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**FUNCTIONAL INEQUALITY IN LATIN  
AMERICA: NEWS FROM THE  
TWENTIETH CENTURY**

**Pablo Astorga**

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

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## Abstract

This paper presents a new consistent yearly series of gross income (between-group) inequality Ginis for four occupational categories in Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela over the period 1900-2011 using a newly assembled wage dataset. The approach used differentiates labour by skill level and allows for changing allocation of the labour force over time. Profits and rents are calculated as a residual. Our regional Gini shows a changing secular process with a reclined “S” shape with an inflection point around 1940 and a peak in the 1990s. There are mixed country trends in the early and middle decades, but in most cases inequality was on the rise in the 1960s. There was also a tendency for narrowing wage inequality in the middle decades of the last century – at the time of the Great Levelling in the developed economies – but whose impact was more than off-set by a rising share of the top group. Inequality in the 20th century is a story of increased polarisation - particularly post 1970 – amid significant social mobility.<sup>1</sup>

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## 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 20th century, and, second, that it has shown a broadly shared narrowing trend in the last ten years or so of this century.<sup>2</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, 2002; 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., 2010). 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 19th century 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 nor not, concerns about this burden seem to have been over emphasised 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 20th century and possible explanatory factors acting within

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<sup>2</sup> Income inequality in Latin America since 1980 or so has been widely studied. Some of the key contributions are Morley (2000); López & Perry (2008); López-Calva & Lustig (2010); Székely & Sámano (2012); Gasparini et al. (2011), Birdsall, et al. (2011). Urrutia (1975) surveys inequality studies and data in Colombia, Mexico and Venezuela covering the middle decades.

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 capital income) and the earnings of the unskilled. Thus we can study in a broader time frame Palma (2011)'s findings of the dominance of centrifugal forces operating in highly-unequal middle income countries (and in particular in 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 & Williamson, 2015, ch. 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>3</sup> Williamson (1999, 2002) teased out developments in inequality by calculating ratios of GDP per worker to unskilled wages for the pre-WW2 period for a set of countries in the periphery (including Argentina, Brazil, Colombia, Cuba, Mexico and Uruguay).<sup>4</sup> Based on Williamson's inequality ratios and available household-surveys 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 20th 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.

However, one important limitation of the above contributions is that they only provide a partial picture of trend behaviour and inflection points over the long term, as

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<sup>3</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>4</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 XX<sup>th</sup> century (1920), so that they do not provide an indication of trends.

they are either covering a limited period; 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 constructs a consistent set of yearly estimates of earnings dispersion 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 earnings levels in two of the four skills 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 paper 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 (including wage series for low skilled, semi-skilled and relatively 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 our work is to put on the table a continuous set of estimates that could inform about long-term inequality and to examine differences and similarities across countries. Moreover, the methodology adopted can give a rough indication of the capital-labour 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).

Regarding the potential for regional variety, 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 stories. Examples of this view include the use of a Latin American dummy in cross country studies and its interpretation (Ahluwalia, 1976; 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 paper concentrates on three aspects: the methodology used in the construction of the inequality series; the analysis of the contributions of the top earners, on the one hand, and wage inequality, on the other; and aggregate regional outcomes. We deal in a separate paper with the description of the wage dataset together with analysis of key issues of the labour market such as the role of education and wage convergence across the LA-6.<sup>5</sup> Also, we largely leave for future research a more rigorous analysis of fundamental forces such as structural change, urbanisation, trade regimes, commodity cycles, as well as a more detailed discussion on labour market policies.

The remainder of the paper is structured as follows. **Section Two** summarises the methodology used to construct the functional (between groups) Ginis and provides complementary evidence on the estimation of incomes of the top earners. **Section Three** presents the new Ginis by country and a comparison with other inequality measures available, and looks at the relative contributions of the top group (including capital income) and of wage inequality. **Section Four** includes some evidence on within-group wage dispersion and its potential implications for overall inequality. **Section Five** presents regional aggregates and discusses commonality and differences. Finally there is a section of **Conclusions**. **Annex A** includes figures by country on: inequality measures; the income share of the top group and wage inequality; average wage, overall income per worker and top-bottom income ratios; within-group wage dispersion; and real wages and income per-worker series. **Annex B** includes tables on employment shares and relative incomes by decades, as well as on trend commonality. **Annex C** includes details on the estimation of employment shares and the overall income series, as well as on the construction of the wage series.

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<sup>5</sup> More details can be obtained from the author.

## 2. Methodology

Our method to estimate inequality 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>6</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 collars 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>7</sup> This has been a key factor in explaining inequality in the region in recent decades (Morley, 2000; Contreras & Gallegos, 2011). The reduced number of groups reflects data limitations during most of the period covered, especially on income.<sup>8</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 income, including capital 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.

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<sup>6</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>7</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>8</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.

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:

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

The starting point in the construction of the yearly values for the EAP shares are ECLAC's figures for circa 2000. Then we move backwards following two estimating procedures. First we use all available data on the distribution of the EAP by occupational groups reported by the International Labour Organisation (ILO) and PREALC (1982) in order to estimate our four employment shares back to 1950 in most cases. To complete the employment shares back from 1950 to 1900 we rely on three indicators constructed by FitzGerald (2008). See Annex C.1 for details.

