

INCOME INEQUALITY IN LATIN AMERICA: A FACTOR COMPONENT ANALYSIS

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The decline in inequality observed in most Latin American countries after 2002 was surprisingly good news, particularly given that most developed countries were experiencing a rise in inequality at that time. Various arguments have been put forward to explain this decline, but there is still no consensus on the most plausible explanation. This article contributes to the ongoing discussion by performing inequality decompositions by factor components. We estimate the importance of each source of income in explaining the observed decline in income inequality between 2002 and 2011 in five Latin American countries. Specifically, we explore the role of the process of formalization that has taken place in regional labor markets, separating formal and informal wages and considering self-employment incomes. In the five countries studied here informal wages and self-employment income contributed to decreasing inequality. Formal sector wages, on the other hand, fostered inequality in all countries except Bolivia.

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1. INTRODUCTION

Most Latin American countries experienced a decline in income inequality during the 2000s, while inequality had been rising throughout the 1990s. In many countries of the region, this decline started in 2002 and 2003, which constitutes an important turning point (ECLAC, 2011). This came as a relief after the lack of improvement in the previous decades, although Latin America still exhibits high levels of inequality compared to other regions.¹ A wide body of literature has investigated the decline of income inequality in the region both at the country and cross-country levels, but scholars have not yet reached a consensus about the causes of this decline. In this cross-country study, we contribute to the existing literature by proposing a factor decomposition of inequality for five Latin American countries (namely Argentina, Bolivia, Chile, Ecuador and Uruguay) at two points in time. We are interested in the effect of labor market dynamics, and more precisely in the variation of formal and informal wages, as well as that of self-employment income. These changes are associated with a process of formalization, which triggered an increase in formal salaried work and a decrease in both informal salaried work and self-employment. We found that both informal and

¹It is usually argued that Latin America is the most unequal region in the world, although world comparisons may have methodological limitations, given that inequality indexes are calculated considering income in Latin America, whereas for other regions they are based on consumption inequality.

self-employment incomes contributed to lowering inequality, while formal wages contributed to increasing it. Finally, although we observed general patterns for all countries, we did find some level of cross-country variation.

In terms of methods, this paper follows a wide body of literature decomposing inequality indexes by factor components (see Shorrocks, 1982; Lerman and Yitzhaki, 1985; Jenkins, 1995, for key references). We perform a factor decomposition analysis for the Gini index. Our goal is to analyze how each source of income contributes to the overall level of inequality at two points in time (around 2002 and 2011), and to decompose their changes during that period. This allows us to compare the importance of different factors and to investigate the existence of common patterns across countries. We use data from household surveys. Income factors include wages, self-employment income, capital income, contributive transfers and other transfers.² We decompose wages between their formal and informal components, and define formality as work with social security contributions. The paper is organized as follows. Section 2 presents previous evidence on the recent decline of inequality in Latin American countries and its possible explanations. Section 3 discusses methodological aspects, including the data, definition of variables and inequality decomposition. Sections 4 and 5 present our main results, and section 6 concludes.

2. THE RECENT DECLINE IN INEQUALITY IN LATIN AMERICA: PREVIOUS EVIDENCE

Previous literature has shown evidence of a significant decline in inequality over the last decade in Latin America (see Gasparini and Lustig, 2011; Gasparini *et al.*, 2011; ECLAC, 2013, among others). Notably, the majority of countries in the region (15 out of 17) saw their level of inequality decrease between 2002 and 2011 (Figure 1).³ This recent downward trend is statistically significant and robust to different inequality measures (see Gasparini *et al.*, 2011).

The decrease in inequality took place in a context of sustained economic growth and decreasing poverty in the region. Per capita GDP increased by 3.8 percent per year between 2002 and 2010, whereas poverty incidence went from 44 percent in 2002 to 31 percent in 2010 (ECLAC, 2011). Economic growth is partly explained by the commodity export boom due to the rise of China and other Asian economies (see ECLAC, 2014).

This widespread decline in inequality has drawn the attention of researchers, and recent studies have tried to understand the causes of this phenomenon. An inequality decomposition presented in ECLAC (2011) indicates that demographic dynamics contributed, to some extent, to the narrowing of the gap between quintiles. The demographic dependency rate decreased significantly, but this decrease was rather homogeneous across all income groups, thus contributing little to the reduction in inequality. It is actually income per capita, and in particular earnings, that appear to be the main factors explaining why inequality decreased in

²Self-employment income includes the income of all independent workers.

³Inequality indexes presented in Figure 1 come from CEPALSTAT, and are based on an income vector with two adjustments. The first one consists of imputing missing wages for workers and retired people. The second one is an adjustment to fit figures from National Accounts (see Amarante, 2014).

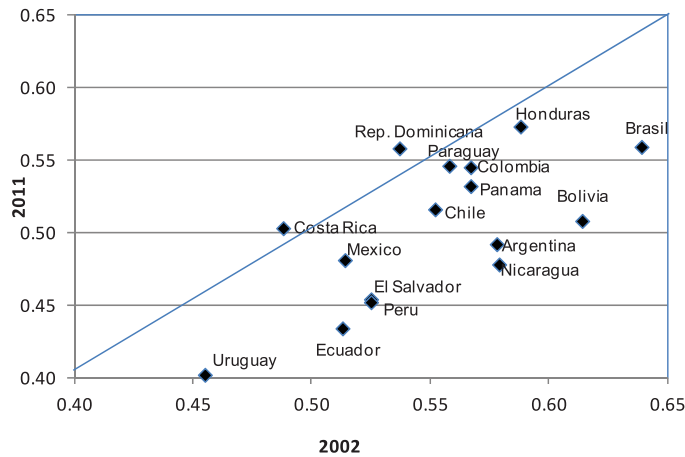


Figure 1. Gini Index in Latin American Countries 2002–2011
Source: CEPALSTAT.

the region. In addition, our income decomposition suggests that the positive impact of earnings on inequality reduction is mainly due the effect of remuneration per employee, as opposed to changes in the employment rate. Note, however, that in some countries increases in employment in the bottom quintile also had a significant impact.

