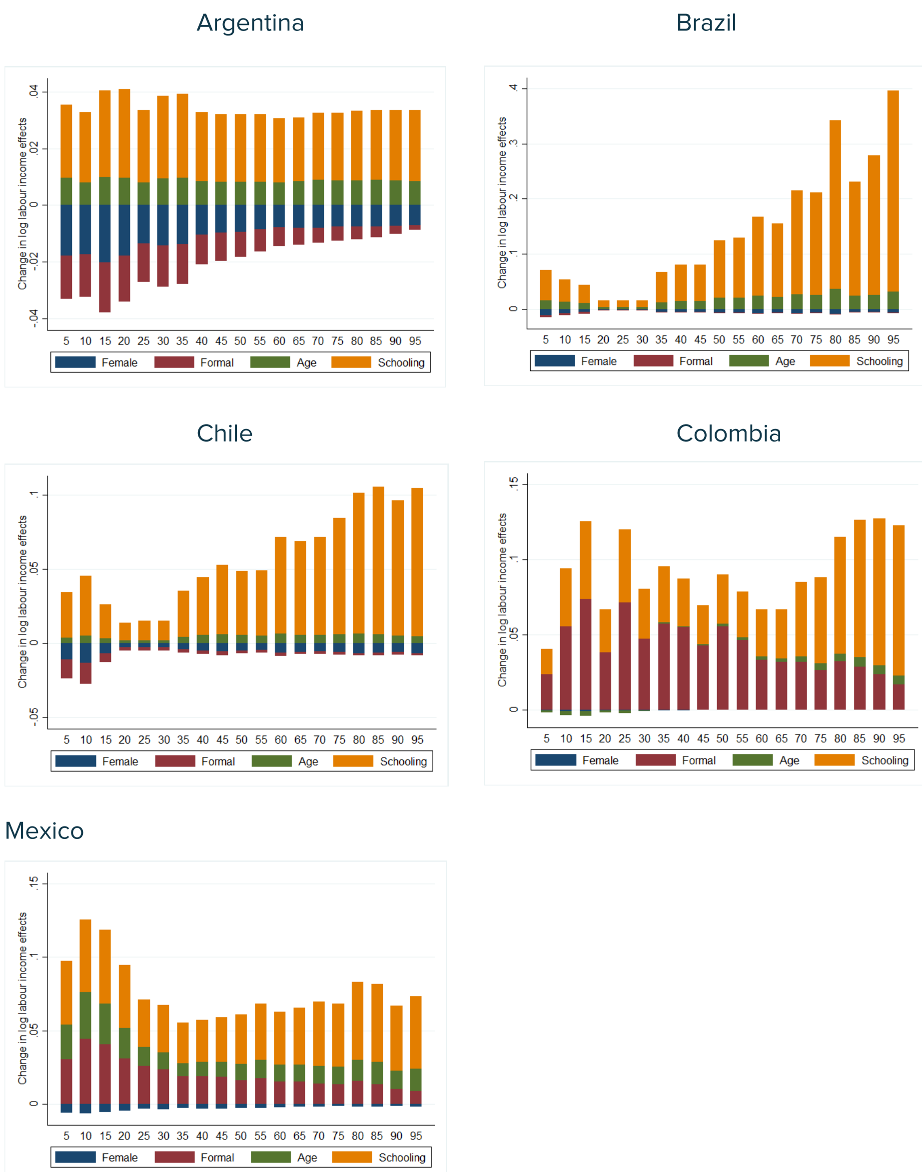
Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted for workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age.

Based on their slope, one can conclude the following. In Argentina, labour income inequality rose during the period. The characteristics effect is slightly unequalizing, and the returns effect is definitely unequalizing. In Brazil, inequality roughly remained unchanged (a sliver higher). The characteristics effect is unequalizing and the returns effect is unequalizing for the bottom 25 percent and equalizing from there onwards. In Chile, inequality declined slightly. The characteristics effect is unequalizing. The returns effect is noisy but in general roughly neutral for the bottom 60 percent, equalizing up to the 90th centile and unequalizing at the top-10 percent. In Colombia inequality declined slightly. The characteristics effect is noisy and slightly equalizing. The returns effect is equalizing as well. In Mexico, inequality declined. The characteristics effect is noisy and slightly equalizing and the returns effect is equalizing.

Figures 4 and 5 show the decomposition of characteristics and returns effects for each characteristic. Figure 4 shows by how much labour income would have increased (decreased) with constant returns if each characteristic changed as observed while the rest are assumed to be constant. As indicated before, in the aggregate, characteristics explain little of the observed change in labour income. However, when one disaggregates the effect, one can observe that some characteristics increase labour income while others decrease it.

The contribution of each characteristic to the change in labour income inequality is as follows. In Argentina, the education and age effects appear uniform throughout the distribution. The female participation effect and changes in the share of informal workers are unequalizing. The former could be the consequence of an increase in female participation at the bottom; since female workers have lower average labour incomes, this component drove bottom incomes down compared to the top. Figure 2 above shows that the share of formal workers decreased but very slightly. The decomposition suggests that the change is more pronounced for the bottom, and because of wage differentials between formal and informal workers, the effect is unequalizing. These last two factors explain why the endowment effect is slightly unequalizing given that both education and age are neutral. Brazil and Chile are quite different from Argentina. The endowment effect is also unequalizing, but practically the whole effect is driven by schooling (the paradox of progress). In Colombia, the characteristics effect appears to be neutral and the effect of schooling, unequalizing. However, the increase in the share of formal workers at the bottom appears to compensate the latter with an equalizing effect. In contrast with the other countries, in Mexico the characteristics effect is slightly equalizing. This seems to be driven by the change in the share of formal workers, which was more pronounced at the bottom. The effect of schooling appears to be neutral.

Figure 4: Detailed decomposition: The effect of characteristics, 2012–2019



Sources: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted for workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age.

Figure 5 shows the effect of returns. We include the unexplained effect (constant) for each regression such that the sum of all returns is equal to the return effect in Figure 3. Figure 5 is harder to interpret because, in some cases, the effect of unexplained factors (constant) is as large and with an opposite sign as the other effects. Unexplained effects could be changes in the real minimum wages and unionization rates as well as unobserved characteristics such as labour market experience, quality of schooling, obsolescent skills due to technical change or the composition of demand for goods and services. One possible interpretation is that returns fall especially for the younger cohorts because of what Campos-Vazquez, Lopez-Calva and Lustig (2016) called “degraded tertiary” education. Camacho, Messina and Uribe (2017) found that over time, the quality of tertiary education deteriorated as new institutions increasingly lowered their standards. To test this, one would need to include the interaction between education and age (as a proxy for experience), a matter that is left for future research.