Regarding overall income estimates, there are available figures on national income for the six economies (see Annex C.2) in the period 1950-2011. We extend these series back to 1900 using rate of growth of gross domestic product (GDP). Note that during those years, to the extent that they are reflected in the annual rate of growth of GDP, our measure of income (both in terms of levels and per worker) includes profits of foreign companies. The income share for Group 1 ( $s_1$ ) is defined as the residual by subtracting the incomes 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:

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

The income of Group 1 is likely to capture income from capital (profits, dividends, interest, and land and natural resource rents) for all the EAP, together with earnings from highly paid workers.<sup>9</sup> Because of the way it is calculated, the income for this group may be subject to a significant margin of error, however, in Latin America this method is likely to generate better estimates than calculations based on tax data

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<sup>9</sup> The long-term evidence in developed economies (Piketty, 2014) shows that income from capital tends to be concentrated in the individuals included in our top group, which means that the misplacement of capital income of individuals included in the middle and bottom groups is unlikely to be significant.

(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 out 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 the capital income share available for the second half of the century.

To estimate earnings of the remaining three occupational groups we rely on three real wages series assembled with the aim of reflecting, when possible, differences in skills: relatively high ( $w_2$ ); medium ( $w_3$ ) and low ( $w_4$ ). We use the same deflator (usually the CPI) to both overall income per worker and wages, so that the ratios are equivalent to those calculated from nominal values (see Annex C.4). 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>10</sup> and found no significant impact.

The methodology used to estimate gross income (functional) inequality is subject to a number of potential measuring biases as those associated with the subsistence economy and unemployment. As to the size of the subsistence economy there is little systematic and consistent evidence for our countries, especially in the early decades, which could be used to make a correction. The subsistence agriculture (non-wage sector) 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 (and income per worker) 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 in the data on economically active population. The latter would largely result in an underestimation of the relative importance of Group 4's earnings and, as a consequence, in higher inequality.

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<sup>10</sup> The average share of urban informality reported for the region during the early 50s and late seventies is about 25% (PREALC, 1982). We estimate that Group 3 may include 10% and Group 4 15%.

Regarding unemployment, there is a potential bias when estimating incomes at group level. This is done by assigning the average wage (as a proxy for average earnings) to the EAP of each group (and not only to those employed), while the mean income for the overall EAP is proxied by the National Income or GDP per economically active person (so including the unemployed in the denominator). That means that at times of high unemployment, our series are overestimating the relative income levels ( $r_i$ ) of Groups 2, 3, and 4 and underestimating the income accruing to Group 1 (calculated as a residual), therefore, underestimating inequality.<sup>11</sup> 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, where unemployment rates are available (see Annex C.3) we calculate deviations of the unemployment rate from an assumed long-term rate (as a proxy for the natural rate of unemployment) and then adjust our overall income per worker series (originally calculated using EAP figures). In this way the latter series will be adjusted upwards during periods of unusually high unemployment – so to minimise the potential underestimation of income accruing to Group 1 – and downwards at times of unusually low rates of unemployment.

Table 1 presents a summary of our estimated EAP shares and relative income ratios for the top and bottom groups for selected years (see Tables B-1 and B-2 for results by the four occupational groups by decades). Differences among the countries' EAP shares are largely driven by variations in the urbanisation process, the timing of the structural change, and improvements in the education level of the labour force. Broadly speaking, Argentina and Chile already have 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 20th century with shares for that group between 65% and 75%.<sup>12</sup> All six countries had inflection points (preceding acceleration) in population growth in the 1930s and in the urbanisation in the 1940s (earlier in Argentina). Differences in the level of development circa 1900 are also

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<sup>11</sup> For example, in the case of Group 4, we calculate  $r_4 = w_4/y$  (both in monthly terms). However, to be consistent with the denominator, we should be using the average earnings of the EAP in that group in the numerator (i.e.,  $Y_4/EAP_4$ ). Thus, in times of growing unemployment  $w_4$  is less sensitive to the destruction of jobs (particularly if there is wage rigidity) and as a result  $r_4$  is overestimated.

<sup>12</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 based on censa data.

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>13</sup>

	Argentina				Brazil				Chile			
	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$
<b>1900</b>	4.0	39.0	10.3	0.45	3.5	72.5	7.0	0.55	6.0	42.1	6.7	0.31
<b>1920</b>	4.3	35.2	11.8	0.34	3.9	69.0	8.1	0.52	5.1	41.9	8.4	0.51
<b>1940</b>	4.6	33.6	9.8	0.36	3.9	64.5	8.9	0.59	5.5	40.9	7.6	0.38
<b>1960</b>	6.2	21.2	7.8	0.34	4.0	55.5	13.6	0.30	7.5	32.5	5.7	0.29
<b>1980</b>	8.3	17.3	6.2	0.18	6.5	43.4	9.4	0.19	9.6	22.7	6.1	0.16
<b>2000</b>	12.1	15.1	4.3	0.24	7.9	31.9	6.3	0.14	13.7	22.0	4.6	0.17
	Colombia				Mexico				Venezuela			
	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$	$n_1$	$n_4$	$r_1$	$r_4$
<b>1900</b>	6.2	65.5	6.6	0.46	3.3	70.8	9.6	0.56	4.1	69.6	7.9	0.36
<b>1920</b>	6.0	60.7	6.8	0.47	3.5	70.8	11.5	0.55	4.6	60.0	6.2	0.41
<b>1940</b>	5.7	56.9	8.5	0.35	2.9	66.0	9.4	0.56	4.2	50.3	6.1	0.37
<b>1960</b>	7.3	48.9	7.3	0.33	4.0	55.3	9.9	0.43	5.8	37.8	9.5	0.22
<b>1980</b>	7.5	39.8	6.8	0.34	7.2	40.5	7.0	0.41	12.5	24.3	5.1	0.26
<b>2000</b>	9.1	36.0	6.1	0.29	9.5	32.4	5.4	0.20	12.3	23.7	4.7	0.29

*All figures are three years averages except those for 1900 based on two years.  
Figures circa 2000 for EAP shares uses benchmark years from ECLAC (see Table B-1).*

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 capital income on 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 in the mean real income or those in Group 4 compared to the average income of the whole labour force between the end and

<sup>13</sup> According to the Barro-Lee database (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.

the start on the 20th century were: 2.1 fold for the overall income and 1.2 fold for Group 4 in Argentina; 5.9 and 1.3 in Brazil; 6.2 and 3.1 in Chile, 6.2 and 4 in Colombia; 3.3 and 1.2 in Mexico (circa 2000 vs. 1921); and 6.5 and 3.6 in Venezuela.

