

# Functional Inequality in Latin America: News from the Twentieth Century

Pablo Astorga Junquera

## 1 Introduction

Two things are certain about income inequality in Latin America: first, that inequality reached very high levels in the closing decades of the twentieth century, and, second, that it has shown a broadly shared narrowing trend in the last 10 years or so of this century.<sup>1</sup> This evidence, based on comprehensive and largely consistent household budget surveys, raises crucial questions. Those concerned about the future are keen to know if this is a sustainable and lasting improvement that can survive the end of the recent commodity boom that has helped to finance redistributive policies. Those studying long-term inequality and its determinants would like to know whether inequality has always been high—a structural feature of these societies, or rather whether the structural transformation and changes in development policies have been key forces shaping the inequality outcome in the region.

According to the dominant view of the institutionalist approach (Engerman and Sokoloff 2000; De Ferranti et al. 2004), the story of a highly unequal region largely reflects the persistence of the actions and omissions of the Iberian colonisers. However, this claim is somehow at odds with evidence that Latin American countries in the pre-industrial era were not especially unequal in an international comparison (Dobado and Garcia 2010; Milanovic et al. 2011). Also, inequality estimates during the First Globalisation show a rising trend from circa 1870 to 1920 in countries in the Southern Cone (Williamson 1999; Willebald 2011; Arroyo 2013), indicating that the region's relatively high inequality is mainly a late nineteenth-century

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<sup>1</sup>Income inequality in Latin America since 1980 or so has been widely studied. Some of the key contributions are Morley (2000), López and Perry (2008), López-Calva and Lustig (2010), Székely and Sámano (2012), Gasparini et al. (2011) and Birdsall et al. (2011). Urrutia (1975) surveys inequality studies and data in Colombia, Mexico and Venezuela covering the middle decades.

P.A. Junquera (✉)

Instituto Barcelona de Estudios Internacionales (IBEI), Barcelona, Spain

phenomenon—though conditioned by inherited structural features. The latest revisionist contribution is Williamson (2015) who, adopting a comparative perspective, argues that the colonial inequality burden is a myth. Myth or not, concerns about this burden seem to have been overemphasised in the literature at the expense of focusing on the influence of forces acting in a more recent period. It is as if, when trying to understand certain characteristics of a child, we give priority to investigating the lives of the great grandparents and fail to ask basic questions about the parents and the sort of upbringing they provided.

Therefore, without assuming that the Big Bang occurred in 1900, this study will focus on inequality in the twentieth century and possible explanatory factors acting within this period. Here there are interesting inequality stories that we would like to explore in the light of a new historical dataset. First, we consider the implications of the different development and growth strategies implemented over the century (FitzGerald 2008; Prados de la Escosura 2007; Bértola 2005; Frankema 2012). Second, by adopting a functional approach in the construction of our inequality estimates, we are in a position to track the distributional fate of different occupational groups, particularly those of the top earners (dominated by property income) and the earnings of the unskilled. Thus we can study in a broader time frame Palma's (2011) findings of the dominance of centrifugal forces operating in highly unequal middle-income countries (and in particular Chile and Mexico under neo-liberal reforms since the 1970s) that resulted in increasing income polarisation. Third, in a global comparative perspective, this is the century of the "Great Levelling" from 1913 to the 1970s in the leading industrial economies (Atkinson et al. 2011; Lindert and Williamson 2016, Chap. 8). And it is of interest to know whether Latin America experienced a similar phenomenon, and, if not, why not.

In recent years there have been important efforts in quantifying inequality in the region in the longer term. Regarding multi-country studies,<sup>2</sup> Williamson (1999, 2002) teased out developments in inequality by calculating ratios of GDP per worker to unskilled wages in the pre-WW2 period for a set of periphery countries (including Argentina, Brazil, Colombia, Cuba, Mexico and Uruguay).<sup>3</sup> Based on Williamson's inequality ratios and available household-survey Ginis, Prados de la Escosura (2007) constructed pseudo-Ginis over the last century for Argentina, Brazil, Chile and Uruguay (adding Colombia and Mexico since 1913). Frankema (2010) studied the pattern of change in the distribution of labour income shares in Argentina, Brazil and Mexico during the twentieth century, finding that in all three countries the labour income share peaked in the middle decades of the last century. Also Frankema (2012) examines the long-run industrial wage inequality in Argentina, Brazil and Chile based on benchmark industrial surveys and census data.

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<sup>2</sup>At a country level there are long-term inequality series for Uruguay (Bértola 2005) and Chile (Rodríguez Weber 2014). Both studies are valuable inputs to our work.

<sup>3</sup>Bértola et al. (2010) constructed Gini benchmarks (based on census data) for Brazil, Chile and Uruguay. But, unfortunately for our purposes, such benchmarks are far apart and with only one Gini in the twentieth century (1920), so that they do not provide an indication of trends.

However, one important limitation of the above contributions is that they only provide a partial picture of long-term trends, as they either cover a limited period; are based on benchmark years; concentrate on a small sample of countries; or do not make allowances for non-labour income. These limitations make it difficult to provide a comprehensive picture of long-run inequality, particularly one that can link in a consistent manner outcomes from the pre-official statistics period with those of the more recent decades with regular household surveys. Some of these limitations are addressed by FitzGerald (2008) who assembles a consistent set of yearly estimates of earnings for four occupational groups that are used to generate Gini coefficients for the 1900–2000 period for Argentina, Brazil, Chile, Colombia and Mexico. However, one important shortcoming of these Ginis is that they rely on sectoral series of output per economically active person to estimate earning levels in two of the four skill groups. This implies well-functioning markets, a strong assumption for a developing region, particularly during the first half of the last century. Also, sectoral productivity estimates are subject to a large margin of error in the early decades.

Therefore, the first step to study secular inequality and its determinants in the region is to construct consistent and comparable series covering the long run. In this chapter we adopt the approach used by FitzGerald but calculate the Ginis using a newly assembled dataset of real wages for three occupational categories of the labour force (low skilled, semi-skilled and skilled labour). In this way we can offer new yearly series of functional inequality for Argentina, Brazil, Chile, Colombia, Mexico and Venezuela (LA-6) since 1900. Together the LA-6 have accounted for more than 80% of the region's population and income since 1900. Perhaps the main virtue of this work is to put on the table estimates that should inform us about long-term inequality and about differences and similarities across countries. Moreover, the methodology adopted can give a rough indication of the property-labour income split, as well as the relative contributions made by the income share received by the top earners (dominated by non-labour income) and by wage inequality (based on the three wage series).

When dealing with inequality in Latin America it is usually assumed that there exists a broad commonality in both patterns and timing across countries, so that regional averages are representative of individual country performance. Examples of this view include the use of a Latin American dummy in cross-country studies and its interpretation (Barro 2000), or the prominence given to a shared institutional heritage that perpetuates a common path of high inequality in the region (Bourguignon and Morrisson 2002). However, to the extent that country-specific factors have played a dominant role, regional averages might not be representative enough and general claims about inequality in the region would need to be qualified, or indeed avoided, if the dispersion is high. Commonality and divergence are two aspects to which we pay special attention here.

For the sake of brevity, this chapter concentrates on three aspects: the methodology used in the construction of the inequality series; the analysis of the contributions of the top income group, on the one hand, and wage inequality, on the other; and regional averages. We largely leave for a future publication a more rigorous analysis of fundamental forces associated with structural change, factor endowments,

demographic transitions and commodity cycles. The remainder of the chapter is structured as follows. Section 2 summarises the methodology used to construct the functional (between groups) Ginis and provides complementary evidence on the estimation of incomes of the top group. Section 3 presents the new Ginis by country and a comparison with other inequality measures, and looks at the relative contributions of the top income group and of wage inequality. Section 4 presents regional averages. An Appendix includes charts by country.