López-Calva and Lustig (2010) provide an in-depth analysis of four middle-income countries in the region (namely Argentina, Brazil, Mexico and Peru), and underline two main factors explaining the decline of inequality thereof: a decrease in the earnings gap between high-skilled and low-skilled workers and an increase in government transfers to the poor.⁴ Regarding the earnings gap, they argue that, in the famous “race between education and technology” in Tinbergen’s words (Tinbergen, 1975), the latter has taken the lead. So, while during the 1990s the demand for skilled workers was higher than supply, in recent years the increase in the supply of skilled labor has outpaced demand and the college premium has decreased. Another relevant paper is that of Azevedo *et al.* (2013), who studied the employed population of 15 countries of the region, and decomposed changes in their hourly wages into quantity, price and unobservable effects. They find that decreasing returns to skills for both education and experience drove the decline in labor income inequality in Latin America. The quantity effect—that is, the contribution of changes in the composition of skills—explains a small share of the inequality reduction. Although they do not consider the contribution of formal and informal labor income to the decrease in inequality, they do decompose inequality changes into price and quantity effects for the subsamples of formal and informal workers. In most countries, labor income inequality declined more in the informal than in the formal sector, although the results vary across

⁴Despite the more progressive pattern of public spending during the 2000s, studies coincide in the poor use of direct taxes as a redistributive tool (see for example Jiménez and Gómez Sabaini, 2012).

countries. The price effect across sectors is similar, but the unobserved effects are higher in the informal sector.

A different argument is given by Gasparini *et al.* (2012), who estimated the relative contribution of supply and demand factors in explaining the recent skill premium trends in 16 Latin American countries. They show that the relative supply of skilled and semi-skilled workers has been increasing since the 1990s. Both in the 1990s and 2000s, returns to secondary education decreased, whereas returns to tertiary education increased in the 1990s before declining in the 2000s. They found that this reversal is due to both supply-side factors and the deceleration of relative demand. The changes in the labor demand trend for workers with a tertiary education can be explained by the commodity price boom, which may favor workers with a non-tertiary education. They found a negative correlation between the evolution of terms of trade and the education premium in the region over the last decade, especially in the case of commodity exporting countries. In addition, the authors suggest that other factors, such as technological diffusion or skill mismatches, may also be at play, and contribute to reducing the labor productivity of highly educated workers. De la Torre *et al.* (2012) highlight the increase in skills within the labor force, but argue that they do not appear to be a crucial factor in explaining the variation in labor income inequality. They found that demand-side forces play a major role, through increases in the relative demand for low-skilled workers. The case studies presented in Cornia (2014) also provide evidence that the increase in commodity prices contributed to decreasing inequality in the region, especially in countries whose exports are commodity-intensive. Nevertheless, this has not been the only cause, as inequality has also fallen in semi-industrialized countries and in countries that strongly depend on remittances.

Scholars have proposed an alternative explanation for the decline in returns to education. Besides the relative contribution of demand and supply, returns to education may have decreased because the quality of tertiary education decreased as its coverage expanded (see Lustig *et al.*, 2013). Thus, our literature review suggests that further research is needed in order to understand which factors contributed to the decline in returns to education.

To the best of our knowledge, there is no extensive literature on the impact of different income sources on inequality. Keifman and Maurizio (2014) are among the few scholars to have investigated this issue. They performed a similar Gini decomposition for Argentina, Brazil, Chile, Mexico and Uruguay from 2003–2010. They found that changes in labor income are the single most important factor in reducing the Gini coefficients, and that the process of formalization has helped to reduce inequality in the countries considered.

The political dynamics behind the recent decline in inequality should not be omitted. Lustig *et al.* (2009) argue that any economy is embedded in a political system that may amplify or reduce market inequality, and suggests that the strengthening of regional democracies during the last decade may have affected labor market institutions and redistributive policies. In his analysis of income distribution under Latin America's new left regimes, Cornia (2010) argues that new left or center-left governments in the region introduced economic reforms inspired

by a “prudent redistribution with growth.”⁵ With a few exceptions—namely Bolivia and Venezuela—these governments did not introduce radical measures altering the distribution of assets, but rather relied on managed exchange rates, neutral or countercyclical fiscal policies, reduced dependence on foreign capital, the accumulation of reserves and an active role in labor and social policies. Among the main policies, these governments addressed labor market problems by strengthening labor market institutions—including wage bargaining and minimum wages. Another prevalent feature is the upward trend in public social expenditure during the 2000s (see ECLAC, 2013) and the expansion of progressive social assistance programs. Robertson (2012) points out that the decline in inequality took place in countries governed by diverse administrations, so that there was no strict link between declining inequality and the ideological profile of the government. Governments across the political spectrum adopted different redistributive policies. This suggests that the institutionalization of democratic competition, in an era of economic stability, induced governments to respond to the claims for social inclusion and to implement new policies against inequality.⁶

As shown in the literature review above, it is difficult to capture the driving forces behind the recent evolution of income inequality in the region, in particular because of the specificity of each country’s experience. This paper aims to shed light on this issue by analyzing the extent to which different sources of income influenced the overall income inequality of each country. In addition, we investigate whether there is a common pattern across countries in the region.

3. METHODS

3.1 Data

This study is based on household survey data from Argentina, Bolivia, Chile, Ecuador and Uruguay, for the years 2002 and 2011.⁷ The time period corresponds to the turning point in the evolution of inequality, as described in the introduction.⁸ These five countries were selected because they share common features: in all of them, inequality and informality declined over the period, all of them have household surveys allowing for the decomposition of household income into similar factors at both points in time, and all of them include similar questions to classify salaried workers as informal if they do not contribute to social security. More importantly, in all of these countries, informal salaried work and self-employment constitute a significant share of total work.

Inequality is measured based on per capita household income, defined as disposable income, that is, net market income (labor market income and capital

⁵By 2009 ten countries, accounting for two-thirds of the region’s population, had left-leaning governments (McLeod and Lustig, 2011).