### **2.1. The top-income group**

In this section we provide complementary information for the relative income of top earners. The main aim is to use available data sets for some countries in the early decades where there is consistent information on earnings for jobs included in our Group 1 as well as on earnings on jobs belonging to the of other groups. In such cases it is possible to calculate earnings ratios that can be used to check the order of magnitude and trends in our estimated  $r_1$ . However, because of the likely high dispersion of earnings in this group, there is a risk of focusing on series that are not representative enough. But, on the whole, we believe that these additional ratios could be informative about wage disparities associated with the 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 1900-30 ( $r_1 proxy$ ), and then compared them with our calculated income ratio for Group 1. Both ratios remains stable up to 1915 and then show higher values between 1920 and 1930. This rising trend continues to be a feature in the G1 ratio up to 1950. The proxy ratio is usually two points higher suggesting that we may be underestimating the income of this group. Next we include comparisons for Chile (1900-40), Colombia (1908-50), and Venezuela (1900-36). For Chile we have two complementary ratios. The first one ( $r_1 proxy_1$ ) of income of employers (representing about 2% of the labour force during the period 1900-30) relative to the average wage. A second ratio ( $r_1 proxy_2$ ) is calculated with public sector data of salaries of top-rank officials (e.g., ministers and directors)<sup>14</sup> and an average of semi-skilled workers (e.g., archivist and postman). Two things to highlight are, first, the rise in the ratio of employers to workers during the 1920s, which is reflected in  $r_1$ . And, second, the similar order of magnitude and relative stability of  $r_1$  and both proxy ratios.

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<sup>14</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 wages in Group 1.

Table 2: Top earners' mean income relative to average income (circa values)											
	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950
<b>Brazil</b>											
$r_1$ proxy	8.2	7.9	7.8	7.0	9.1	n.a.	9.1	n.a.	n.a.	n.a.	n.a.
$r_1$	7.0	6.9	6.4	5.3	8.1	8.7	8.4	6.5	8.9	11.4	11.2
<b>Chile</b>											
$r_1$ 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.
$r_1$	6.7	6.3	5.3	6.1	8.4	9.6	8.4	9.3	7.6	6.6	6.0
<b>Colombia</b>											
$r_1$ proxy	n.a.	n.a.	5.4	4.5	4.2	4.8	5.0	5.8	5.7	4.4	4.9
$r_1$	6.6	6.5	7.1	7.1	6.8	8.0	7.9	8.0	8.5	8.1	7.9
<b>Venezuela</b>											
$r_1$ 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	7.3	7.0	9.0	6.2	5.3	4.9	7.3	6.1	6.8	8.5
$r_1$ : mean income of Group 1 relative to overall income per worker. $r_1$ proxy, calculated using representative occupations as follows: <i>Brazil</i> : salary of a factory manager to a semi-skilled worker (Lobo, 1978). <i>Chile 1</i> : earnings per employers relative to average wages from Rodriguez-Weber (2014). <i>Chile 2</i> : salaries of high-rank officials relative to median salary in the public sector from Rojas (1982). <i>Colombia</i> : average salary "spokesperson & treasure" to "doorman" in city councils (López Uribe, 2008). <i>Venezuela</i> : avg. salary of high-rank officials to median government salary (Carrillo Batalla, 2002, 2003).											

In the case of Colombia we take as representative earnings for Group 1 the average wage of two high-rank officials in local government with the top wages of those occupations included in the dataset. Then we divide this average by the wage of a low skilled occupation in local government which could have been closer to the average income in the country during the period. The order of magnitude is, on average, about one point higher in  $r_1$  and both series show higher ratios for the period 1925-40 compared to early values. Finally, for Venezuela we use the average wage of top officials in ministries and a measure of the median income in the central government (calculated as the average between the mean and the minimum income). The proxy ratio shows steady values during the period. There is a good match with  $r_1$  between 1900 and 1910, but from then onwards variations in both series tend to differ. In sum, this complementary information on top earners does not show any significant divergence from – and in many cases is consistent with - our calculated relative incomes for Group 1 in the four countries included in the table.

### 3. Functional Inequality

We use the standard de-composition of the Gini coefficient in order to calculate the between-group inequality component (Lambert & Aronson, 1993) using our estimated employment shares and income ratios for four groups. We are assuming that all individuals within a group earn the mean income of such a group, so that the within inequality component is zero.<sup>15</sup> Section 4 offers some estimates and discussion on within-group inequality for selected periods.

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

Figure A-1 presents our functional Gini series (*Gini\_between*) – five-year, centred moving averages - by country, together with three additional inequality measures. First, available household Ginis (*Gini\_HS*) sourced from Thorp (1998, Statistical Appendix), Székely & Sámano (2012), and ECLAC website. Note that our inequality series reflect inequality before net taxes and transfers, whereas the household Ginis are usually based on disposable income after net taxes and transfers.<sup>16</sup> 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\_industry*, with a fitted moving average line).<sup>17</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 in Mexico, we opted to estimate separately the earnings Gini for the 1900-10 period using the data available on nominal wages and GDP (see Annex C.2). This means that the levels pre-1910 are not fully comparable with those after 1921.