## 2 Methodology<sup>4</sup>

Our method is akin to that used in the construction of dynamic social tables (combining benchmark years from census data with annual data on income from other sources) for Uruguay (Bértola 2005) and Chile (Rodríguez Weber 2014), as well as social tables (using only selected benchmark years) in pre-industrial societies (Milanovic et al. 2010; Lindert and Williamson 1982).<sup>5</sup> In our case, we rely on annual income series (of overall income and three wage categories) and interpolation between benchmarks for the shares of economically active population (EAP). Following the occupational categories used in ECLAC (2000), for each country we divide the EAP into four groups: Group 1 (employers, managers and professionals); Group 2 (technicians and administrators); Group 3 (semi-skilled blue-collar workers, other urban workers in relatively low-productivity sectors such as retailing and transport, and artisans); and Group 4 (rural workers and personal service—including domestic servants—plus unskilled urban workers and street vendors). To ensure consistency with the overall EAP series, the labour force in Group 3 is calculated as a residual.

The main rationale for drawing the distinction between the four groups is differences in education levels and skills.<sup>6</sup> This has been a key factor in explaining inequality in the region in recent decades (Morley 2000; Contreras and Gallegos 2011). The reduced number of groups reflects data limitations during most of the period covered, especially on income.<sup>7</sup> Also some arbitrary aggregation is difficult to avoid. For instance, in Group 1 owners of capital and landlords are lumped together with managers and professionals. This group is dominated by non-wage

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<sup>4</sup>For more details on procedure, assumptions, data issues, sources and by-country figures on employment shares and income ratios see the background paper (Astorga 2015a), particularly annexes B and C.

<sup>5</sup>Our method is also in the spirit of the distribution tables (with three main groups: the bottom 50%, the middle 40% and the top 10%) used by Piketty (2014, Part III), although a key difference is that, in our case, the relative size of our income groups varies over time.

<sup>6</sup>The mean years of education by each of the four groups circa 2000 are estimated by ECLAC as 11.4 years for Group 1; 11.2 years for Group 2; 6.5 years for Group 3; and 3.5 years for Group 4.

<sup>7</sup>One example of groupings with higher data demands is Portes and Hoffman (2003) who work with six groups defined by their control over skills and capital and their incorporation into the modern economy.

income, including property income and compensation for labour. Group 2 includes a mix of manual and clerical workers (or blue- and white-collar workers) with comparable years of formal education (e.g. bank tellers, typists, mechanics, turners). Group 3 lumps together urban informal workers with precarious incomes and highly skilled artisans with rather secure employment. Some administrators of micro firms included in Group 2 can have earnings below those of relatively qualified workers in commerce included in Group 3. Finally, Group 4 comprises unskilled rural workers, together with workers in personal services, including domestic services, largely in urban areas.

Based on the four occupational categories we calculate the EAP share of each group ( $n_i$ ), the income share of each group ( $s_i$ ), the mean income in each group ( $y_i$ ) and the ratio of the mean income in each group to that for the EAP as a whole ( $r_i$ ). We have then a functional income distribution defined as

$$\sum_i^4 n_i r_i = 1 \quad (1)$$

The income share for Group 1 ( $s_1$ ) is defined as the residual by subtracting the income shares for the other three groups. This is then divided by the respective proportion of the EAP to yield the group's relative income level:

$$r_1 = s_1 / n_1 = \left\{ 1 - \sum_2^4 n_i r_i \right\} / n_1 \quad (2)$$

The income of Group 1 is likely to capture income from property (profits, dividends, interest, and land and natural resource rents) for all the EAP, together with earnings from highly paid workers.<sup>8</sup> Because of the way it is calculated, the income for this group may be subject to a significant margin of error. However, this method is likely to generate better estimates in Latin America than calculations based on tax data (famously unreliable to gauge income at the top, if available at all) and on household surveys (which are only available for the later period and tend to miss information on top earners). At the end of this section we offer some complementary evidence showing that, in general, our estimates for the first half of the last century are consistent with data available on top earners. Also, in the following section we provide some additional consistency checks for our calculated  $s_1$  based on comparisons with official estimates of property income shares available for the second half of the century.

To estimate mean earnings of the remaining three occupational groups we rely on three real wage series assembled to reflect, when possible, differences in skills: relatively high, medium and low. We use the same deflator (usually the CPI) for

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<sup>8</sup>The long-term evidence in developed economies (Piketty 2014) shows that income from property tends to be concentrated in the individuals included in our top group, which means that the misplacement of property income of individuals included in the middle and bottom groups is unlikely to be significant.

both overall income per worker and wages, so that the ratios are equivalent to those calculated from nominal values. There is a possibility that we are overestimating earnings in Group 3 by assigning the average semi-skilled wage to all workers in the group which is calculated as a residual and is likely to include workers in the informal sector. We performed sensitivity analysis to our inequality results by assigning the minimum urban wage to the estimated informality share post-1950,<sup>9</sup> and found no significant impact.

The methodology used to estimate gross income inequality is subject to a number of potential measurement biases associated with the subsistence economy and the unemployed. As to the size of the subsistence economy there is little systematic and consistent evidence for our countries which could be used to make a correction. Subsistence agriculture was particularly important in the early decades of the last century in Brazil, Colombia, Mexico and Venezuela, and less so in the relatively more advanced and urbanised economies of Argentina and Chile (Berg 1970). To the extent that the measured overall income underestimates the subsistence economy, our estimates are biased against inequality because it would reduce the actual size of Group 1's income, which is calculated as a residual. However, this potential bias may be offset by the equally likely underestimation of those working outside the market economy in the EAP data. The latter would result in an underestimation of the relative importance of Group 4's earnings and, as a consequence, in higher inequality.

Regarding unemployment, there is a potential bias when estimating earnings at group level. Since the average wage is taken as a proxy for average earnings of the three lower income groups, any variance in the unemployment rate across groups will impart errors in our estimates. Thus at times of high unemployment, our series will overestimate  $r_2$ ,  $r_3$  and  $r_4$ , and underestimate  $r_1$ , underestimating inequality. This problem can be especially relevant during the early years of the Great Depression or during the outbreak of the Debt Crisis in the 1980s. In order to minimise the potential impact of this bias, we calculate deviations of the unemployment rate (where such data are available) from an assumed long-term rate (as a proxy for the natural rate of unemployment) and then adjust our overall income per worker series accordingly.

Table 1 presents a summary of our estimated EAP shares and relative income ratios for the top and bottom groups for selected years. Differences among the countries' EAP shares are largely driven by variations in the urbanisation process, timing of the structural change and improvements in the education level of the labour force. Broadly speaking, Argentina and Chile already had significant urban populations by 1900 reflected in relatively lower values for the economically active persons in Group 4 dominated by low-paid workers in rural areas, whereas according to these estimates, Brazil, Colombia, Mexico and Venezuela started the twentieth century with shares for that group between 65 and 75%.<sup>10</sup> All six countries had inflection points (preceding acceleration) in population growth in the 1930s and in urbanisa-

<sup>9</sup>The average share of urban informality reported for the region during the early 1950s and late 1970s is about 25% (PREALC 1982). We estimate that Group 3 may include 10% and Group 4 15%.

<sup>10</sup>The estimates for the urbanisation rates circa 1900 are Argentina 38%, Chile 34%, Brazil 23%, Mexico 28.3 and Venezuela 11%. The first observation available for Colombia is 30.9% in 1938. Our calculations are based on census data.