⁶Discussions about the empirical links between political regimes and inequality reduction can be found in McLeod and Lustig (2011) and Montecino (2012).

⁷Data for Chile corresponds to 2003 instead of 2002.

⁸In the case of Uruguay, the timing was rather different. Income inequality increased throughout the mid-1990s. During the 2000s, it continued growing, albeit modestly, until 2007. Inequality then decreased between 2008 and 2013 (for more details about the Uruguayan experience, see Amarante *et al.*, 2014). In addition, informality has been decreasing since 2004 in Uruguay (see Perazzo, 2012).

income excluding social contributions and direct taxes) plus cash transfers (social insurance, assistance programs, etc.). Labor market income corresponds to the sum of salaries and wages, self-employment and business income for salaried workers, self-employed workers and employees. Wages are separated into informal and formal. Capital income includes rent income, business income (non-workers), interests and dividends. Cash transfers are divided into contributive transfers and other transfers. The former includes contributive pensions, unemployment benefits, and severance payments. Other transfers include non-contributive public transfers (including conditional cash transfers), scholarships and alimony payments. We exclude imputed rents.

Let us provide a few clarifications about the data. First, regarding the income vector used in our decompositions, we use the one provided in the household surveys without imputing missing data or adjusting it to fit national records. Table A.1 illustrates the main characteristics of our data sources.⁹ Second, we decided to use per capita income—a common practice in the region—as opposed to adopting a parametric approach. Mancero and Alonzo (2011) estimate equivalence scales in Latin American countries and show that different econometric methods are subject to different biases and limitations. Their results imply that the best parametric models are the ones that assume a parameter of 0.7 or 0.8. However, given that there is no evidence that this adjustment—or any alternative adjustment—is the best option, we decided to present per-capita results.¹⁰

3.2 *Inequality Factor Decomposition*

In terms of methods, this paper follows a wide body of literature decomposing inequality indexes by factor components (see Shorrocks, 1982; Lerman and Yitzhaki, 1985; Jenkins, 1995 for key references). We perform a factor decomposition of the Gini index. The decomposition of inequality indexes by factor sources allows us to estimate how each factor contributes to total inequality, and to understand its changes. Despite being a purely descriptive exercise, inequality decomposition by factors can illustrate the changing role of different income sources.¹¹

To decompose the Gini index, we follow Lerman and Yitzhaki (1985). The Gini coefficient at a given point in time can be expressed as follows:

⁹As discussed in Amarante (2014), the two main compilations of inequality measures for the region are provided by ECLAC and SEDLAC. Both of them impute missing wages for workers and retired individuals. ECLAC also makes adjustments to match National Accounts (see Altimir, 1987). In this article, we use the original income vectors from the household surveys, which explains why our data may differ slightly from that of ECLAC and SEDLAC.

¹⁰Inequality measures reported by ECLAC for the region are based on per capita income, whereas SEDLAC reports measures based both on per capita and adjusted income, using the equivalence scale proposed by Deaton and Zaidi (2002) for all countries, although they recognize that it would probably be better to use different parameters for different countries.

¹¹The two main strands of inequality decomposition are summarized by Cowell and Fiorio (2011). They distinguish between “a priori approaches”—mainly decompositions of inequality indexes by subgroup or factors—and “explanatory models”—where a counterfactual distribution is specified in order to examine the influence of each potential causal factor. The use of simple regression models constitutes a less explanatory option.

$$(1) \quad G = \sum_{f=1}^F s_f G_f R_f.$$

where f corresponds to income sources; s_f is the share of source f in total income; G_f is the Gini coefficient of the income source f ; and R_f is the “Gini correlation” between the income component f and total income. At a given point in time, the absolute contribution of each income source f to total inequality, SH_f , is simply the product of the share of that source in total income, s_f , the Gini coefficient of that income source, G_f , and its Gini correlation, R_f . The relative contribution of each income source to total inequality is given by the ratio between SH_f and G .

Pioneering work by Shorrocks (1982) and Jenkins (1995) has shown that the change in aggregate inequality can be decomposed into an exact sum of changes in the contributions of the various sources, which are the result of the correlations of that source with total income, factor shares and factor inequality. As stated by Jenkins (1995), the sources that contribute significantly to inequality in a given year are not necessarily the ones that contribute the most to the change in inequality.

Following Milanovic (1998), we decompose the contribution of each income source to the change in the Gini index between a share effect and a concentration effect. The concentration index of each income source, C_f , is defined as the product of the Gini coefficient of the income source and the Gini correlation between that income source and total income:

$$(2) \quad C_f = G_f * R_f$$

Then the overall Gini coefficient can be written as an average of the concentration indexes of income sources, C_f , weighted by the corresponding shares:

$$(3) \quad G = \sum_{f=1}^F s_f C_f$$

Taking the differences of (3) between two points in time, the change in the Gini coefficient can be written as:

$$(4) \quad \Delta G = \sum_f \Delta s_f C_f + \sum_f s_f \Delta C_f + \sum_f \Delta s_f \Delta C_f$$

where the first term reflects the change in the Gini index due to a variation in the shares of income sources (share effect), the second term reflects changes in the Gini index due to changes in the concentration coefficients of the different income sources (concentration effect), and the last term is an interaction term (residual). Thus, each income source f plays a role in the overall change in inequality, and this role derives from the change in its share and concentration. If the concentration indexes remain constant, the Gini coefficient will increase if the share of income sources with concentration indexes higher than the overall Gini increases

(share effect). On the other hand, if income shares remain constant, the Gini coefficient will increase if the concentration indexes increase.