Changes in returns to age in Argentina were equalizing while the changes in returns to schooling were equalizing but very small. The effect of unexplained factors appears to be unequalizing. In Brazil, the effect of unexplained factors is ambiguous; the effect of changes in returns to schooling appears to be equalizing but not monotonically. In Chile the unexplained effect is unequalizing especially because of what happens at the bottom and upper tails; changes in returns to age were equalizing, and changes in returns to schooling were also equalizing albeit not monotonically and very slightly. In Colombia, the two most important factors are the changes in returns to unexplained variables and in returns to age. The latter is equalizing while the former is unequalizing. In addition, the returns to formality have increased at the bottom of the distribution, producing an equalizing effect. Changes in returns to schooling were equalizing but small. In Mexico the changes in returns to age and the unexplained factors are the most important factors in determining the change in returns. Age is unequalizing, and the unexplained factors effect is equalizing. Changes in returns to schooling were unequalizing but small.[26]

[26] We also estimated the RIF regressions with education defined by schooling levels of low, medium and high. The results—available in the supplementary materials online—basically do not change.

Figure 5: Detailed decomposition: The effect of returns, 2012–2019

Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017, and for Mexico it is from 2012 to 2018. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age.

Our results appear to be in line with those of other studies. Firpo et al. (2021) find that—in the case of schooling—for the period 2012–2019 the characteristics effect is unequalizing and the returns effect is equalizing. Although the period of analysis is not strictly comparable, Zapata-Roman (2021) finds that in Chile the characteristics effect of schooling is unequalizing while the returns effect is equalizing.

6. Conclusions

We use the RIF method to estimate the contribution of changes in characteristics and returns to the change in labour income inequality between 2012 and 2019. We chose 2012 as the start date because it marks the end of the commodities boom and 2019 as the end because it is the most recent year before the highly disruptive labour market effects of the COVID-19 pandemic in 2020. During this period, labour income inequality rose in Argentina, changed very little in Brazil, and declined in Chile, Colombia and Mexico. Our results suggest that the characteristics effect is small and unequalizing in Argentina, Brazil and Chile. In Colombia and Mexico, the effect is slightly equalizing but noisy. The returns effect is equalizing in all except in Argentina where it is quite unequalizing.

At the disaggregated level, for the characteristics effect, schooling is unequalizing in Brazil, Chile and Colombia. In Argentina and Mexico, however, this effect is more ambiguous. Regarding the returns effect, changes in returns to schooling were equalizing but very small in Argentina; equalizing but not monotonically in Brazil; very slightly and not monotonically equalizing in Chile; and equalizing but small in Colombia. Of note, for Mexico, even though small, changes in returns to schooling were unequalizing. For all the countries, the unexplained effect is significant, which means that other factors not included in this exercise are affecting labour inequality outcomes.

Given the historically prominent role of return effects, future research should analyse the determinants of the evolution of relative returns. Changes in returns can be attributed to changes in the relative supply and demand of workers of different characteristics and/or changes in institutional factors, such as the minimum wage and the unionization rate as well as unobserved characteristics such as labour market experience, quality of schooling, obsolescent skills due to technical change or the composition of demand for goods and services. Future country studies should focus on identifying the contribution of these various factors.

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8. Supplementary Materials (available online only)

Table A1: Data sources and definition of labour income

Country	Survey name	Years	Definition of labour income
Argentina	Encuesta Permanente de Hogares Continua (EPHC)	2012–2021	Monetary income from main occupation and secondary occupation.
Brazil	Pesquisa Nacional por Amostra de Domicílios Contínua (PNADC)	2012–2021	Monetary and non-monetary income from main, secondary and other occupations.
Chile	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	2013, 2015, 2017	Monetary and non-monetary income from main occupation for employees and self-employed, income from unpaid family work, income from secondary occupation for employees and self-employed, income from previous jobs, remuneration from occasional work and consumption of agricultural products.
Colombia	Gran Encuesta Integrada de Hogares (GEIH)	2012–2020	Income from main job, overtime, food, housing, transportation, other income in-kind; food, transportation, family and educational subsidies. Bonuses (seniority, climate, order, etc.). Annual bonuses, service bonus, Christmas bonus, vacation bonus, travel expenses and payment for work accidents. Business fees. Income from harvesting. Income from secondary job.
Mexico	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)	2012, 2014, 2016, 2018, 2020	Monetary income from main occupation: salaries, wages, piecework, overtime, commission, bonuses and extra pay, incentives, rewards, prizes and, vacation bonus. Secondary employment income from cooperatives and businesses that function as corporations. Secondary employment monetary income from subordinate workers. Monetary income from other employment in the last past month.

Notes: Authors' elaboration.

Table A2: Descriptive statistics

	Argentina		Brazil		Chile		Colombia		Mexico	
	2012	**2021**	**2012**	**2021**	**2013**	**2017**	**2012**	**2020**	**2012**	**2020**
% Female	51.80	51.25	51.27	51.08	53.12	52.90	51.72	51.39	52.07	52.43
Age	38.32	39.17	37.80	39.14	39.41	40.02	37.76	38.25	37.65	38.76
Years of schooling	10.68	11.42	9.36	10.40	11.38	11.98	8.79	9.75	9.21	10.20
% Without instruction	0.53	0.42	4.93	3.13	1.73	1.11	4.96	3.40	4.64	3.05
% Incomplete primary	4.85	3.35	31.38	21.25	7.78	5.72	14.04	9.19	11.62	7.33
% Primary	18.48	11.88	10.78	7.12	4.77	3.15	14.29	11.88	15.51	11.94
% Incomplete high school	17.81	18.03	6.38	7.35	25.68	24.29	18.17	15.78	33.78	34.09
% High school	24.97	26.72	29.58	33.06	37.07	39.35	24.96	32.32	15.58	19.63
% Incomplete college	16.47	18.97	5.25	8.60	10.59	10.20	6.12	5.55	7.02	8.55
% College	16.88	20.63	11.71	19.50	12.38	16.18	17.46	21.89	11.85	15.42
% Urban	100.00	100.00	86.00	86.76	87.60	87.75	78.85		79.28	78.81
% Married	34.44	27.76	0.00	0.00	53.08	52.00		58.34	44.70	38.54
% Workers	64.28	63.39	67.38	61.85	68.22	71.04	70.53	61.06	69.13	68.19
% Females that work	51.44	53.01	55.17	50.69	55.30	59.87	57.52	47.41	54.58	54.44
% Employer[1]	3.82	3.33	3.90	4.12	1.89	2.04	5.09	3.30	11.49	10.71
% Self-employed[1]	17.87	22.66	22.14	26.40	18.05	20.09	44.22	44.93	16.24	14.76
% Salaried[1]	77.82	73.53	71.45	67.66	79.69	77.48	46.76	48.96	72.27	74.53
% Formal workers[1]	47.99	45.56	64.48	65.43	66.50	65.30	30.48	39.43	32.70	37.86
Monthly Earnings[1,2]	4,591	3,928	1,595	1,576	466,806	500,126	917,217	887,467	8,373	8,100
Hourly wage[1,2]	30.16	28.07	20.05	19.40	2,903.68	3,012.78	4,701.54	4,598.98	47.52	47.52
Hours worked[1]	39.72	36.63	49.96	52.72	42.44	42.83	47.40	45.36	43.94	43.04

Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to individuals aged 18-65 years old.
1 Restricted to workers.
2 Sample restricted workers with positive income. 3Local currency at 2013 prices and for Mexico at 2022 prices.