**Table 1** EAP shares and relative income ratios, selected groups and years

	Argentina				Brazil				Chile			
	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$
1900	4.0	39.0	11.3	0.42	3.5	72.5	6.9	0.57	6.0	42.1	7.5	0.28
1920	4.3	35.2	12.5	0.32	3.9	69.0	8.4	0.54	5.1	41.9	9.4	0.47
1940	4.6	33.6	10.6	0.34	3.9	64.5	9.1	0.61	5.5	40.9	8.4	0.35
1960	6.2	21.2	8.3	0.32	4.0	55.5	14.0	0.31	7.5	32.5	6.3	0.27
1980	8.3	17.3	6.6	0.17	6.5	43.4	9.8	0.18	9.6	22.7	6.5	0.14
2000	12.1	15.1	4.6	0.22	7.9	31.9	6.8	0.14	13.7	22.0	4.8	0.16
	Colombia				Mexico				Venezuela			
	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$
1900	6.2	65.5	6.7	0.37	3.3	70.8	9.6	0.56	4.1	69.6	7.9	0.41
1920	6.0	60.7	7.9	0.37	3.5	70.8	11.9	0.53	4.6	60.0	7.8	0.37
1940	5.7	56.9	9.0	0.35	2.9	66.0	10.7	0.54	4.2	50.3	7.6	0.34
1960	7.3	48.9	7.9	0.30	4.0	55.3	10.8	0.42	5.8	37.8	10.2	0.20
1980	7.5	39.8	7.4	0.31	7.2	40.5	7.4	0.39	12.5	24.3	5.4	0.24
2000	9.1	36.0	6.5	0.27	9.5	32.4	5.8	0.19	12.3	23.7	4.9	0.28

All figures are 3-year averages except those for 1900 based on 2 years

EAP shares circa 2000 use benchmark from ECLAC (2000) except Argentina which uses ILO's data

tion in the 1940s (earlier in Argentina). Differences in the level of development circa 1900 are also reflected in the timing of the decline of the share of Group 4. The initial share for Argentina and Chile (around 40%) is only reached by 1955 in Venezuela, and around 1980 in Brazil, Colombia and Mexico. This largely reflects different educational realities.<sup>11</sup>

The relative income ratios for the top group tend to show high and rising values during the first half of the last century (especially in Brazil, Colombia, Mexico and Venezuela) and then a decline in the second half. The rising trend indicates a growing share of property income in total income and slow increases in the number of top earners. The falling trend reflects an increase in the numbers of EAP in that group after 1960 or so (reducing the group's income per person engaged) in line with better access to education and a rapid increase in GDP per worker between 1950 and 1970 in most countries (raising the denominator of the ratio). Meanwhile, the ratios of the bottom group are dominated by a steady decline over the century. This is largely the result of increases in the wage of the unskilled lagging behind advances in the overall average income. In absolute terms (not shown), the gains of the average income of the whole labour force compared to the gains in the mean real income or those in Group 4 between the start and the end of the twentieth century were 2.1-fold for the overall income and 1-fold for Group 4 in Argentina; 5.9 and 1.2 in Brazil; 6.2 and 3.1 in Chile, 6.2 and 4 in Colombia; 3.3 and 1.1 in Mexico (circa 1921 vs. 2000); and 6.5 and 3.6 in Venezuela.

<sup>11</sup> According to the Barro and Lee (2011), the average years of schooling and the percentage share of the population without schooling in 1950 were 4.9 years and 15% in Argentina, 2.1 years and 63% in Brazil, 3.7 years and 21% in Chile, 2.3 years and 40% in Colombia, 2.2 years and 45% in Mexico and 1.6 years and 49% in Venezuela.

## 2.1 The Top-Income Group

In this section we provide complementary information for the relative income of top earners. Table 2 presents comparisons for four of our countries. For Brazil we calculate a wage ratio using data for Rio de Janeiro for factory managers and semi-skilled workers (e.g. masons and carpenters) for the period 1900–1930 ( $r_1 proxy$ ), and compare them with our calculated income ratio for Group 1 ( $r_1$ ). Both ratios remain stable up to 1915 and then rise to higher values between 1920 and 1930. This rising trend continues to be a feature of  $r_1$  up to 1950. For Chile (1900–1940) we have two complementary ratios: the mean income of employers (representing about 2% of the labour force) relative to the average wage ( $r_1 proxy_1$ ) and representative salaries of top-rank officials (e.g. ministers and directors)<sup>12</sup> relative to an average of semi-skilled workers in the public sector (e.g. archivist and postman)— $r_1 proxy_2$ . Despite different order of magnitude, both  $r_1$  and  $r_1 proxy_1$  move in line between 1900 and 1930. The comparison between our ratio and  $r_1 proxy_2$  shows values of similar magnitude, but with lower coincidence in trends, perhaps reflecting a more stable wage structure in the public sector.

**Table 2** Top earners' mean income relative to average income (circa values)

	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950
<i>Brazil</i>											
$r_1 proxy$	8.2	7.9	7.8	7.0	9.1	n.a.	9.1	n.a.	n.a.	n.a.	n.a.
$r_1$	6.9	6.8	6.3	5.1	8.4	8.8	8.6	6.7	9.1	11.6	11.5
<i>Chile</i>											
$r_1 proxy_1$	12.1	9.8	17.2	20.9	22.9	23.2	18.0	n.a.	n.a.	n.a.	n.a.
$r_1 proxy_2$	7.0	6.3	6.6	5.6	6.1	5.5	6.3	5.4	5.3	n.a.	n.a.
$r_1$	7.5	7.1	6.0	7.0	9.4	10.6	9.5	10.0	8.4	7.6	7.0
<i>Colombia</i>											
$r_1 proxy$	n.a.	n.a.	5.4	4.5	4.2	4.8	5.0	5.8	5.7	4.4	4.9
$r_1$	6.7	6.9	7.9	8.0	7.9	8.9	8.7	8.0	9.0	8.9	8.7
<i>Venezuela</i>											
$r_1 proxy$	6.0	6.8	6.5	6.3	6.7	6.1	6.4	5.9	n.a.	n.a.	n.a.
$r_1$	7.9	7.4	7.2	10.0	7.8	7.0	6.6	8.7	7.6	7.9	9.3

$r_1$ : Mean income of Group 1 relative to overall income per worker

$r_1 proxy$ , calculated using representative occupations as follows:

*Brazil*: Salary of a factory manager to a semi-skilled worker (Lobo 1978)

*Chile 1*: Earnings per employers relative to average wages from Rodríguez Weber (2014)

*Chile 2*: Salaries of high-rank officials relative to medium salary in the public sector from Rojas (1982)

*Colombia*: Average salary “spokesperson and treasurer” to “doorman” in city councils (López Uribe 2008).

*Venezuela*: Avg. salary of high-rank officials to median government salary (Carrillo Batalla 1999–2003)

<sup>12</sup>Although the employment share of the public sector tended to be relatively small in the early decades (e.g. about 5% in Chile and Venezuela), the salaries paid to high-rank officials could well be representative of earnings in Group 1.

In the case of Colombia (1908–1950) we take as representative earnings for Group 1 the average wage of some high-rank officials in local government divided by the wage of low-skilled occupations in local government. Both series show higher ratios for the period 1925–1940 compared to early values. For Venezuela (1900–1936), we use the average wage of top officials in ministries divided by the median income in the central government. Although both ratios show similar order of magnitude, the proxy ratio shows no trend—again likely to reflect a more stable wage structure in the public sector. In sum, this complementary information on top earners does not show any significant divergence from our calculated relative incomes for Group 1 in the four countries.