Based on this decomposition of the Gini coefficient, we will now analyze the marginal effect of each income source. This marginal effect allows us to investigate how changes in the size of a particular income source affects the overall income inequality, holding income from all other sources constant. If there is a change in each person's income from source f equal to eY_f , where e is close to 1, the partial derivative of the overall Gini with respect to a percentage change e in source f gives the marginal impact of this income source on overall income inequality.

$$(5) \quad \partial G / \partial e_f = s_f (R_f G_f - G)$$

The source's marginal effect relative to the overall Gini is:

$$(6) \quad \frac{\partial G / \partial e_f}{G} = \frac{s_f R_f G_f}{G} - s_f$$

where a negative sign means that a marginal increase in the source has an equalizing effect. As shown in equation (4), it is important to distinguish between the impact of a marginal change in a given source on inequality at one point in time and the effect of each source on the variation in the Gini index between two points in time.

4. INEQUALITY AND INCOME COMPOSITION

In all countries under consideration, income inequality decreased between 2002 and 2011, and this decline is robust to the use of different inequality indexes (Table 1). The Gini coefficient decreased by more than 10 points in Argentina and Bolivia, and by 3 to 5 points in other countries. In terms of percentage, decreases in the Gini coefficient ranged from 6 percent in Chile to 21 percent in Bolivia. The Generalized Entropy (GE) index, with parameters 0 and 1, also known as Theil 0 (mean log deviation) and Theil 1, reflects even higher decreases in inequality, both in relative and absolute terms.¹²

This process of decreasing inequality occurred at a time of important changes in the labor market. In particular, informality among salaried workers decreased significantly in all countries (Table 2). The share of informal salaried workers with respect to the total number of salaried workers decreased from 45 percent to 31 percent in Argentina, whereas in Bolivia it went down from 71 percent to 58 percent. Decreases in informality among salaried workers were also significant in Chile (from 22 percent to 18 percent), Ecuador (from 58 to 42 percent) and Uruguay (from 23 percent to 16 percent). A distinctive

¹²Measures from the GE class are sensitive to changes at the lower end of the distribution for parameters close to 0, and equally sensitive to changes across the distribution when the parameter equals 1 (Theil index). Bootstrapped confidence intervals for inequality indexes are presented in Table A.2. In all cases, changes are statistically significant.

TABLE 1
INEQUALITY INDEXES 2002 AND 2011.

	Argentina		Bolivia		Chile		Ecuador		Uruguay	
	2002	2011	2002	2011	2002	2011	2002	2011	2002	2011
Theil 0	52.2	33.3	82.2	45.3	54.6	48.9	49.5	40.5	38.6	30.2
Theil 1	51.7	32.6	76.2	40.1	64.3	52.2	59.0	42.0	41.3	32.1
Gini	54.4	44.1	60.2	47.8	52.9	49.8	53.3	49.5	47.7	42.3
Variation 2002–2011										
	Relative	Absolute	Relative	Absolute	Relative	Absolute	Relative	Absolute	Relative	Absolute
Theil 0	–36%	–18.9	–45%	–36.9	–10%	–5.7	–18%	–9	–22%	–8.4
Theil 1	–37%	–19.1	–47%	–36.1	–19%	–12.1	–29%	–17	–22%	–9.2
Gini	–19%	–10.3	–21%	–12.4	–6%	–3.1	–7%	–3.8	–11%	–5.4

Source: Household Surveys.

characteristic of households in Latin America is the importance of self-employment. The share of self-employed individuals relative to total employment decreased in Argentina and, to a lesser extent, in Bolivia, Chile and Uruguay. By the end of the period, the self-employment rate ranged from 22 percent of workers in Argentina and Chile to 38 percent in Bolivia and Ecuador.

While it is not necessarily the case that economic growth leads to a decrease in informality, in these countries, economic growth and stability seem to have facilitated its reduction. In a context of economic stability, the risks and costs associated to layoffs decrease, which may induce employers to favor formal workers. Also, lower unemployment rates—like the ones observed in these countries compared to previous decades—can increase workers' bargaining power and their chances of being formalized. Self-employment, on the other hand, tends to be pro-cyclical. Besides the macroeconomic context, a set of public policies has been implemented in all of these countries. Every national experience is unique, but in general terms the policies implemented in these countries contributed to

TABLE 2
EMPLOYMENT BY CATEGORY AND EMPLOYMENT RATE.

	Salaried (Formal)	Salaried (Informal)	Salaried (Total)	Self- Employed	Others	Total	Employ- ment Rate
Argentina 2002	40%	32%	72%	27%	1%	100%	48%
Argentina 2011	53%	24%	77%	22%	1%	100%	56%
Bolivia 2002	9%	22%	30%	40%	30%	100%	68%
Bolivia 2011	15%	21%	37%	38%	25%	100%	69%
Chile 2002	57%	16%	73%	24%	3%	100%	50%
Chile 2011	63%	14%	77%	22%	1%	100%	51%
Ecuador 2002	25%	34%	59%	37%	5%	100%	61%
Ecuador 2011	31%	22%	53%	38%	9%	100%	60%
Uruguay 2002	54%	16%	70%	28%	2%	100%	50%
Uruguay 2011	60%	11%	72%	27%	2%	100%	62%

Source: Household Surveys.

TABLE 3
INCOME COMPOSITION BY SOURCE. 2002 AND 2011

	Formal Wages	Informal Wages	Self- Employment	Capital	Contributive Transfers	Other Transfers	Total
Argentina 2002	44.9	12.9	18.3	1.2	17.6	5.1	100.0
Argentina 2011	56.0	8.8	15.0	0.3	15.8	4.1	100.0
Bolivia 2002	22.5	23.8	38.7	4.1	3.4	7.5	100.0
Bolivia 2011	24.3	21.3	43.4	2.6	3.2	5.2	100.0
Chile 2002	47.6	8.4	19.7	0.5	7.0	16.7	100.0
Chile 2011	54.7	6.6	18.5	2.1	3.7	14.4	100.0
Ecuador 2002	27.6	21.6	36.7	5.2	2.7	6.2	100.0
Ecuador 2011	40.9	14.9	30.0	1.9	5.7	6.6	100.0
Uruguay 2002	43.2	4.2	18.4	3.3	25.8	5.1	100.0
Uruguay 2011	50.0	3.4	19.1	3.1	20.1	4.4	100.0

Source: Household Surveys.

enhancing formalization (see ILO, 2014). Interventions included, for instance, the strengthening of labor market institutions (minimum wage and wage bargaining), the simplification of registration processes and costs and the implementation of subsidies for investments which create formal employment.