The comparison with the household Ginis from a more recent period serves the purpose of assessing the capacity of our functional (between-groups) Ginis to reflect the behaviour of overall personal income inequality. For the post 1950 years up to 2000 our

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<sup>15</sup> Relying on between-group inequality is a common feature in inequality studies covering the long run (Milanovic et al., 2010).

<sup>16</sup> In developed economies with strong welfare states there tend to be significant differences between Ginis pre and post net taxes and transfers, but in Latin America both measures were close together by the end of the last century (Goñi et al., 2011). And the gap is likely to have been even narrower during the previous decades when redistributive policies were limited.

<sup>17</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 included in the charts.

series fit reasonably well the trends and fluctuations observed in the household Ginis available, especially in the case of Brazil, Chile and Colombia. This gives us some reassurance that estimates during the first half of the last century can also be a good proxy for the overall personal inequality. The fit between both series in the first decades of this century shows some discrepancies in Venezuela, which may be explained by the fact that our functional Ginis do not reflect the impact on inequality of recent social transfer programmes.<sup>18</sup>

On the other hand, the inclusion of the Williamson ratios, constructed with less information, aims to check the extent to which our new measure supports claims made based on those ratios. The consistency between the new series and the W-ratios (1900-40) is mixed, with the cases of Argentina and Mexico offering the best fit showing increasing inequality up to about 1920, whereas in Brazil and Chile there are important discrepancies in the trends of both measures. Overall, there is no clear communality in trends to support claims that the First Globalisation in its final years or so brought about a significant increase in inequality.

Regarding the intra-industry inequality series, they are likely to capture the impact of differences in productivity and technological sophistication – and the demand on skills - across industries (Berman et al., 1998). This inequality is likely to have had a bearing in the wage structure, particularly during the industrialisation years with expanding industries with profits and productivity higher than normal paying higher wages to attract the labour they needed.<sup>19</sup> The comparison between the underlying trends in *F\_industry* and those in *Gini\_between* shows, in general, coincidence in trends, especially in Argentina and Mexico. In Brazil functional and intra-industry inequality show a consistent evolution from 1920 up to the 1980s (with an inflection point in the mid-1930s likely to reflect the industrialisation plus urbanisation process), and then diverge during the last two decades of the last century or so.

In Colombia the limited number of observations for intra-industry inequality shows an upward trend between the early 1960s and the late 1990s, a pattern that is roughly reflected in our Gini. And in Mexico the acceleration in intra-industry inequality during the 1990s (likely to be associated with the country's incorporation into

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<sup>18</sup> For instance, conditional cash transfer programmes in Chile, Peru and Mexico, *Bolsa Familia* in Brazil, and *Misiones* in Venezuela (Roberts, 2012).

<sup>19</sup> Scholars studying the wage structure in the region based on evidence in 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 (Venezuela, Chile) as prime examples (Berg, 1968,4).

NAFTA in January 1994) is also in line with the rising trend observed in the new Gini. In Uruguay an income Gini in manufacturing behaves similarly as in Argentina in the period 1908-1965 (Bértola, 2015). Overall, the acceleration in inequality since 1960 or so in both measures suggests that skill-biased technological change was a contributing force for increasing inequality (either by expanding the wage structure or by boosting profits) particularly during the closing decades of the last century, which was dominated by more open economies and trade liberalisation.<sup>20</sup>

Some additional comments are in order about our calculations for Brazil and Venezuela. In the case of Brazil, because the new series depicts a pattern at odds with previous evidence. In the case of Venezuela, because an inequality measure covering the early decades is offered for the first time. Our inequality estimate for Brazil shows a relatively low and trendless level up to circa 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 considerable high, reflecting the fact that poorer societies have a smaller surplus for the elite to extract (Milanovic et al., 2010). The daily wage data in rural areas available for benchmark years for Brazil as a whole (e.g., 1911, 1921, and 1936) from IBGE indicate a relatively stable wage structure. Equally, a stable wage structure is shown by Eulalia Lobo's urban wage series in Rio de Janeiro during the first three decades of the 20th century (which we use as a source for the period) as well as in data assembled by Ball (2013) for industrial workers in selected firms in São Paulo during the "Old Republic" (1891-1930).

Regarding Venezuela, there is scant earnings data prior to 1936. So our estimates during this period should be taken as a gross approximation. According to Valecillos (2007, 103), the general picture of the labour market is one dominated by the private sector, largely based on agriculture with 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

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<sup>20</sup> In the case of Colombia, this observation is confirmed by Cardenas & Bernal (1999) who found that during the period 1976-96 both trade liberalization and skill-complementary technological change had a positive impact on skill premia in manufacturing and, in turn, on inequality.

remuneration to land and capital during the period, but not enough to result in a clear rising trend in functional inequality - which would need to wait until the 1930s once the development of the oil sector was in full swing.