### 3 Functional Inequality

The between-group inequality component (Lambert and Aronson 1993) is calculated as

$$Gini\_b = \sum_{i=2}^4 \sum_{j=1}^{i-1} n_i n_j |r_i - r_j| \quad (3)$$

We assume that all individuals within a group earn the mean income of such a group, so that the within inequality component is zero.<sup>13</sup> Elsewhere (Astorga 2015a), we offer some estimates of within-group inequality for selected periods from various sources (including ILO’s October Enquiry) for Argentina (1936–1976), Brazil (1911–1937), Chile (1938–1971), Mexico (1936–1982) and Venezuela (1940–1982). This complementary evidence shows that geographical dispersion in earnings rose from early to the middle decades, and thus played a role in boosting group inequality. Data available for Brazil and Mexico confirms this. The evidence available for the middle decades (mostly for wage dispersion in Groups 3 and 4) also suggests that within-group inequality trends reinforced those in between-group Ginis. Bértola (2005) and Rodríguez Weber (2014) also found such reinforcing trends in Uruguay and Chile, respectively. In short, we think that the latter measure is a reasonable proxy for trends in overall functional inequality.

#### 3.1 Comparison with Other Inequality Measures

Figure A.1 presents our functional Gini series (*Gini\_b*) as 5-year, centred moving averages. We also plot three additional inequality measures. First, available household income inequality Ginis (*Gini\_hs*):<sup>14</sup> Note that our inequality series exclude

<sup>13</sup>Relying on between-group inequality is a common feature in inequality studies covering the long run (Milanovic et al. 2011).

<sup>14</sup>Thorp (1998, Statistical Appendix), Székely and Sámano (2012) and ECLAC website.

taxes and transfers, whereas the household Ginis are usually based on disposable income. Secondly, the inverse of the Williamson ratio (*W-ratio*) from 1900 to circa 1940 in Argentina, Brazil, Chile, Colombia and Mexico. And, third, Frankema's Theil index of inter-industry inequality (*F\_ind*, with a fitted moving average line).<sup>15</sup> In Chile we add the income Gini series estimated by Rodríguez Weber (2014). In the case of Mexico, because of data limitations and the distortions caused by the hyperinflation during the revolution, we estimate separately the earnings Gini for the 1900–1910 period. Thus the pre-1910 levels are not fully comparable with those after 1921.

The comparison with the household Ginis from a more recent period serves to assess the capacity of our between-group Ginis to reflect the trends in overall personal income inequality. For the years from 1950 to 2000, our series correlate reasonably well with *Gini\_hs*, especially for Brazil, Chile and Colombia. This gives us some reassurance that our between-group trend estimates during the first half of the last century are also good proxies for personal inequality trends. The association between both series in the first decades of this century is poor for Venezuela, which may be explained by the fact that our Ginis do not reflect the impact on inequality of recent social transfer programmes (Roberts 2012).

On the other hand, the correlation between *Gini\_b* and the *W-ratio* (1900–1940) is mixed, with Argentina and Mexico offering the best fit, confirming a rise in inequality up to about 1920, whereas in Brazil and Chile there are important discrepancies in the trends of both measures. Overall, this evidence does not offer unambiguous support for claims that the final years of the First Globalisation episode brought about a significant increase in inequality.

Intra-industry inequality also correlates well with our between-group inequality trends, especially for Argentina and Mexico. In Brazil both measures rise from 1920 up to the 1980s (with an inflection point in the mid-1930s likely to reflect the industrialisation plus urbanisation process), but then diverge during the last two decades of the last century or so. In Colombia the limited number of observations for *F\_ind* shows an upward trend between the early 1960s and the late 1990s, a trend also apparent in *Gini\_b*. And in Mexico, the acceleration in *F\_ind* during the 1990s (likely to be associated with the country's incorporation into NAFTA in January 1994) is also in line with the rising trend in *Gini\_b*. Overall, rising inequality since 1960 or so in both measures suggests that skill-biased technological change was a contributing force (either by stretching the wage structure or by boosting profits)

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<sup>15</sup>We calculate the ratio (1913=1) GDP per capita to real unskilled wage using Williamson (1998). In Brazil we present only the ratio for the Southeast region. For intra-industry inequality we calculated an index (1996=1) using original data in Frankema (2012). We drop an outlier observation in 1984 for Chile. Both indices are plotted on the right-hand side scale of the charts, whereas the two Ginis are on the left-hand side. We are not including the pseudo-Ginis series in Prados de la Escosura (2007) because they are largely a combination of the Williamson ratios and the household Ginis, both included in the charts.

particularly during the closing decades of the last century, which was dominated by more open economies and trade liberalisation.<sup>16</sup>

Some additional comments are in order about our calculations for Brazil and Venezuela. Our *Gini<sub>b</sub>* for Brazil shows a relatively low and trendless level up to about 1930 (though with significant fluctuations). This outcome is consistent with evidence from the 1920 population census of a large share of the labour force (about 80%) being rural, illiterate and low skilled (Bértola et al. 2009). Under such circumstances, it is likely that the maximum feasible income Gini was relatively low but that the extraction rate was relatively high, reflecting the fact that poorer societies have a smaller surplus for the elite to extract (Milanovic et al. 2010). The Brazilian daily wage data in rural areas available for the benchmark years 1911, 1921 and 1936 (IBGE) indicate a relatively stable wage structure. A stable wage structure is also confirmed by urban wage series in Rio de Janeiro during the first three decades of the twentieth century (Lobo 1978), as well as by data assembled by Ball (2013) for industrial workers in selected firms in São Paulo from 1891 to 1930.

There is scant earnings data prior to 1936 for Venezuela, so our estimates for those years should be taken as a gross approximation. According to Valecillos (2007: 103), the general picture of the labour market is one dominated by roughly constant wages and stable wage structure up to the mid-1930s when wages started to rise gradually, driven by the growing importance of the oil industry. This situation is consistent with a roughly stable inequality shown by our Gini in the early period. According to De Corso (2013), GDP per worker rose 1.1 times between 1905 and 1922, pointing to a relative increase in the remuneration to land and capital during the period, but not enough to result in a clear rising trend in functional inequality until the oil sector was in full swing.

### 3.2 *The Top-Income Group and the Rest*

Here we focus on the relative contributions to inequality of the income share of Group 1 (capturing concentration at the top) and a Gini coefficient of the three wage groups (capturing developments in the wage structure). Following Alvaredo (2010), the overall Gini coefficient can be expressed as

$$Gini = Gini^{Top} n_1 s_1 + Gini^{Rest} (1 - n_1) (1 - s_1) + s_1 - n_1, \quad (4)$$

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<sup>16</sup>Scholars studying the wage structure in the region based on evidence for the middle decades of the last century already stressed the tendency of the leading industries to pull up the general level of wages in the rest of the economy, with the oil or mining industry (Chile, Venezuela) as prime examples (Berg 1968, 4). For Colombia, Cárdenas and Bernal (1999) found that during the period 1976–1996 both trade liberalisation and skill-complementary technological change had a positive impact on skill premia in manufacturing and, in turn, on inequality.

where  $s_1$  and  $n_1$  are the income and population shares of the top group and  $Gini^{Top}$  and  $Gini^{Rest}$  are the Gini coefficients for the top group and for the rest of the population, respectively. For  $n_1$  sufficiently small, (Eq. 4) can be approximated as

$$Gini = Gini^{Rest} (1 - s_1) + s_1, \quad (5)$$

In our case, because of lack of data  $Gini^{Top}$  is equal to zero anyway, and  $Gini^{Rest}$  is approximated by the between-group Gini coefficient of the three wage groups ( $Gini_w$ ). Thus, the overall Gini in (Eq. 5) becomes the between-group Gini (as in Eq. 3) and can be expressed as

$$Gini_b = Gini_w (1 - s_1) + s_1. \quad (6)$$

This decomposition makes it possible to separate the action of the forces affecting property and labour income, a distinction that is missing in Gini coefficients based on household income data. Labour income inequality is driven by demand and supply conditions in the labour market, as well as by institutional factors such as minimum wage legislation or the action of unions. Ultimately, they are influenced by changes in technology, international trade, structural change and developments in human capital formation. In the case of property income, the usual dominant forces are savings and investment behaviour, inheritance laws and rate of return to wealth. Unambiguous inequality trends emerge when there is a falling top-income share and wage compression, or rising top-income share and wage expansion, occurring simultaneously.