There is some level of cross-country variation regarding the structure of household income. Table 3 reports the average share of each income source with respect to total household income. During the last year of the period, the share of wages in the total income ranged from over 60 percent in Argentina to 45 percent in Bolivia. In all countries, the share of formal wages increased over the period, which is consistent with the fall in informality observed among salaried workers. The smaller increase took place in Bolivia (less than 2 percentage points). The share of wages that goes to informal workers varies considerably across countries, but it is always lower than the share associated with formal workers—except in Bolivia, where more than half of the total wage goes to informal workers. In all countries, the share of informal wages decreased over the period. The share of self-employment income also tended to decrease over the decade—in accordance with employment movements—,except in Bolivia. In that country and, to a lesser extent, in Ecuador, self-employment income constitutes a significant part of total income. The share of capital income is very low—although this measure may be biased due to the difficulty of capturing high incomes through household surveys. Contributive transfers represent a higher proportion of income in Argentina and Uruguay than in other countries, which is consistent with their more mature social protection systems.¹³

Figure 2 shows the income composition by decile in 2011. In general, the importance of informal wages decreases with income. In Bolivia and Ecuador, informal wages account for a significant part of total household income at the middle of the distribution. These two countries are also characterized by a high

¹³A comparison with the data reported by García Peñalosa and Orgiazzi (2013) suggests that there is no significant difference between Latin America and developed countries in terms of labor market income shares—the main difference being in terms of composition. In the countries we studied, self-employment income represents on average 30 percent of total household income, while in developed countries it accounts for 6 percent of total income. The shares of capital income are also similar.

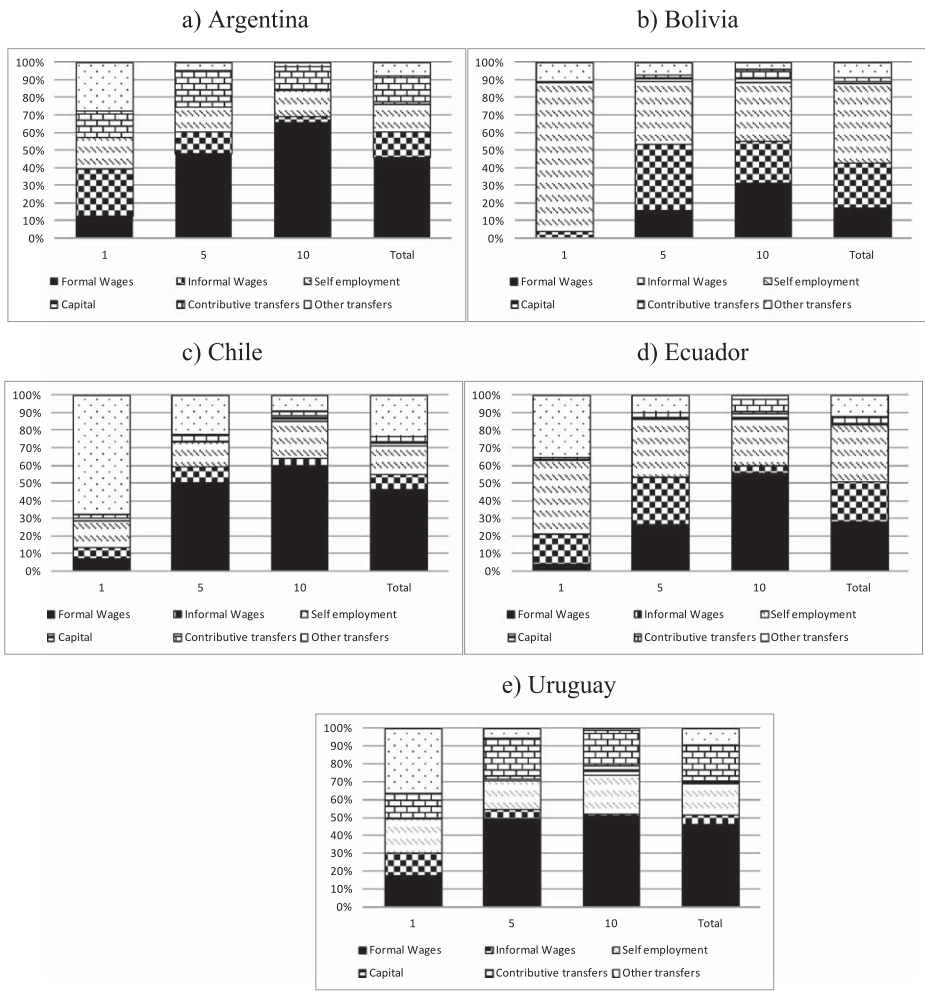


Figure 2. Income Composition by Income Source and Decile 2011

Source: Household Surveys.

share of self-employment income, especially in the first decile. As expected, the importance of capital increases with income, while we observe the opposite pattern for other transfers. In Argentina, Chile and Uruguay other transfers represent a high proportion of income in the first decile. As mentioned earlier, these other transfers are mainly composed of conditional cash transfer programs. In fact, one of the main changes in social protection systems in Latin America during the last 15 years has been the expansion of conditional cash transfer programs, which developed in various countries as a tool for poverty reduction. Notably, these programs were implemented in the five countries we studied. Argentina created the *program Jefes y Jefas de Hogar* in 2002, and although the original program does not exist anymore, nowadays they have a conditional cash transfer program called *Asignación Universal por Hijo*, which covers 8.62 percent

of the total population. In Bolivia, the program *Bono Juancito Pinto*, created in 2006, covers 16 percent of the population. In Chile, the program *Chile Solidario* has existed since 2002 and covers 6.5 percent of the total population. Ecuador implemented the program *Bono Solidario* in 1998, and in 2003 this program became *Bono de Desarrollo Humano* and covers 40 percent of population. In Uruguay, the original cash transfer program implemented in 2006, *Ingreso Ciudadano*, was replaced by *Asignaciones Familiares* in 2008, and now covers 15 percent of the population.¹⁴

5. FACTOR INEQUALITY DECOMPOSITIONS

In this section, we decompose income inequality by the contribution of different income sources. For each country, we decompose the Gini index—based on per capita household income—into formal and informal wages, self-employment income, capital income, contributive transfers and other transfers.