### ***3.1. The top earners and the rest***

Here we move away from the Gini measure and 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).<sup>21</sup> Following Alvaredo (2010), the Gini coefficient  $G$  can be expressed as:

$$(4) \quad G = G^{\text{Top}}n_1s_1 + G^{\text{Rest}}(1 - n_1)(1 - s_1) + s_1 - n_1,$$

where  $s_1$  and  $n_1$  are the income and population shares of the top group and  $G^{\text{Top}}$  and  $G^{\text{Rest}}$  are the Gini coefficients for the top group and for the rest of the population respectively. In our case,  $G$  is the overall between-group Gini (as in eq. 3),  $G^{\text{Top}} = 0$  because of lack of data, and  $G^{\text{Rest}}$  is approximated by a Gini coefficient of the three wage groups (excluding any within-group inequality). Then, (4) becomes:

$$(5) \quad G_B = G^{\text{Rest}}(1 - n_1)(1 - s_1) + s_1 - n_1,$$

And for  $n_1$  small, (5) can be simplified as:

$$(6) \quad G_B = G^{\text{Rest}}(1 - s_1) + s_1.$$

This decomposition makes it possible to separate the action of the forces affecting capital and labour income, a distinction that is missing in Gini coefficients based on personal income data (Piketty, 2014). 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, the structural change and by developments in human capital formation. In the case of income from capital the usual dominant forces are savings and investment behaviour, inheritance laws, terms of trade (affecting profits in the external sector), and - never to be underestimated in this region - the bargaining power of the elites. Note that there are two combinations of both variables that result in an unambiguous inequality impact: falling top-earners share and wage compression,

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<sup>21</sup> Our Group 1 also include wage earners, but these are a minority (although with a significant earning capacity) compared to those included in the other occupational groups.

narrowing overall inequality; and rising top-earners share and wage expansion, widening inequality.

Figure A-2 offers time series on  $s_1$  ( $GI\%$ ) together with the wage, between-group, Gini ( $Gini\_wage$ ). For comparative purposes we are also including available official estimates for the capital share or, when this is not directly available, the complement of the labour share ( $Kap\%$ ),<sup>22</sup> as well as our overall between-group Ginis ( $Gini\_between$ ) - as in Figure A-1. The official estimates of capital shares and the income shares of Group 1 are broadly consistent in terms of the direction of changes.<sup>23</sup> The second half of the 20th century and the 2000s are dominated by upward trends in  $s_1$ . The rise starts in the early 1940s in Brazil (though with a downward trend developing in the early 1990s), Colombia (though stable post 1980) and Venezuela; and in the late 1950s in Argentina and Chile; and in the mid-1960s in Mexico.<sup>24</sup> Prior to that, the tendency for the secular top earners share was to fluctuate considerably around relatively constant value. Though 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.

A rising trend in the income shares for Group 1 (or falling trend in the labour share) is a common feature in Latin America during the closing decades dominated by market-friendly reforms. In the cases of Chile and Mexico, Palma (2011) locates the origin of such trend in the emergence of a “scissors” effect between the average real wage and labour productivity. In Figure A-3 we show equivalent series for our six countries accompanied by the ratio between the mean incomes of Group 1 and Group 4 ( $y_1/y_4 = y_1/w_4$ , or top-bottom ratio).<sup>25</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 suggesting the workings of labour-

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<sup>22</sup> The sources are: BCRA (1976) in Argentina 1935-62; Ginneken (1979) in Mexico 1950-67 (our calculation based of labour shares for 1950, 54, 58, 63, 67, and 75 from official sources); BCV for Venezuela 1957-97; otherwise ECLAC website (*excedente de explotación*).

<sup>23</sup> Also, our proxies for the labour share behave similarly to the labour shares estimated by Frankema (2010) for Argentina (1900-2000), and Mexico (1913-2000), and is partly consistent in the case of Brazil (1920-2000; with a good fit in the sub-periods 1920-40 and 1950-80).

<sup>24</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, the increased role of financial activity, and labour market de-regulation (Stockhammer, 2012).

<sup>25</sup> The wage series are weighted by the labour shares of Groups 2, 3, and 4. Labour productivity is calculated as GDP (adjusted by the terms of trade gains) divided by overall EAP. The timing of the scissors effect is robust to the use of non-adjusted GDP per worker series..

saving technology (boosting productivity but also displacing labour and keeping unskilled wages subdued).

As to the behaviour of the  $y_1/y_4$  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 step fall in this ratio from the first half to the second half of the 20th century (except for the spike in the late 1980s, likely to be associated with hyperinflation and a decreed freeze in wages).<sup>26</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 US. In Venezuela the doubling of the ratio in the 1950s is the result of 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). For these years there are already national income official estimates, so that the top incomes should exclude profits accruing to oil multinationals operating in the country. 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 income ratio indicates that, despite the fact that the growing income share of Group 1 had to be shared by an increasing number of people, in most cases the top earners were able to increase – or at least keep - their position relative to the mean income of the unskilled.

### **3.2. *Wage inequality***

Regarding secular movements in the wage structure, there are some patterns in Figure A-2 and Figure A-3 that can be related to the different development strategies adopted. The early decades, dominated by export-led growth, are characterised by an expanding or constant wage structure. For Brazil and Chile this is the case only after 1920 or so. The early decades were dominated by labour markets with relatively stable average real wages and limited changes in the wage structure. Our evidence is consistent with the claim that during the first export-led growth era, immigration, lack of a well-integrated

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<sup>26</sup> In the case of Argentina, Alvaredo (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, then there is a significant fall from 1947 to 1952 - amid Perón's policies that favoured labour at the expense of rural rents - followed by a steady decline to 1972. This pattern is roughly consistent with trends in our top-bottom ratio for the country.

labour market, and coercion<sup>27</sup> undermined the potential of demand-led growth favouring unskilled labour to support wage compression (Bértola and Ocampo, 2012).