Figure A.2 offers time series on  $s_1$  ( $GI\%$ ) together with  $Gini_b$  and  $Gini_w$ . For comparative purposes we are also including available official estimates for the property income share or, when this is not directly available, the complement of the labour share ( $Prop\%$ ).<sup>17</sup> Trends in  $GI\%$  and  $Prop\%$  are broadly consistent.<sup>18</sup> The second half of the twentieth century and the 2000s are dominated by upward trends in  $GI\%$ . The rise starts in the early 1940s in Brazil, Colombia and Venezuela; in the late 1950s in Argentina and Chile; and in the mid-1960s in Mexico. Prior to that, the tendency for the secular top-income share was to fluctuate considerably around a trendless mean.<sup>19</sup>

A falling trend in the labour share (or a rising trend in  $GI\%$ ) is a common feature in Latin America during the closing decades of the twentieth century dominated by

<sup>17</sup>The sources are the BCRA (1976) in Argentina 1935–1962, van Ginneken (1979) in Mexico 1950–1967 (our calculation, using labour shares for 1950, 1954, 1958, 1963, 1967 and 1975 from official sources) and the BCV for Venezuela 1957–1997. Otherwise ECLAC website (operating profits).

<sup>18</sup>Also, our proxies for the labour share behave similarly to the labour shares estimated by Frankema (2010) for Argentina (1913–2000), with a 0.69 correlation, and Mexico (1913–2000), with a 0.68 correlation. And it is partly consistent in Brazil (1920–2000), with a 0.76 correlation in the sub-period 1950–1980.

<sup>19</sup>Relatively low values in the early decades in Brazil are likely to reflect an underestimation of income per worker, whereas in Mexico and Venezuela they may reflect an overestimation of wages.

market-friendly reforms.<sup>20</sup> In the cases of Chile and Mexico, Palma (2011) locates the origin of the trend with the emergence of a “scissors” effect between the average real wage and labour productivity. In Fig. A.3 we show equivalent series for our six countries accompanied by the ratio between the mean incomes of Group 1 and Group 4 ( $y_1/y_4$ , or top-bottom ratio).<sup>21</sup> We also found a “scissors” effect in Argentina, Brazil, Colombia and Venezuela, although in the last three cases the gap starts developing before the wave of neo-liberal reforms.

As to the behaviour of the top-bottom ratio, there are rising secular trends in Brazil, Chile, Colombia, Mexico and Venezuela starting in the 1920s or the 1930s. Argentina is the odd case with a steep fall in this ratio from the first half to the second half of the twentieth century (except for the spike in the late 1980s, likely to be associated with hyperinflation and a decreed freeze in wages).<sup>22</sup> The spike in Mexico circa 1950 is consistent with the surge of business opportunities in the country (amid subdued wages) created by the war effort in the USA. In Venezuela the doubling of the ratio in the 1950s is associated with a 1.9-fold rise in oil production and a 25 % increase in oil prices—which peaked in early 1957 during the Suez Crisis (Baptista 1997). Bértola (2005, Chart 9) presents a similar measure in Uruguay showing a significant drop during the mid-1950s and the mid-1960s, followed by a recovery of the ratio later on. In general the evolution of the top-bottom ratio indicates that in most cases the top earners were able to increase—or at least keep—their position relative to the mean income of the unskilled.

### 3.3 Wage Inequality

Secular movements in wage inequality (also reflecting the wage structure) and in the average real wage are plotted in Figs. A.2 and A.3, respectively. The early decades, dominated by export-led growth, are characterised by an expanding or a constant wage structure. This is the case only after 1920 or so for Brazil and Chile. Our evidence is consistent with the claim that during the first export-led growth era, immigration, lack of a well-integrated labour market and coercion (Bulmer-Thomas 1994: 7) undermined the potential of demand-led growth favouring unskilled labour and wage compression (Bértola and Ocampo 2012).

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<sup>20</sup>Falling labour shares is also a common trend in both developed and developing countries since the 1970s or so that has been attributed primarily to globalisation, increased role of financial activity and labour market deregulation (Stockhammer 2013).

<sup>21</sup>The wage series are weighted by the labour shares of Groups 2, 3 and 4. Labour productivity is calculated as GDP at constant prices divided by overall EAP. The timing of the scissors effect is robust to the use of GDP per worker series using the CPI as deflator.

<sup>22</sup>In the case of Argentina, Alvarado (2010) estimates the top 1 % income share for the period 1932–1972 and 2002 using tax data. This share reaches a peak in early 1940s, and then, there is a significant fall from 1947 to 1952 followed by a steady decline to 1972. This pattern is roughly consistent with trends in our top-bottom ratio for the country.

The middle decades were dominated by the import-substitution industrialisation strategy led by the state (Cárdenas et al. 2000). The average real wage experienced a sustained rise in all six countries. There was narrowing wage inequality in Argentina, Colombia, Mexico and Venezuela, but a widening in Brazil and Chile.<sup>23</sup> Wage compression was favoured in some cases by government intervention in the labour market and by the introduction of minimum wage legislation—particularly effective in Argentina, Brazil and Mexico (Méndez 1950; Ericksson 1966: 16–17). Frankema (2012) studied industrial wage inequality in Argentina, Brazil and Chile and found significant differences whose origin lies in the nature of the labour market policies and political developments, particularly in the post-WW2 decades. Whilst in Argentina and Chile major trend breaks can be attributed to political regime changes (with military coups in 1976 and 1972, respectively), in Brazil the process of wage inequality was gradual and in tune with a strong rise of inter-industry labour productivity differentials.

The closing decades show the implementation of market-friendly reforms—including more flexible labour markets—and the return of export-led growth as the dominant strategy. During this period there is a tendency towards a rise in the property income share and a widening in wage inequality, amid falling real wages. This is particularly clear during the “lost decade” of the 1980s marked by rising top-bottom ratios (in most cases, also during the 1990s), indicating that wage earners largely bore the cost of the adjustment. In Mexico widening wage inequality was driven by the trade liberalisation reform of 1985 which affected unskilled labour disproportionately (Hanson and Harrison 1999). Venezuela is the exception with a constant (1980s) and falling (1990s) wage inequality, the causes of which are likely to be found in the growth implosion that occurred after the end of the 1970s which particularly affected wages in the middle groups. In addition, within-group inequality (by educational categories) grew in Argentina and Brazil (Morley 2000).

In general, widening inequality during this period was driven by institutional changes that weakened the power of the unions and by a decline in real minimum wages. The military regimes in place in Argentina (1976–1983), Chile (1973–1990) and Brazil (1963–1980) effectively restricted—or banned—the action of unions, increased flexibility in the labour market and reduced the coverage of the minimum wage as part of the reform agenda (Morley 2000). Unionisation plummeted across the region averaging only 10.7% of the workforce in 2005 compared to a peak of 23% in the 1970s (Roberts 2012). And, according to ECLAC figures, the average real minimum wage for the LA-6 fell, on average, 5.9% per year during the 1980s, followed by a moderate recovery of 1.7% annual growth in the 1990s. In the first decade of the current century wage inequality tended to decline, a trend consistent with that shown by labour earnings Ginis calculated from household surveys (World Bank 2012: 28).