Table A3. Percent change in characteristics between 2012 and 2019

	Argentina	Brazil	Chile	Colombia	Mexico
Female	−0.24	−0.21	−0.41	−0.48	0.89
Age	2.01	2.62	1.55	1.25	1.87
Years of schooling	4.24	7.23	5.22	10.43	7.75
Low[1]	−12.84	−3.52	−19.98	−21.51	−22.52
Medium[2]	7.64	−12.35	−0.75	15.57	9.67
High[3]	10.32	48.28	18.15	21.10	21.19
Urban	0.00	1.18	0.17	0.86	−2.16
Married	−18.81		−2.03		−8.24
Workers	−1.91	−2.74	3.04	−1.83	2.52
Females that work	2.98	0.17	7.31	−1.79	3.63
Employer[4]	−10.32	13.42	7.83	−28.43	−18.79
Self-employed[4]	18.09	12.32	11.31	−3.23	−9.16
Salaried[4]	−3.61	−3.53	−2.76	8.21	5.05
Formal workers[4]	−4.58	0.17	−1.01	17.97	14.00
Monthly Earnings[5,6]	−11.81	2.94	7.14	6.96	2.48
Hourly wage[5,6]	−5.71	3.70	3.76	9.12	−0.72
Hours worked[4]	−6.67	−1.78	0.94	−3.35	1.07

Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to individuals aged 18–65 years old. 10 to 8 years of formal education. 29 to 13 years.

1 Restricted to workers.

2 Sample restricted workers with positive income. 3Local currency at 2013 prices and for Mexico at 2022 prices.

3 More than 13 years.

4 Restricted to workers.

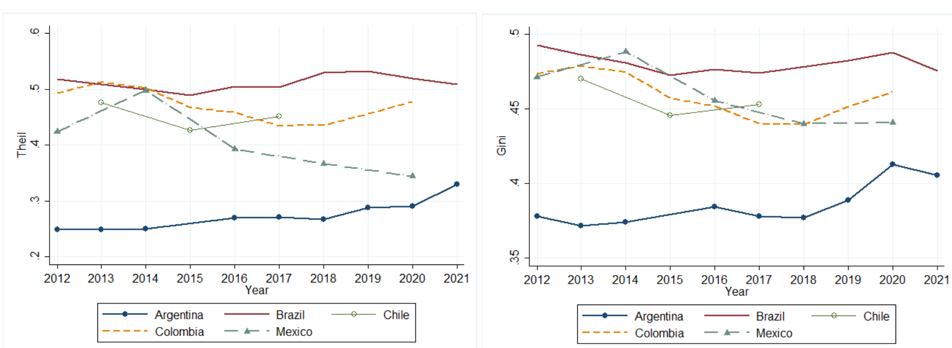
5 Sample restricted to workers with positive income.

6 Local currency at 2013 prices and for Mexico at 2022 prices. For Chile the percentage change is from 2013 to 2017; for Mexico it is from 2012 to 2018.

Figure A1: Labour income inequality

A. Theil, monthly labour income

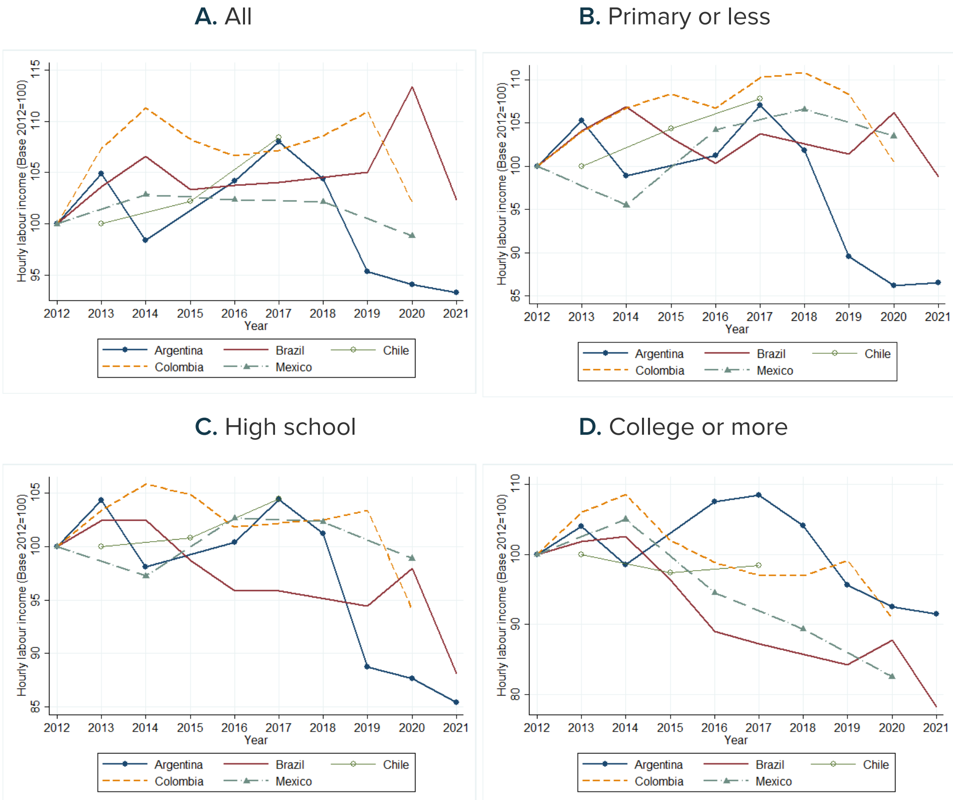
B. Gini, hourly labour income



Source: Authors' calculations using microdata for each country.