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 sustain rise in all six countries amid a common trend of real exchange rate appreciation (Astorga, 2012). There was narrowing wage inequality in Argentina, Colombia, Mexico and Venezuela. By contrast, Brazil and Chile exhibit widening wage inequality.<sup>28</sup> Wage compression was favoured in some cases by government intervention in the labour market (e.g., in Argentina under President Perón) and by the introduction of minimum wage legislation - particularly effective in Argentina, Brazil and Mexico (Méndez, 1950) - and other pro-labour policies.<sup>29</sup> Frankema (2012) studies in detail wage inequality in industry 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 growth strategy. During this period there is a tendency towards a rise in the capital share and a widening in wage inequality (with both effects boosting inequality), amid falling real wages. This is particularly clear during the “lost decade” of the 1980s, also marked by depreciating real exchange rates (not shown) amid rising top-bottom ratios (in most cases, also during the 1990s), indicating that wage earners largely bore the cost of the adjustment.<sup>30</sup> 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, and which particularly affected the

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<sup>27</sup> Bulmer-Thomas (1994, 87): “Real wages in the export sector were often unchanged over long periods of time, and in some cases they even decline. Employers were extremely reluctant to tempt workers with the offer of higher wages. ..Coercion ... was still found in many parts of Latin America on the eve of the First World War.”

<sup>28</sup> Evidence on within-group wage dispersion for Groups 3 and 4 in Argentina, Chile, Mexico and Venezuela (see Section 4) points to narrowing or constant wage spreads in the period.

<sup>29</sup> Eriksson (1966, 16-17) also found a move towards wage compression in the region between the late 1930s and the early 1960s, partly a result of a more widespread minimum wage legislation.

<sup>30</sup> This provides further support to Palma’s point that the decade was not lost for everybody (2011, 52).

wages in the middle groups. In addition, within-group inequality (by educational categories) grew in Argentina and Brazil (Morley, 2000).

In general, the expansion in the wage structure during this period was favoured 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 (1976-83), Chile (1973-90) and Brazil (1963-80) 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 (all countries had negative growth except Colombia with a 0.8% annual rate), followed by a moderate recovery of 1.7% annual growth in the 1990s – above the average growth rates of GDP per worker. The weakening of the labour movement was also the result of the shift of labour from the formal to the informal sector that intensified during that period and by the privatisation of state-owned firms. In the first decade of the current century there is a tendency towards a decline in wage inequality, a pattern that is consistent with that shown by labour earnings Ginis calculated from household surveys (World Bank, 2012, 28).

#### **4. Within-group Inequality**

A complete assessment of functional inequality would also require us to consider inequality within the four groups. In particular, it is of interest to know whether the between-group and the within-group components reinforced each other or whether they tended to offset each other. The former would result in a more accentuated pattern for overall inequality than that shown by our between-group Ginis, whereas the latter should result in an overall inequality with smoother fluctuations.

The main factors likely to affect earnings inequality within our groups are geographical differences and the dispersion among jobs included in each group. The latter may reflect variations in rewards to skills or experience, as well as possible discrimination related to gender (as for the first half of the last century we are largely using wages paid to men) and race. Changes in technology and education are likely to have most of their impact on between-group earnings differentials. Geographical earnings dispersion within countries was particularly important during the early decades

of the last century when labour markets were not well integrated allowing for inter-regional differences in earnings for equivalent jobs. This is likely to be a key factor whose absence contributed to high within-group inequality, but with a limited effect on between-group inequality (to the extent that relative wage differences were similar across regions).

Gender disparities are likely to have played a more significant role since the 1970s as a result of the acceleration in the female participation rate in the LA-6, and Latin America in general. Camou and Maubrigades (2015) identify three periods in the evolution of female participation rates in Latin America: 1910-1940 a fall in Argentina, Chile and Mexico (no data available for the rest of LA-6); few changes in female participation in the period 1940-1970; and an explosive growth in participation from 1970 to 2000. The contribution of race discrimination to within-group inequality is likely to have remained stable during most of the period, and to have played a role in widening earning dispersion for relatively unskilled occupations (our Group 4). For instance in Brazil, according to census data the proportion of the black population that completed primary school was below 5% in 1940, 1950, and 1960; rising to 10% in 1980 and above 30% by 2000. And black workers were predominately in low skills occupations in agriculture (Bucciferro, 2015).

The task of estimating accurate and comprehensive figures of within-group inequality over the period is a major task and one that is beyond the limits of this research. Nevertheless, in this annex we offer some limited and partial evidence of wage dispersion in the early and middle decades that could shed light on changes in within-group inequality and the potential implications of these changes for overall inequality. Because we lack data on people engaged in the different occupations within the groups (i.e., the weights needed to calculate Gini or Theil coefficients), we are using the coefficient of variation of wages (e.g., disaggregated by geography or occupations) as our measure of dispersion.

#### ***4.1. Early decades in Brazil***

Based on data available for wages in the rural areas in Brazil in the years circa 1911, 1921 and 1936-37 (IBGE, various) we calculated the coefficient of variation in the average wages paid to two occupations: carpenters - semi-skilled job - and unskilled rural workers (*trabalhador da enxada*) in a sample of 15 Brazilian states. According to this measure, intra-state wage dispersion in both occupations registered a significant

reduction over the three decades. In the case of unskilled workers, the coefficient of variation dropped from 0.81 in 1911, to 0.43 in 1921, and to 0.34 in 1936-37 (average of the two years). The corresponding values for carpenters were 0.57, 0.37, and 0.25.

The same source also offers data on minimum and maximum wages paid by the same occupation in each state (differences are likely to reflect experience premium). This makes it possible to calculate wage dispersion within similar jobs as the ratio between the maximum and the minimum values. These ratios are 2.1 (1911), 1.7 (1921), 3.4 (1936-37) for unskilled rural workers and 2.2, 1.7 and 5 for carpenters. By contrast, there was little change in relative wage differences in occupations of similar levels of skills in all three benchmark years. For instance, the average wage for carpenters and masons (both are occupations included in our Group 3) were pretty close in 1911, 1921 and 1936-37; and the relative differences in wages paid to *trabajadores de enxada* and *aradores* (ploughmen), both included in our Group 4, did not change significantly in the period covered by these data.