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<sup>23</sup> In addition, evidence on within-group wage dispersion for Groups 3 and 4 in Argentina, Chile, Mexico and Venezuela (Astorga 2015a) points to narrowing or constant wage spreads in the period.

## 4 Regional Averages

In this section we present some regional indices and then proceed to explore whether they tend to reflect commonality or if results are driven by country-specific features. We calculate regional inequality first as the simple average of individual countries using our income Ginis together with a Gini available for Uruguay<sup>24</sup> (LA-7) and, second, as a population-weighted average. Figure 1 (chart on the left) shows 5-year, centred moving averages of the two regional averages for LA-7. We add polynomial fitted lines to reflect secular movements. In addition, we show the simple-average inequality curve for the Southern Cone—Argentina, Chile and Uruguay. This separation is of interest because this group of countries industrialised relatively early and tends to display different inequality-growth dynamics.

The LA-7 averages reveal a secular process resembling a “reclined S”-shaped curve for 1900–2011 with an inflection point around 1940 and a peak in the closing decades. The peak appears a little earlier for the population-weighted Gini. There is a moderate decline in inequality in the early decades driven by developments in Brazil and Colombia (inequality in the Southern Cone remains stable). According to this evidence, the final years of the Belle Époque (1900–1914) were not accompanied by rising inequality. In the middle decades, there was a rise in inequality driven by the latecomer industrialisation (Brazil, Colombia and Venezuela), but inequality fell in the Southern Cone which might be attributed to protectionist policies favouring urban workers and labour policies fostering wage compression. From the 1930s, average inequality rose steeply to a plateau around the “lost decade”, and then declined with the turn of the new century. The “reclined S” shape is more pronounced in the case of the population-weighted series.

Figure 1 (chart on the right) shows the LA-6 simple averages of  $G1\%$ ,  $Gini_w$  and  $Gini_b$ . The early decades of the last century show no trend in either the top group income share or the inequality among the three wage groups. But there are differences after the 1930s. Wage inequality rises less steeply in the 1940s and 1950s followed by a fairly stable wage structure in the 1960s and 1970s. Then there is a relatively rapid rise in wage inequality in the closing decades and wage compression in the 2000s. By contrast, the top-income share accelerates from the mid-1930s to the end of the 1970s, followed by a more moderate rise in the closing decades. What is apparent in Fig. 1 is that trends in between-group inequality were primarily driven by trends in the top group.

The chart on the left of Fig. 2 shows simple averages for the LA-6 of the real wage series for the three lower occupational groups (used to estimate the mean income of each group), and the resulting EAP-weighted average real wage. To facilitate the comparison  $Gini_w$  is also included. Both the average wage ( $wage_{avg}$ ) and wage inequality show a rising trend from the early 1930s up to the 1960s,

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<sup>24</sup>For Uruguay we use Bértola (2005) for the period 1908–1966 and then use Gini values based on household surveys from ECLAC website to complete the series to 2011. The averages during the period 1911–1921 exclude Mexico.

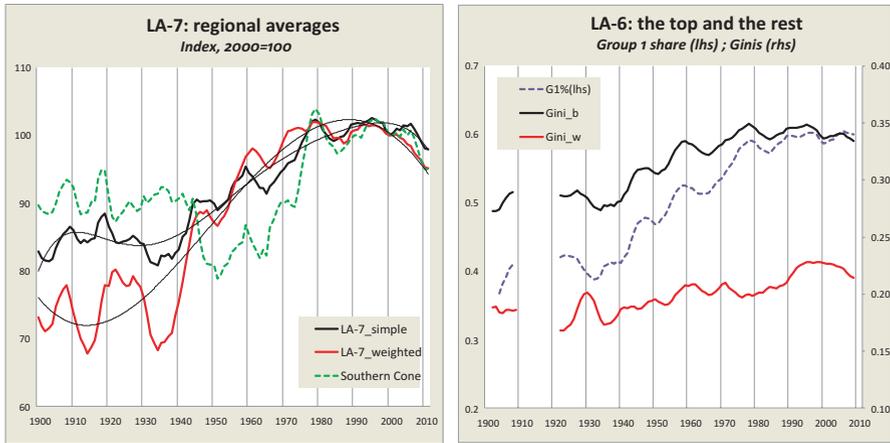


Fig. 1 Regional functional inequality

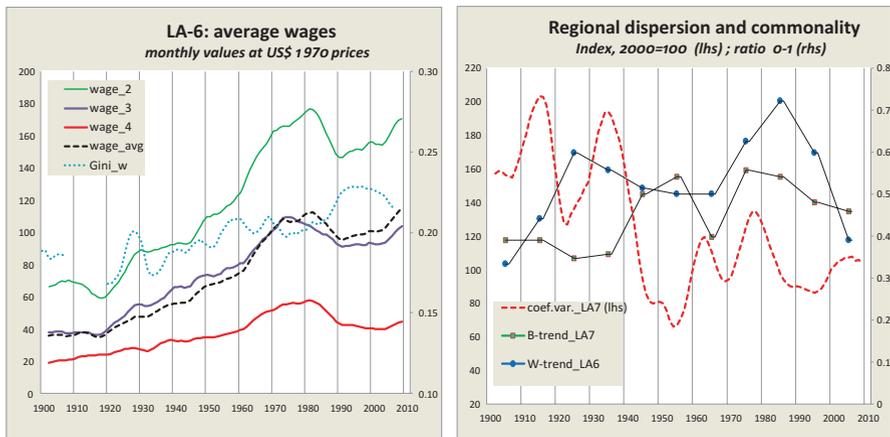


Fig. 2 Regional wages and inequality dispersion

implying that more skilled workers benefited more than the less skilled. In the following two decades or so, the real wage accelerated while the wage structure remained roughly stable, indicating that wage earners benefited more evenly from economic growth.

The closing decades of the twentieth century were marked by falling real wages and widening wage inequality. The average real wage for the unskilled in the LA-6 (*wage\_4*) around 2000 returned to their 1960 levels (and 30% below the peak around 1975). But there was significant labour mobility. The regional EAP share of Group 4 (see Table 1) came down to about 30% in 2000 from about 45% in 1960 and 65% in 1900. Those able to acquire more skills and move upwards to Group 3

did rather better, seeing a 20 % rise in their average real wage (*wage\_3*) between 1960 and 2000 (though the 2000 value is about 15 % below the peak reached around 1975). The average LA-6 worker in Group 2 had a 30 % rise between 1960 and 2000, and a 10 % fall from a peak around 1980.

#### 4.1 Dispersion and Trend Commonality

Figure 2 (chart on the right) includes three measures to account for dispersion in Gini levels and trend commonality. First is the coefficient of variation for the between-group Gini for the LA-7 (*coef.var.\_LA7*, 5-year moving averages). This measures diversion—or convergence—in levels, showing a clear split between two periods: one of relatively high average dispersion 1900–1940 (with a trough in the early 1920s and two spikes of dispersion in the mid-1910s and mid-1930s), and the other of relatively low dispersion 1940–2011 (with a trough around 1950 and two spikes of dispersion in the early 1960s and late 1970s).<sup>25</sup> One possible interpretation of this result is that although the inequality outcome over time differs across the seven countries, this reflects a different timing of a common underlying process (e.g. of a Kuznets-Lewis type) that would eventually lead to a similar end. This interpretation is supported by the outcome of a panel data analysis that reveals important regularities in the LA-6 associated with the action of common fundamental forces (Astorga 2015b).