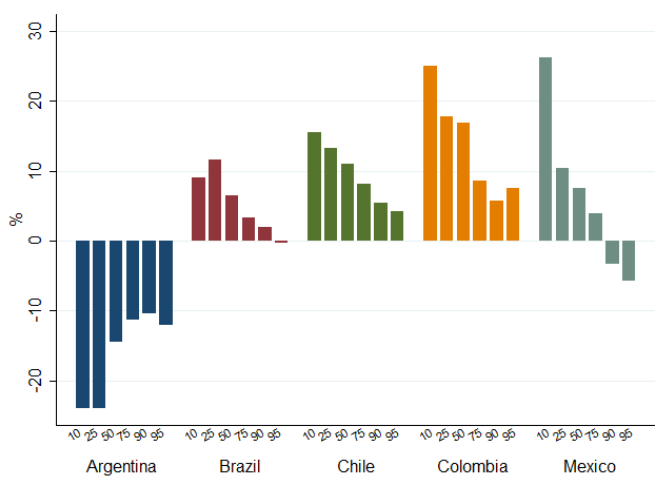
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. In panel B, the expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A2: Evolution of hourly labour income, base 2012



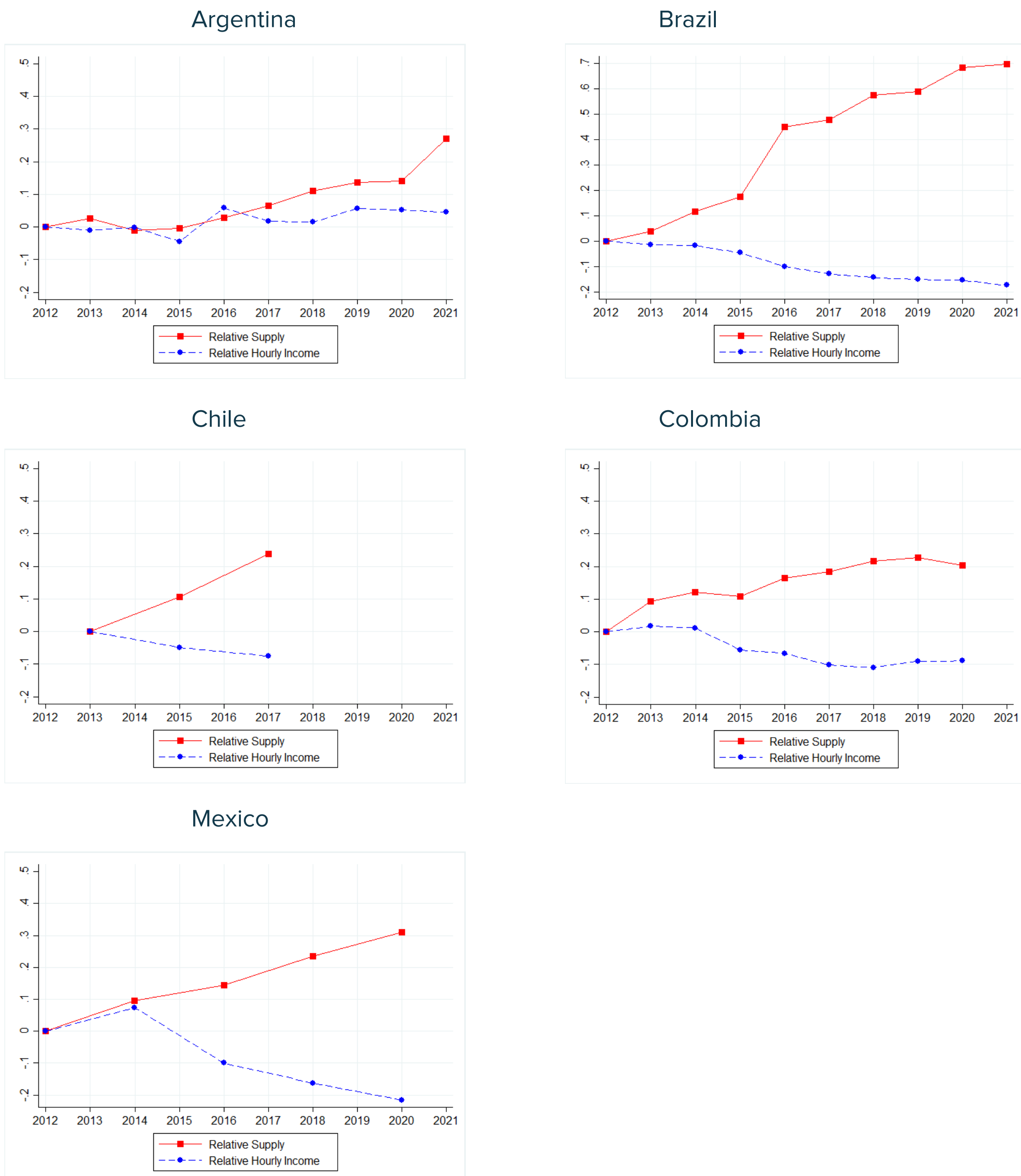
Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, base 2013=100. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A3: Percent change of hourly labour income across the income distribution