Thus, although wage dispersion between jobs requiring comparable skill levels remained roughly unchanged between 1911 and 1937, the dispersion within the same jobs rose considerably between 1911 and 1937. And the potential effect of this trend to within-group inequality in our Group 3 and Group 4 may have partly offset the geography-related dispersion trend (that is, combinations of high geographic dispersion and low job dispersion in 1911; and lower geographical dispersion and higher job dispersion in 1937). With these data we can also calculate the average wage ratio between carpenters and unskilled rural workers: 3.2 (1911), 3.0 (1921) and 2.5 (1936-37). This decline in the between-group disparity in the categories of semiskilled and unskilled workers is consistent with the wage ratios calculated from our wages series for those years.

#### **4.2. Middle decades**

To inform about within-group wage variation during the middle decades we use data available from ILO's October Survey for Argentina, Chile, Mexico, and Venezuela (equivalent data from this source for Brazil and Colombia is scant). We make two calculations of wage dispersion (coefficient of variation): one based on unskilled wages for four different sectors (construction, textile, electricity, and local government); and another based on seven semi-skilled occupations in the construction sector (bricklayers & masons, structural iron workers, concrete workers, carpenters and joiners, painters,

plumbers, and electrical fitters). Figure A-4 shows the results for the period 1936-1982. For comparison purposes, the charts also include our wage Gini (*Gini\_wage*, capturing between-group inequality in our three wage categories). In general, the evolution of wage dispersion for the semi-skilled group is in most cases in line with trends in the wage Gini. Despite the fewer number of wages in the group, the coincidence between dispersion in unskilled jobs and the inequality measure is also good particularly in the cases of Argentina, Chile and Mexico. But there are some diverging trends in Chile during the 1950s and Argentina and Venezuela in the late 1960s.

Regarding geographical wage dispersion, Mexico's chart also includes a coefficient of variation of official minimum wages across 32 states (*regional\_min*). This shows a significant reduction in regional wage dispersion over the period, with a pattern which is consistent with that exhibited by the between-group wage Gini.<sup>31</sup> In the case of Colombia, Jaramillo et al. (2000) report wages for rural labourers over 17 regions (*departamentos*) from 1940 to 1998. Calculations based on these data (not shown) depict a period of relatively stable wage dispersion in rural wages between 1940 and circa 1975 (a coefficient of variation of 0.24), followed by another of lower dispersion (0.17). This indicates that a large part of the geographical differences in rural wages may have been reduced prior to 1940. For the early decades Palacios (1979) gives an account of significant differences in agricultural wages across the regions and some mobility of labour allowing for some uniformity of wages within regions.

## 5. Regional Outcomes

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 Gini together with a Gini available for Uruguay<sup>32</sup> (LA-7) and, second, as a population-weighted average - largely driven by developments in Brazil and Mexico - also including Uruguay.<sup>33</sup> Figure 1 (chart on the left) shows five-year, centred moving

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<sup>31</sup> The data is sourced from "Comisión Nacional de los Salarios Mínimos", available at ITAM dataset. The average coefficient of variation for the period 1934 to early 1950s is 0.41, then it come down to 0.34 in the period 1954-1963, 0.20 in 1964-1980, and 0.13 in 1980-1985.

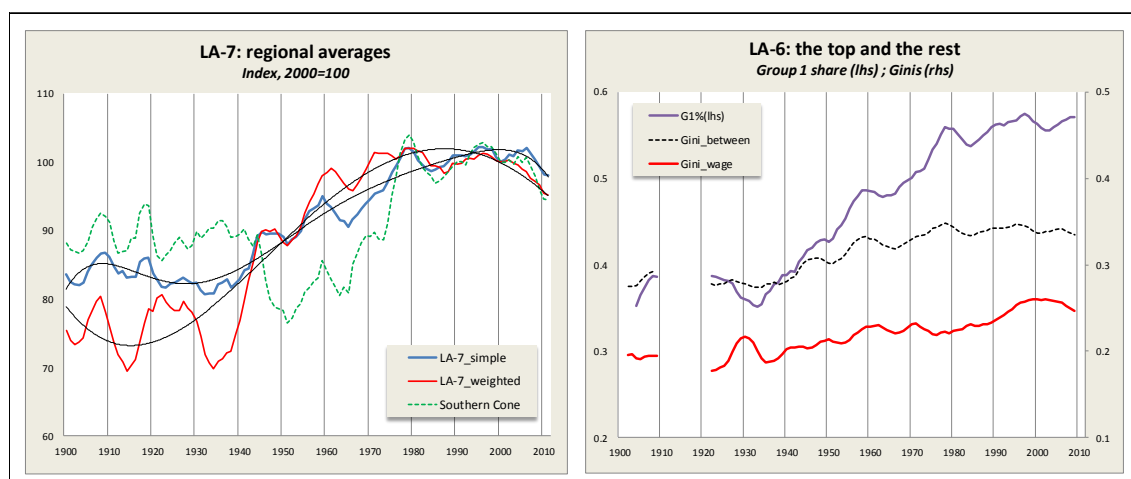
<sup>32</sup> For Uruguay we use Bértola (2005) for the period 1908-66 and then use Gini values based on household surveys from ECLAC website to complete the series to 2011. The averages during the period 1911-21 exclude Mexico.