We first present the decomposition at two points in time. Table 4 presents the main decomposition results. More precisely, it shows the share of each income source in the average income (s_f), each source's Gini index (G_f), the “Gini correlation” between the income component (f) and total income (R_f), the absolute contribution of each source to total inequality (SH_f)—which is the product of the first three columns—and the relative contribution of each source to total inequality (columns 5 and 10). In general, capital income constitutes the most concentrated source in all countries, although contributive transfers also exhibit high levels of inequality—especially in Bolivia. Informal wages are characterized by higher inequality indexes than formal ones in Argentina, Chile and Uruguay, which are the countries with the lowest informality in our sample.

In all countries, formal wage inequality decreased over the period. The share of total income associated with formal workers increased, while the share associated to informal workers decreased, as shown previously. Regarding the decomposition of the Gini index at the last point in time, we find that more than half of the total income inequality is associated with formal wages, in almost all countries under consideration. The only exception is Bolivia, where self-employment income and informal wages contribute significantly to total income inequality. Self-employment income is the second most important factor contributing to income inequality in the countries under consideration. In Argentina and Uruguay, contributive transfers also contribute significantly to total inequality.

The Gini decomposition proposed by Lerman and Yitzhaki, (1985) allows us to estimate the marginal effect of changes in each income source on inequality. The idea is the following: if an income source is unequally distributed but targets poor individuals, a marginal increase in this source—say a one-dollar increase in a targeted cash transfer—will have an equalizing effect on the income distribution. In other words, using this method helps us understand how a marginal increase in one income source may affect the value of the Gini coefficient, all

¹⁴More details on these programs can be found in ECLAC's Social Protection Database (<http://dds.cepal.org/proteccionsocial/bases-de-datos>).

TABLE 4
GINI DECOMPOSITIONS. 2002 AND 2011.

	2002					2011				
	S_f	G_f	R_f	SH_f	Relative Contribution	S_f	G_f	R_f	SH_f	Relative Contribution
Argentina										
Formal Wages	44.9	77.4	79.1	27.5	50.6	56.0	67.7	78.9	29.9	68.0
Informal Wages	12.9	80.9	25.7	2.7	4.9	8.8	83.3	8.1	0.6	1.3
Self-Employment	18.3	90.4	66.1	10.9	20.1	15.0	86.9	49.6	6.5	14.7
Capital	1.2	99.3	75.6	0.9	1.7	0.3	99.9	86.9	0.3	0.7
Contributive Transfers	17.6	90.0	67.2	10.6	19.5	15.8	84.7	46.6	6.2	14.1
Other Transfers	5.1	94.3	36.4	1.7	3.2	4.1	90.2	14.4	0.5	1.2
Total				54.4					44.1	
Bolivia										
Formal Wages	22.5	92.9	83.4	17.5	29.0	24.3	85.7	68.6	14.3	29.9
Informal Wages	23.8	80.8	61.2	11.7	19.5	21.3	80.7	47.9	8.2	17.2
Self-Employment	38.7	75.4	70.4	20.5	34.1	43.4	70.6	65.4	20.1	42.0
Capital	4.1	98.3	85.7	3.5	5.8	2.6	97.4	70.9	1.8	3.7
Contributive Transfers	3.4	98.2	76.8	2.6	4.3	3.2	97.4	67.6	2.1	4.5
Other Transfers	7.5	93.3	63.2	4.4	7.3	5.2	87.5	28.8	1.3	2.8
Total				60.2					47.8	
Chile										
Formal Wages	47.6	73.7	80.2	28.1	53.2	54.7	69.9	79.6	30.4	61.1
Informal Wages	8.4	88.5	35.3	2.6	5.0	6.6	91.6	33.6	2.0	4.1
Self-Employment	19.7	89.7	69.3	12.2	23.1	18.5	89.0	64.3	10.6	21.3
Capital	0.5	99.6	81.7	0.4	0.8	2.1	98.1	76.2	1.6	3.2
Contributive Transfers	7.0	92.6	56.5	3.7	7.0	3.7	95.7	46.4	1.6	3.3
Other Transfers	16.7	74.2	46.8	5.8	11.0	14.4	75.2	32.3	3.5	7.0
Total				52.9					49.8	
Ecuador										
Formal Wages	27.6	83.5	70.3	16.2	30.4	40.9	80.3	81.4	26.7	54.0
Informal Wages	21.6	76.0	40.1	6.6	12.3	14.9	78.9	22.2	2.6	5.3
Self-Employment	36.7	80.3	71.1	21.0	39.4	30.0	77.3	59.5	13.8	27.9
Capital	5.2	98.6	85.7	4.4	8.3	1.9	98.6	74.8	1.4	2.9
Contributive Transfers	2.7	97.4	63.9	1.7	3.2	5.7	96.3	71.5	3.9	7.9
Other transfers	6.2	94.2	59.0	3.4	6.5	6.6	83.2	19.3	1.1	2.2
Total				53.3					49.5	
Uruguay										
Formal Wages	43.2	69.7	70.8	21.3	44.6	50.0	64.7	70.3	22.7	53.8
Informal Wages	4.2	89.2	2.1	0.1	0.2	3.4	92.1	4.1	0.1	0.3
Self-Employment	18.4	86.4	61.0	9.7	20.3	19.1	85.9	57.6	9.4	22.3
Capital	3.3	98.1	80.1	2.6	5.5	3.1	97.5	78.7	2.4	5.7
Contributive Transfers	25.8	81.5	63.7	13.4	28.0	20.1	81.9	50.3	8.3	19.6
Other Transfers	5.1	84.8	15.3	0.7	1.4	4.4	78.9	-19.9	-0.7	-1.6
Total				47.7					42.3	

Source: Household Surveys.

other things being equal. We are then able to classify income sources as equalizing or unequalizing in marginal terms.