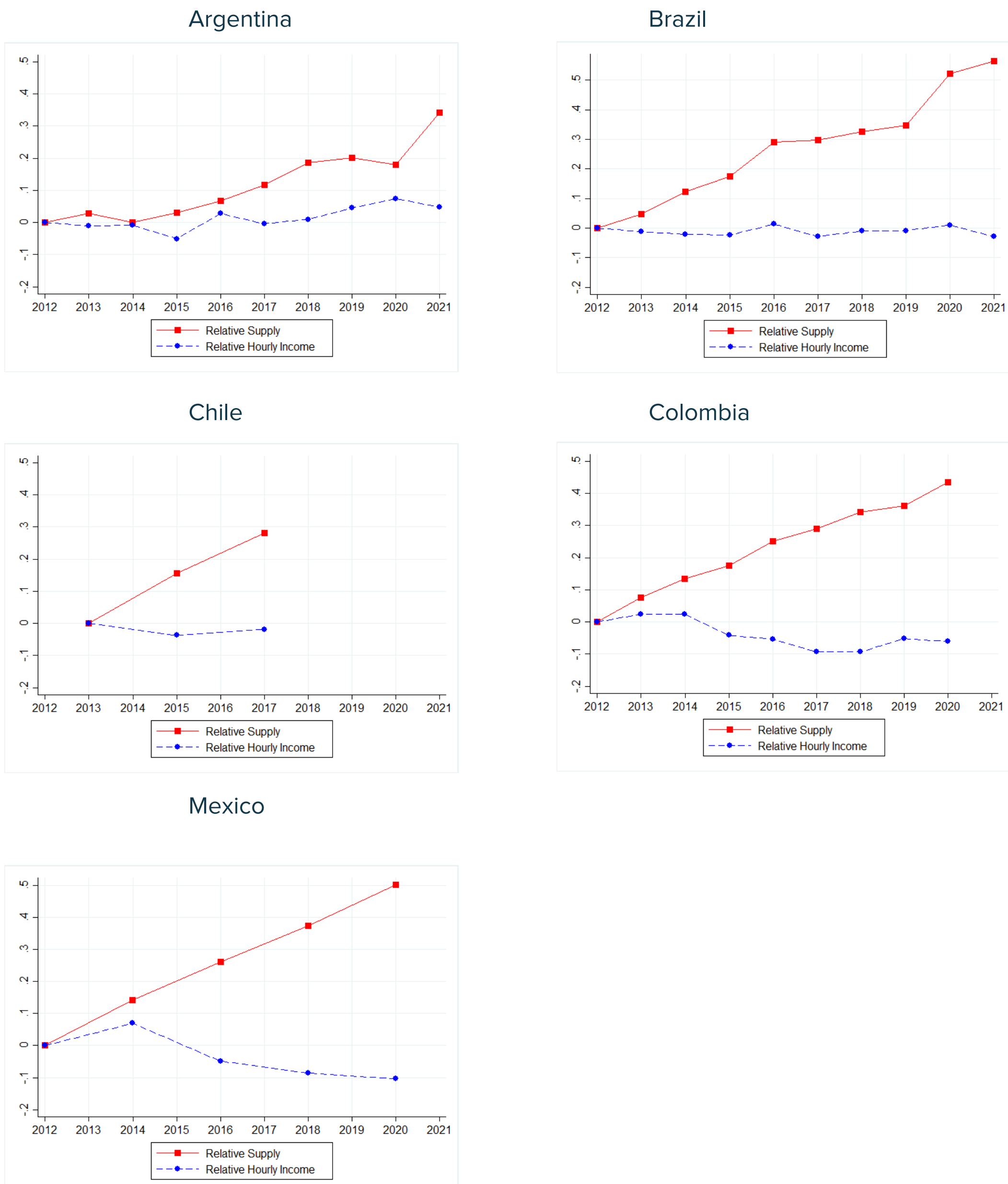
Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. In panel A, for Chile, the percentage change is from 2013 to 2017; for Colombia and Mexico is from 2012 to 2020. In panel B for Chile, the percentage change is from 2013 to 2015.

Figure A4: Relative hourly income and relative supply between college or more and rest of workers, base 2012=0



Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. For relative labour income, sample restricted to workers with positive income. For Chile, base 2013=0. The expansion factor used is the survey factor multiplied by the number of hours worked.

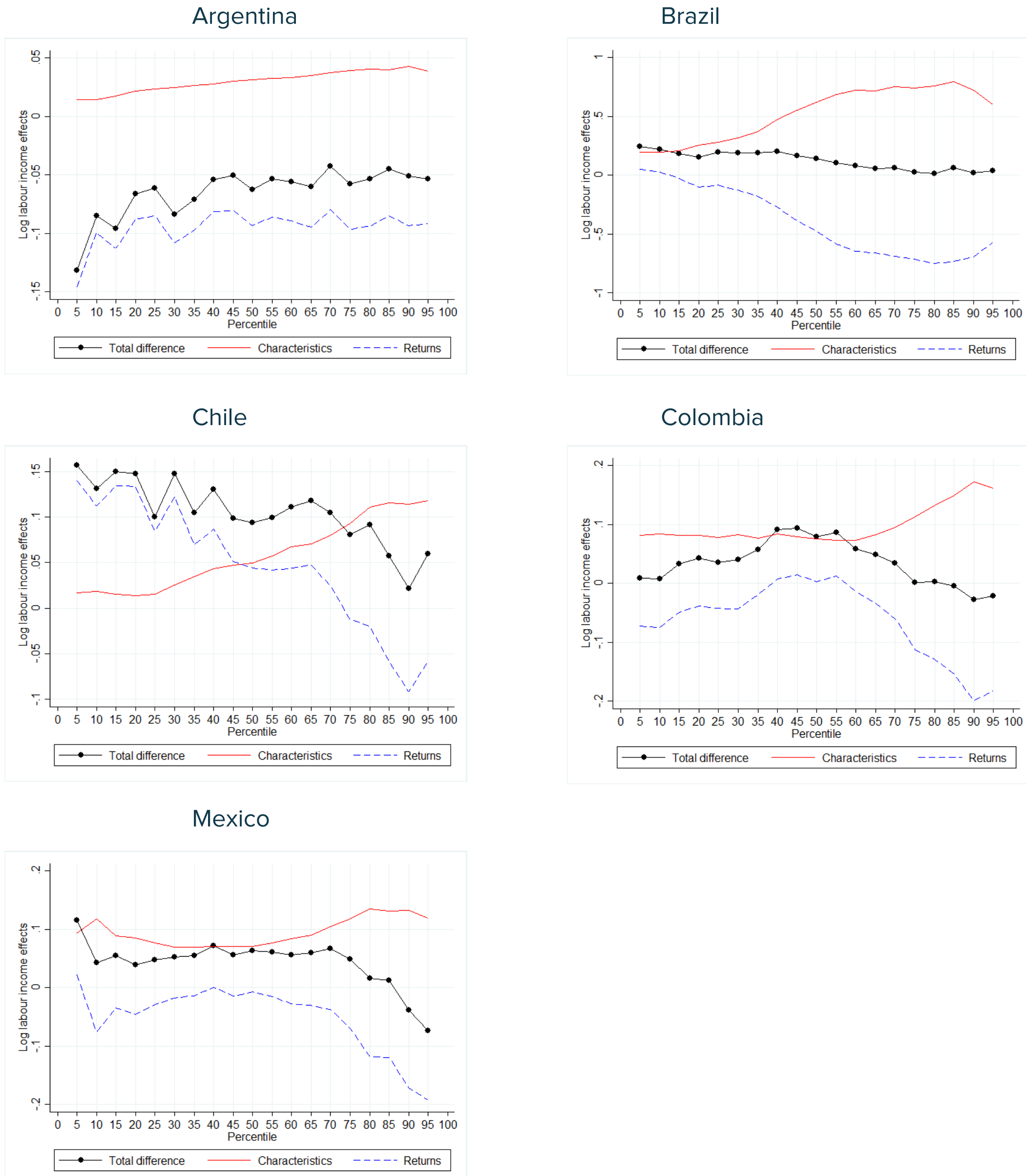
Figure A5: Relative hourly income and relative supply between high school or more and rest of workers, base 2012=0



Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. For relative labour income, sample restricted to workers with positive income. For Chile, base 2013=0. The expansion factor used is the survey factor multiplied by the number of hours worked.