One drawback of the above measure is that it does not capture commonality or divergence in trends, so that a low value in the coefficient of variation can indicate catching up in Gini levels but with countries undergoing opposite inequality trends (as during the middle decades). To address this limitation, Fig. 2 includes two measures to track the extent of trend commonality or synchronicity over natural decades in the between-group Ginis (*B-trend\_LA7*) and in the wage Ginis (*W-trend\_LA6*). A high value in a given natural decade (shown as an observation in the middle of the decade) indicates that most countries were experiencing similar trends.<sup>26</sup>

Over the century there was higher trend synchronicity in the wage Ginis than in the overall, between-group, Ginis, pointing to a higher level of uniformity in developments in the labour markets (e.g. associated with minimum wage legislation and unionisation) than in the forces affecting incomes at the top. Movements in both

<sup>25</sup>The pattern of between-country dispersion (not shown) for *G1%* and *Gini\_w* resembles that of *Gini\_b*.

<sup>26</sup>The score of trend commonality is calculated in two steps. First, in each country the dominant trend pattern in each decade is identified (rising, constant, falling, or a combination of these options). Then, the number of times that a given pattern occurs is added up, assigning a “1” for a dominant trend over a given decade or a “0.5” when there are two salient patterns (e.g. for the *B-trend\_LA7* in the 1980s: rising=4.5; constant=0, falling=2.5). Those partial results are multiplied by itself and then added up to obtain an overall score (4.52+02+2.52=26.5). Finally, the overall score is divided by the maximum possible score (26.5/49=0.54). See more details in Astorga (2015a, Table B-3).

trend measures show diverging trends in the first half of the twentieth century (consistent with high values for the coefficient of variation) but a clear move towards synchronicity during the second half. Overall, based on this evidence, the 1970s and the 1980s come out as the decades with the highest commonality in inequality trends.

## 5 Conclusions

We have presented new estimates of functional income Ginis for the period 1900–2011 covering six Latin American countries, which use newly assembled wage series for three occupational categories. It offers a consistent and comprehensive view of long-term inequality. Our method and the data have their limitations, so our findings need to be corroborated by future research. That said, the key findings can be summarised as follows:

Secular trends as well as fluctuations in inequality across the twentieth century exhibit important country variations, particularly prior to 1960. Our series do not show a shared inequality rising trend during the end of the Belle Époque, and reveal mixed results in the middle decades. But by the early 1960s inequality was on the rise in most countries reaching a peak in the closing decades of the last century amid the implementation of the “Washington Consensus” policies. The regional Gini averages (simple and population weighted) of the LA-7 show a “reclined S” shape with an inflection point around 1940 and a peak in the 1990s (a decade earlier in the population-weighted curve).

Our evidence on relative incomes and employment shares is broadly consistent with the Kuznets-Lewis thesis. The early decades were characterised by a high proportion of rural unskilled labour with polarised income between them and those at the top, largely reflecting disparities between capital or land owners and low-skilled landless workers. As the structural change got underway, and labour moved from low to higher productivity sectors, wage inequality rose. It was expected that the urban labour force would improve their educational levels and skills, whilst the fall in the rural workforce and the modernisation of agriculture would bid up their wages. However, there is a well-known twist to the standard Kuznets-Lewis process in Latin America. Industrialisation stagnated in the final quarter of the last century and workforce growth swelled the urban informal sector creating the conditions for worsening inequality.

There is an absence of episodes in which falling property shares and wage compression reinforced each other, generating a sustained fall in inequality. The tendency for wage compression, or slow wage expansion, during the decades of industrialisation under protection suggests that potentially dis-equalising forces—arising from still limited access to education and a delayed demographic transition favouring returns on skills—were curbed, particularly in the Southern Cone, by government intervention in the labour market, unionisation and workings of mini-

imum wage policies. However, overall, they could not offset the action of centrifugal forces boosting disparities between those at the top and the rest of the distribution.

Inequality in the twentieth century is a story of increased polarisation but at the same time one of significant social mobility. For the LA-6 as an average, the estimated mean real income of top earners rose from 17 times the income of the unskilled around 1900, 30 times around 1970 and 27 times around 2000. Those at the top experienced a 3.3-fold rise in their mean income between 1900 and 2000 far above the 2.4-fold increase of those at the bottom. A second key development was the expansion of the middle groups, which went from about 32 % of the overall EAP at the start of the century to 62 % by the end. The mean income of those at the middle grew 2.9-fold between 1900 and 2000. But in all three occupational wage groups the absolute mean income at the end of the century was no higher than that of about 1970.