Equation (6) shows the derivation of this marginal effect. Figure 3 presents the marginal effect of each income source. In all countries, formal wages appear to gain importance in both years, and their marginal effect increases by the end of the period, except in Bolivia. Informal wages, on the contrary, appear to have an equalizing effect in all countries. Both formal and informal wages exhibit relatively high Gini indexes. However, informal wages tend to be associated mainly

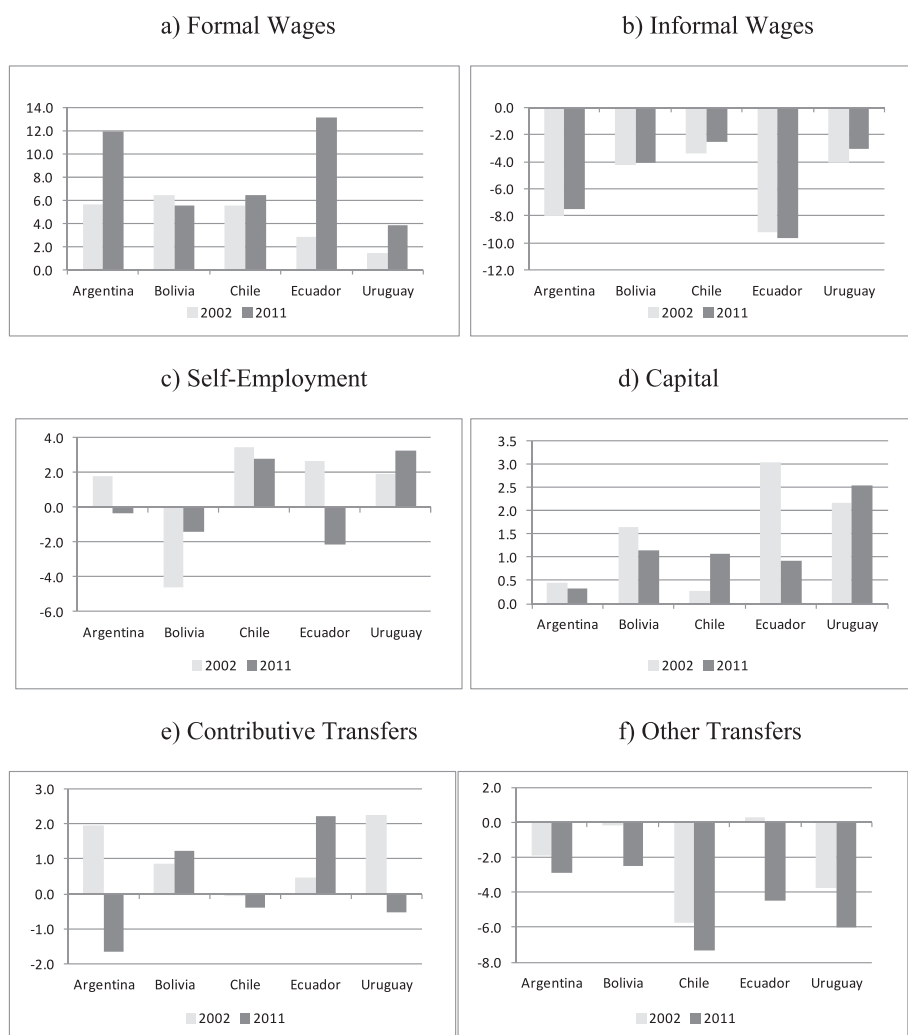


Figure 3. Marginal Effects on Gini Coefficients by Income Source 2002 and 2011
Source: Household Surveys.

with poor individuals, and their correlation with total income is smaller. This explains the different marginal effects of both sources.

The marginal effect of the other income sources, apart from wages, tends to be smaller. Self-employment income appears to be an unequalizing source in Chile and Uruguay, whereas it has an equalizing effect in Bolivia—where self-employment accounts for 38 percent of total employment. In Argentina and Ecuador, self-employment income went from being an unequalizing source of income around 2002 to being an equalizing one in 2011. Capital contributes to increasing inequality in all countries. The magnitude of its effect has increased in Chile and Uruguay over the last decade.

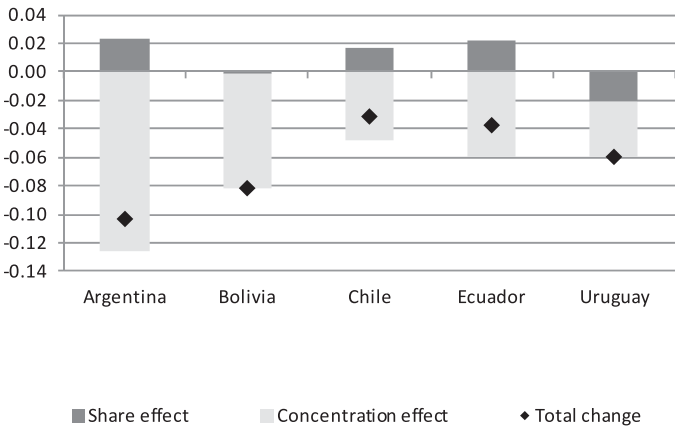


Figure 4. Dynamic Decomposition of Changes in the Gini Coefficient—Share and Concentration Effects 2002–2011.

Source: Household Surveys.

The results are more heterogeneous regarding contributive transfers. These transfers constitute an unequalizing source of income in Bolivia and Ecuador, whereas they have an equalizing effect in Chile and, by the end of the period, also in Argentina and Uruguay. In these two countries, the marginal effect of other transfers is equalizing, and its magnitude is significant in Chile and Uruguay. In all countries, the equalizing effect of these other transfers—mainly non-contributive transfers—has increased over the last decade, which is consistent with the expansion of non-contributive transfers and improved targeting.