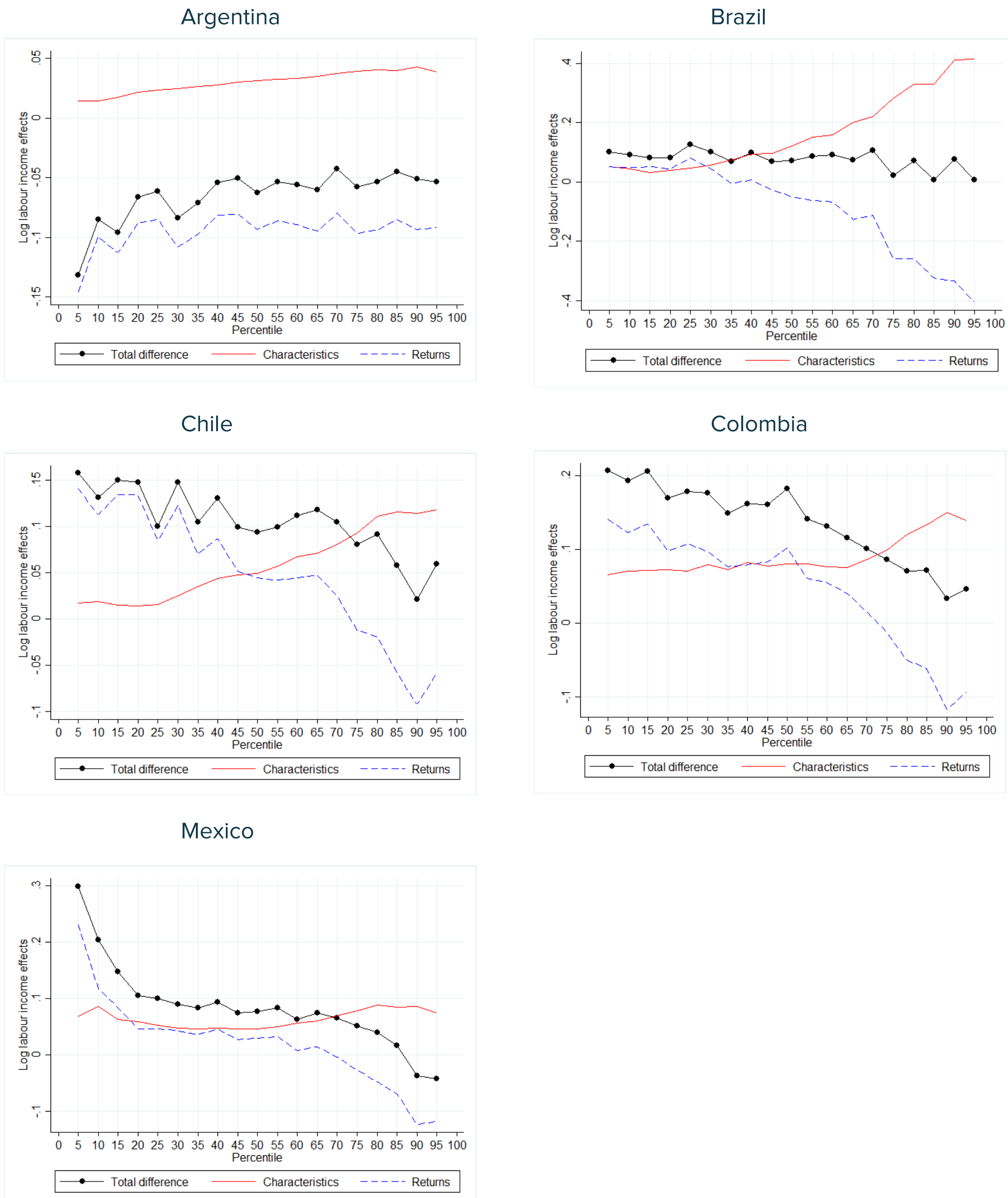
Figure A6: Decomposition results. Hourly labour income, 2012–2021



Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico and Colombia is from 2012 to 2020. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A7: Decomposition results. Hourly labour income, 2012–2019

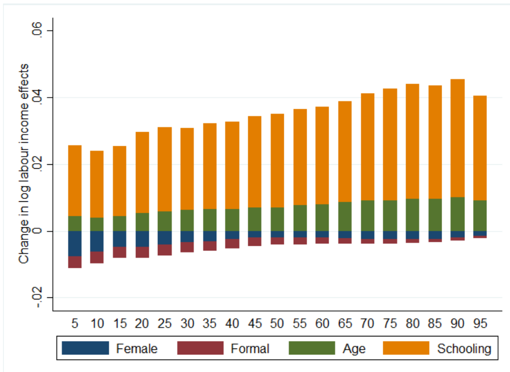


Source: Authors' calculations using microdata for each country.

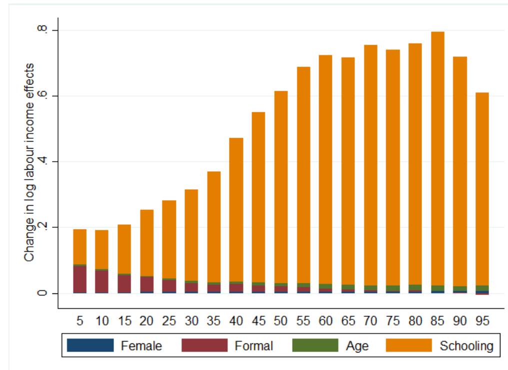
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A8: Detailed decomposition: The effect of characteristics, 2012–2021. Hourly labour income