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## 6 Appendix

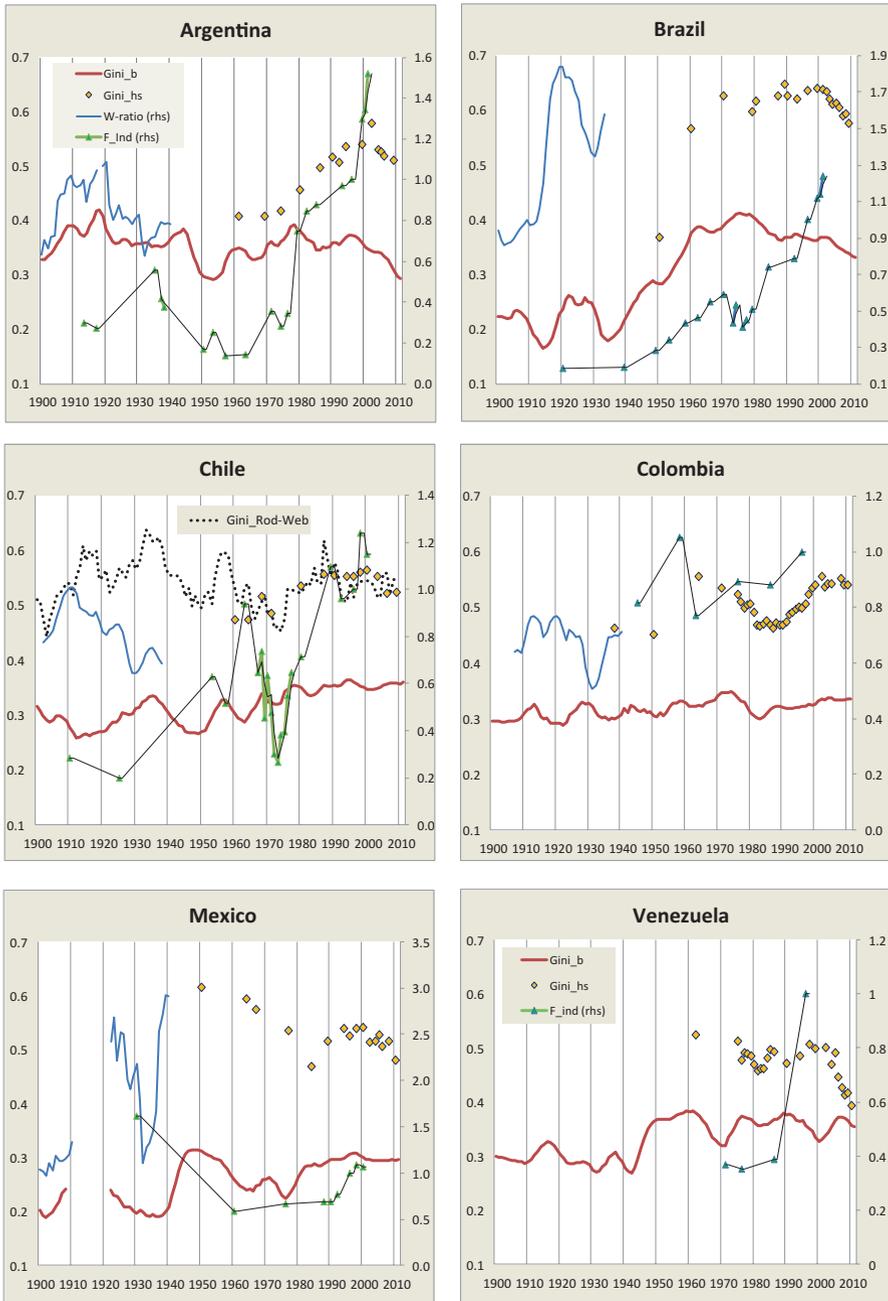
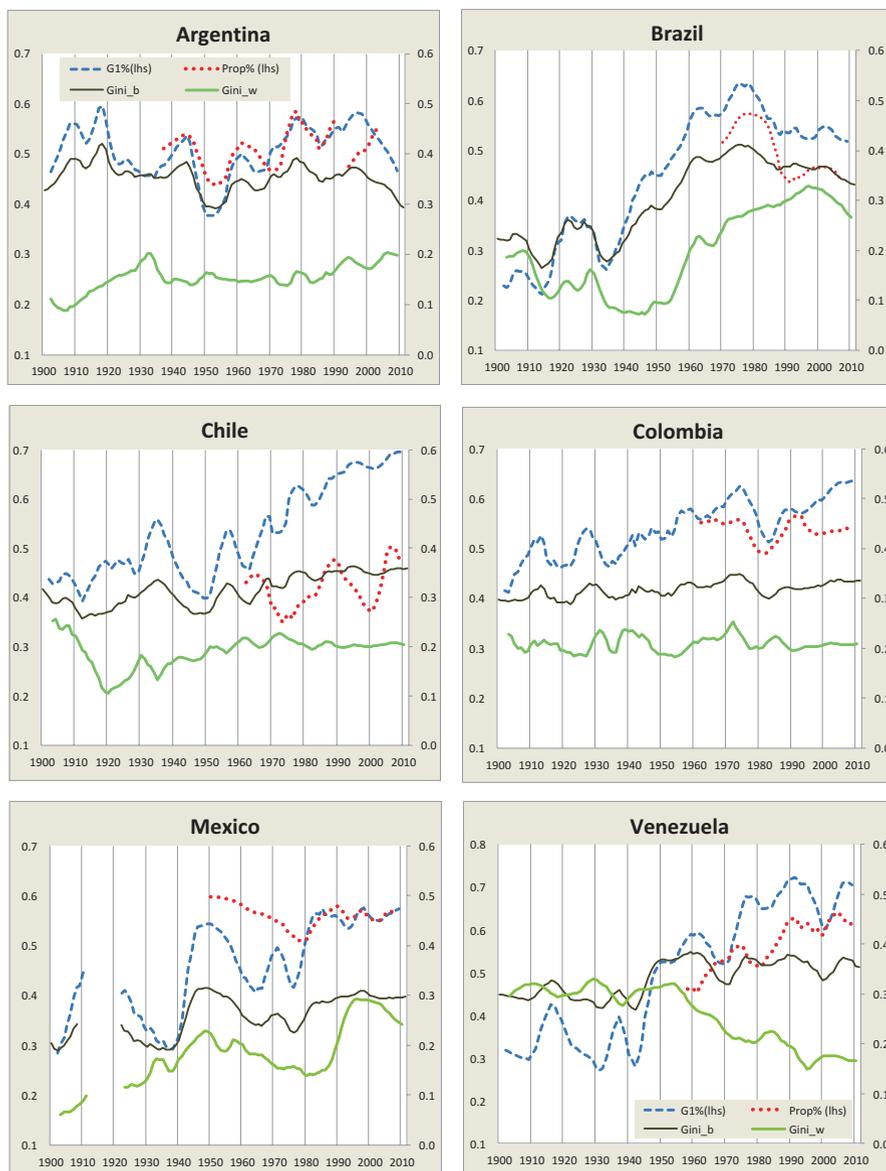


Fig. A.1 Inequality measures by country (lhs axes: Gini coefficients; rhs axes: ratios)



**Fig. A.2** Concentration at the top and wage inequality (lhs: shares; rhs: Gini coefficients; all series 5-year m.a.)

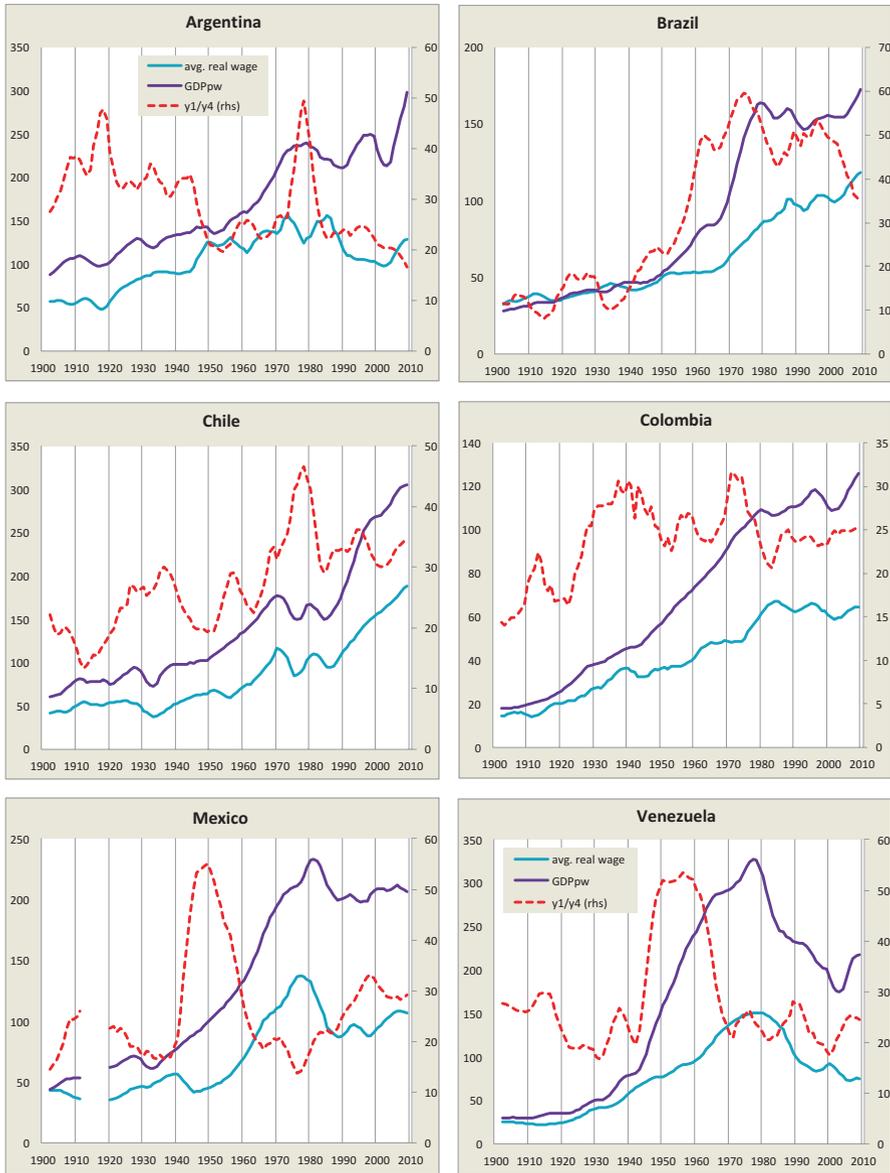


Fig. A.3 Average wage, GDP pw and top-bottom ratios (lhs: US\$ per worker/month, 1970 prices; rhs: ratio; all series 5-year m.a.)

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**Pablo Astorga Junquera** is Research Fellow at the Barcelona Institute of International Studies (IBEI). Previously, he was Senior Economist at Oxford Economics and researcher at the Latin American Centre in Oxford. His research has focused on the economic development of Latin America over the long run, including income inequality, economic growth, and productivity. He holds a D.Phil. in Economics and an M.Sc. in Development Economics from Oxford University.



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