In order to analyze how each income source affected the total variation in the Gini index, we performed a dynamic decomposition (see Equation (4)). The total change in the Gini index, as well as the impact of each income source, can be decomposed into a share effect and a concentration effect. Regarding the overall decomposition, we find that changes in the Gini in all countries were mainly driven by the concentration effect, as the share effect was actually unequalizing for three countries out of five (namely Argentina, Chile and Ecuador, as shown in Figure 4 and Table A.3).

A more detailed analysis reveals the contribution of each income source. Formal wage inequality has contributed to increasing total income inequality (Figure 5 and Table A.3). Despite the fall in inequality among formal workers, as described previously, formal wages have contributed to inequality because of their increasing share in total income. In all countries, informal wages contributed to the decrease of inequality, in particular in Bolivia and Ecuador, and not so much in Uruguay. Self-employment income contributed significantly to the reduction of inequality in Ecuador and to a smaller extent in Argentina. As for contributive transfers, they were important in explaining the fall in inequality in Argentina and, to a greater extent, in Uruguay.¹⁵

¹⁵Decompositions of the half squared coefficient of variation yield similar results to the ones derived from Gini decompositions. These results are presented in Table A.4.

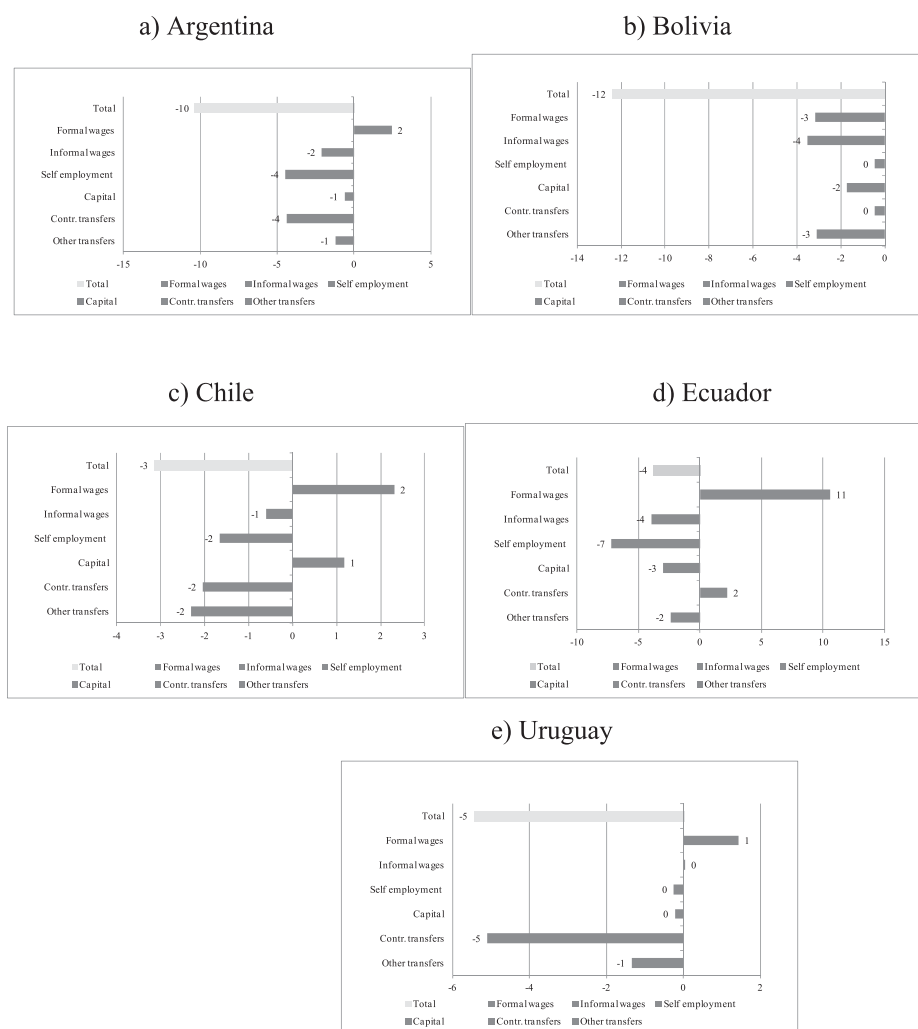


Figure 5. Contributions of Income Sources to Changes in the Gini Coefficient 2002–2011
Source: Household Surveys.

In general, the concentration effect contributed to lowering inequality for all sources, including formal wages. In this case, the overall unequalizing effect is driven by the share effect (see Figure A.1).

6. FINAL COMMENTS

The analysis presented throughout this article sheds light on the impact of different income sources on inequality in Latin America. In all countries under consideration, formal wages account for a significant part of inequality. Self-employment and, to a lesser extent, informal wages also contribute to inequality. In addition, the decrease in the Gini index in all countries was mainly driven by a

concentration effect,—which reflects lower levels of concentration within each income source—while the share effect had a minor role or was even unequalizing. Our analysis of the impact of each source indicates that formal wages contributed to increasing inequality, even though their level of internal inequality decreased. This is due to the fact that they constitute a mostly unequalizing force, whose share in the total income has increased. In all countries, informal wages contributed to the decrease of inequality, in particular in Bolivia and Ecuador, and not so much in Uruguay. Self-employment income contributed significantly to the reduction of inequality in Ecuador and, to a lesser extent, in Argentina. As for contributive transfers, they were important in explaining the fall in inequality in Argentina and, to a greater extent, in Uruguay.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web-site.

Appendix

Table A1: Main Characteristics of Household Surveys

Table A2: Inequality Indexes and Confidence Intervals

Table A3: Dynamic Decomposition of Changes in the Gini Coefficient—Share and Concentration Effects by Income Source 2002–2011.

Table A4: Contributions of Income Sources to Changes in the Coefficient of Variation. 2002–2011.

Figure A1: Dynamic Decomposition of Changes in the Gini Coefficient—Share and Concentration Effects by Income Source 2002–2011.