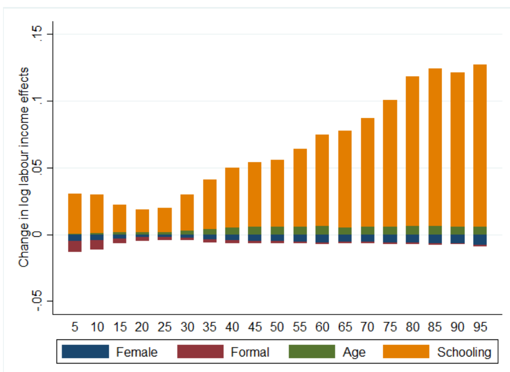
Argentina



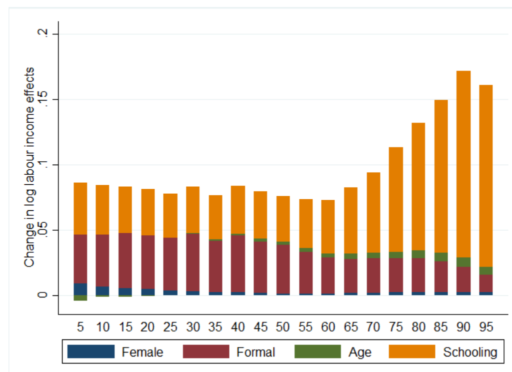
Brazil



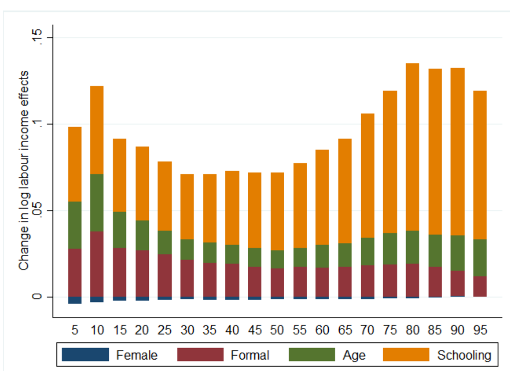
Chile



Colombia



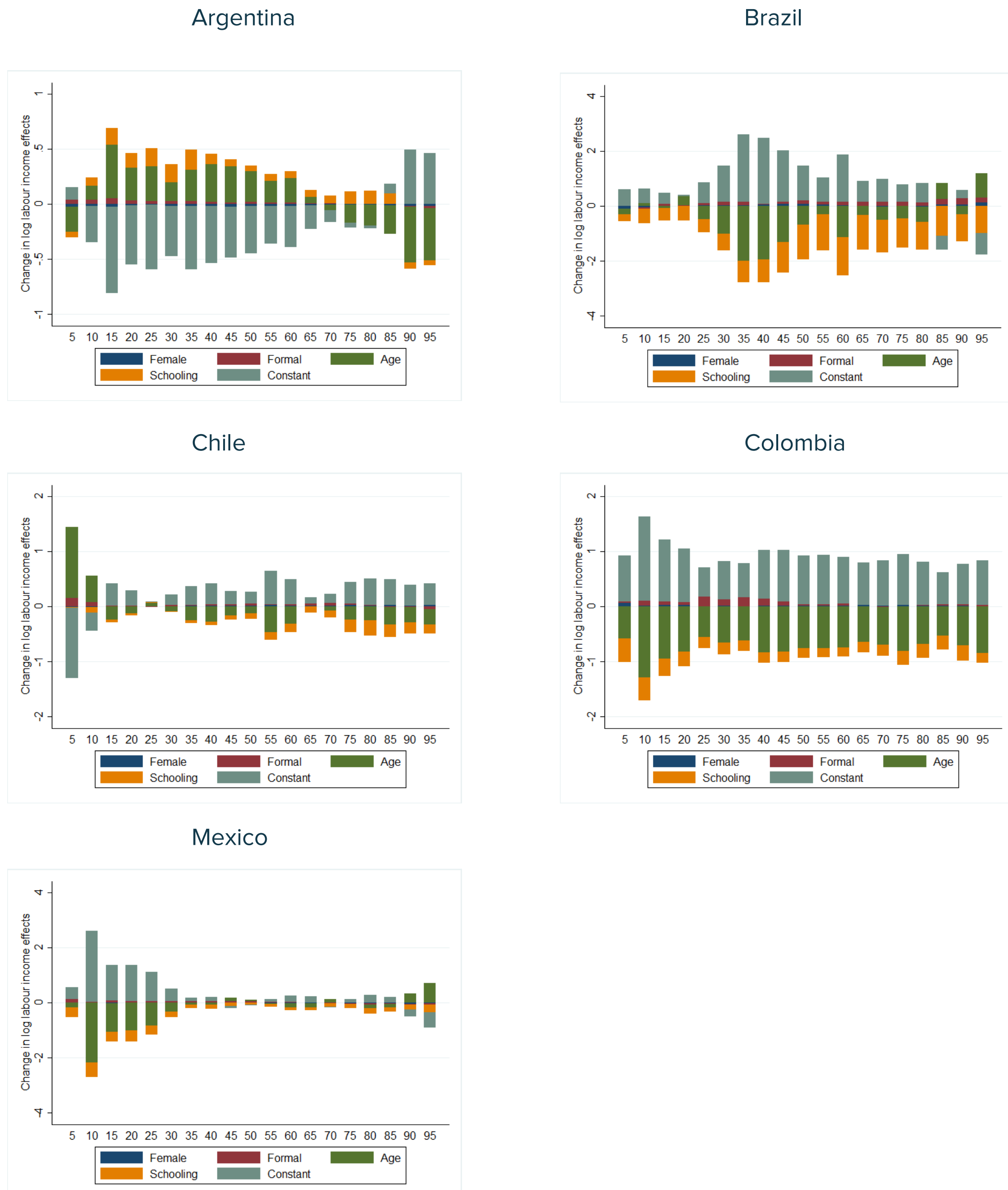
Mexico



Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico and Colombia is from 2012 to 2020. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A9: Detailed decomposition: The effect of returns, 2012–2021



Source: Authors' calculations using microdata for each country.

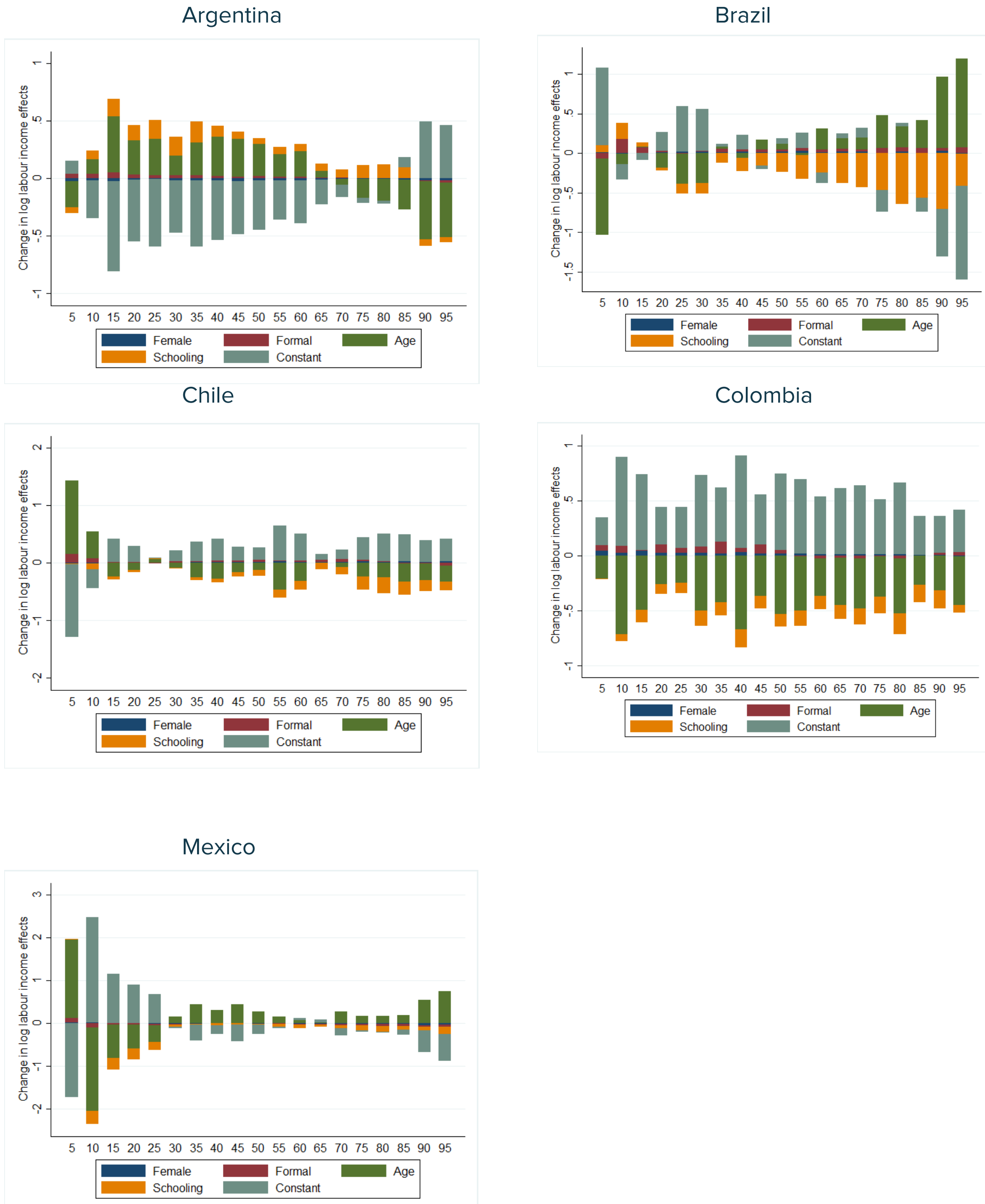
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico and Colombia is from 2012 to 2020. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A10: Detailed decomposition: The effect of characteristics, 2012–2019. Hourly labour income

Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A11: Detailed decomposition: The effect of returns, 2012–2019



Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers and linear, quadratic and cubic terms of years of schooling and age. The expansion factor used is the survey factor multiplied by the number of hours worked.

Figure A12: Decomposition results using categorical variables for schooling, 2012–2019

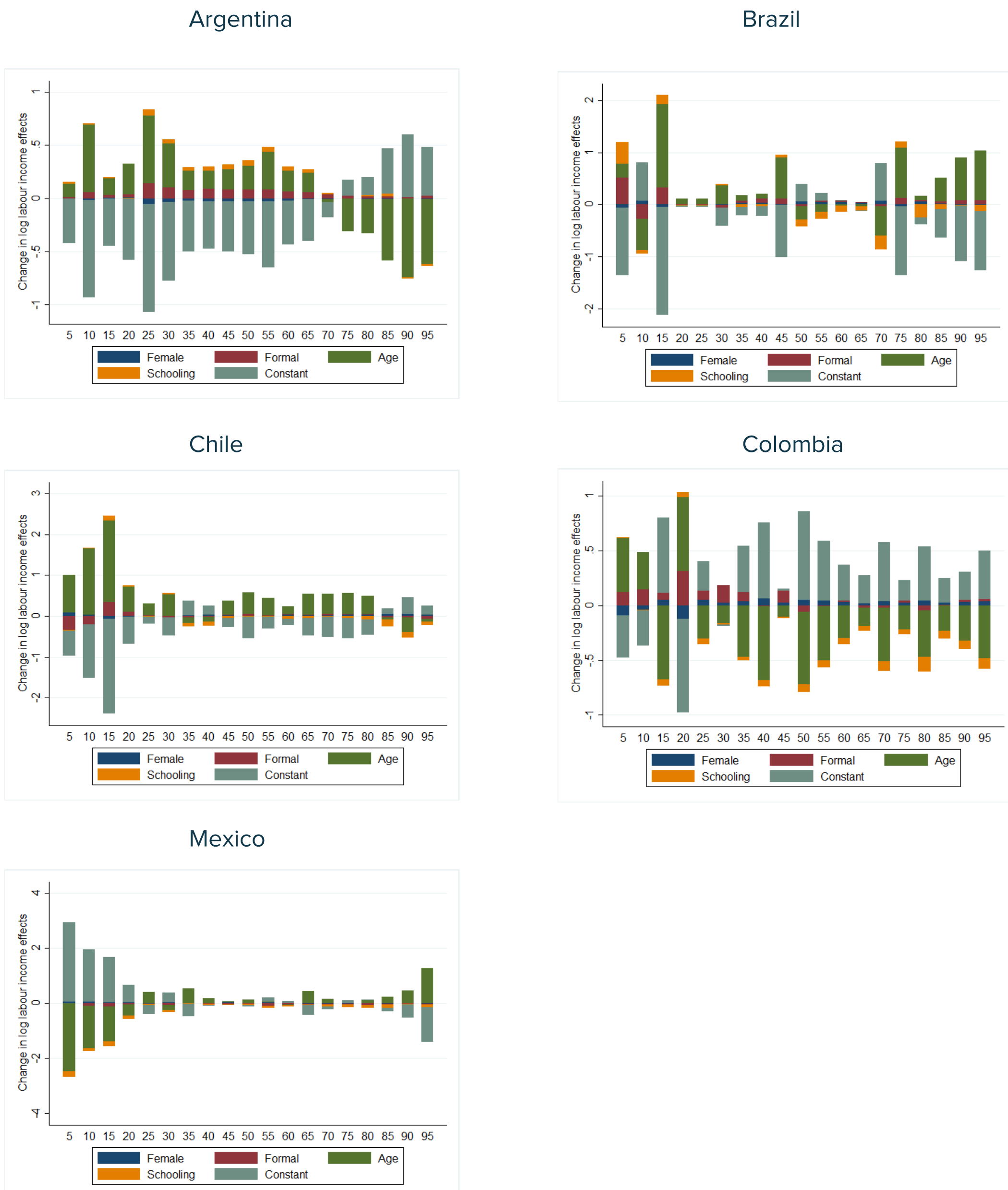
Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers, medium and high educational level, and linear, quadratic and cubic terms of age.

Figure A13: Detailed decomposition using categorical variables for schooling: The effect of characteristics, 2012–2019

Source: Authors' calculations using microdata for each country.
Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers, medium and high educational level, and linear, quadratic and cubic terms of age.

Figure A14: Detailed decomposition using categorical variables for schooling: The effect of returns, 2012–2019



Source: Authors' calculations using microdata for each country.

Notes: Sample restricted to workers aged 18–65 years old. Sample restricted to workers with positive income. For Chile, the difference is from 2013 to 2017 and for Mexico is from 2012 to 2018. The model includes dummies for female and formal workers, medium and high educational level, and linear, quadratic and cubic terms of age.