<sup>33</sup> We can use our data to calculate a between-group Gini for the LA-6 as a geographical unit, in this case using as weights the EAP rather than population. This aggregate (not shown) tracks closely the population-weighted Gini.

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 show the presence of a secular process resembling a “reclined-S” shaped curve for the period 1900-2011 with an inflection point circa 1940 and a peak in the closing decades (this later peak appears earlier in 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 outcome the final years of the First Globalisation (1900-1914) were not accompanied by a shared rising inequality. Then the middle decades are dominated by a rising trend driven by the relative latecomers in terms of the industrialisation process (Brazil, Colombia and Venezuela). But inequality narrows in the Southern Cone which can be attributed to protectionist policies favouring urban workers and labour policies pursuing wage compression. In this sub-set of countries the long-term curve resembles more a “reclined-M”. Then inequality reached a plateau around the time of the “lost decade” (this is a shared outcome), before beginning to decline with the turn of the new century. The “reclined-S” shape is more pronounced in the population-weighted series.

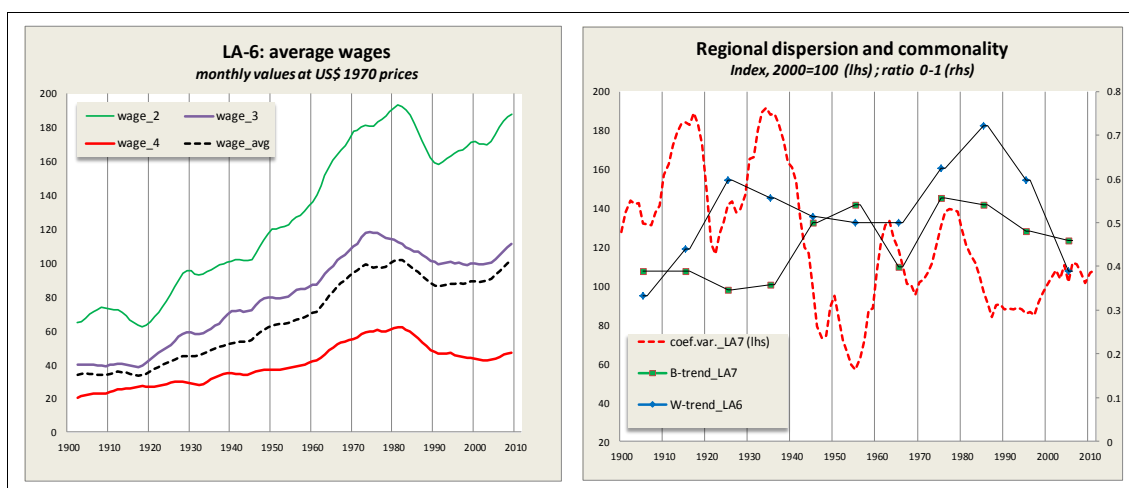
**Figure 1: Regional functional inequality**



We also calculate two additional regional measures by averaging the countries’ series of income share of the top group (G1%) and of wage inequality (*Gini\_wage*, see Section 3). Figure 1 (chart on the right) shows the LA-6 simple averages of those two

components together with the overall, simple average, Gini (*Gini\_between*). According to our estimations, the early decades on the last century are characterised by a trendless behaviour of the contribution of the top group and the rest, although the former experienced higher fluctuations.<sup>34</sup> But there are different dynamics in both components after the 1930s. The wage component is more stable with wage inequality widening in the 1940s and 1950s and a fairly constant wage structure in the 1960s and 1970s. This is followed by a relatively rapid rise in wage inequality in the closing decades and wage compression in the 2000s. By contrast, the share of the top earners accelerated from the mid-1930s to the end of the 1970s followed by a more moderate rise in the closing decades (a period of widening wage inequality). What is apparent in this chart is that changes in between-group inequality were primarily driven by developments in the top group.

**Figure 2: Regional wages and inequality dispersion**



The chart on the left of Figure 2 shows simple averages for the LA-6 of the three wage series and the resulting EAP-weighted average wage. The average wage and wage inequality rose in synchronicity up to the early 1960s, implying that more skillful workers tended to benefit proportionally more than those with fewer skills. Then, in the following two decades or so, the real wage accelerated while the wage structure remained roughly stable, indicating that wage earners tended to benefit more evenly from the gains from economic growth.

<sup>34</sup> According to our data these fluctuations are driven by volatility in the income terms of trade, particularly during the early and closing decades of the last century.

The closing decades are marked by falling real wages and widening wage inequality; a period of wage losers but with the unskilled workers losing more than the skilled ones. The average real wage for the unskilled in the LA-6 circa 2000 went back to the 1960 level and 30% below the peak near 1975; quite a setback in the living standards of those at the bottom. Although the regional EAP share of Group 4 came down to about 30% in 2000 from about 45% in 1960 and 65% in 1900. Those who were able to acquire more skills and move upwards to Group 3 did rather better, seeing a 20% rise in their average real wage between 1960 and 2000 (though the 2000 value is about 15% below the peak reached in circa 1975). The average LA-6 worker in Group 2 had a 30% rise between 1960 and 2000, and a 10% fall from a peak circa 1980.

### ***5.1. Catching-up in inequality levels and trend commonality***

Figure 2 (chart on the right) includes three measures to account for dispersion and commonality. First is the coefficient of variation for the between-group, simple average, Gini for the LA-7 (*coef.var.\_LA7*). This measures diversion or catching up in levels, showing a clear split between two periods: one of relatively high average dispersion 1900-1940; and one of relatively low dispersion 1940-2011 (with a trough circa 1950 and two spikes of dispersion in the early 1960s and late 1970s).<sup>35</sup> One possible interpretation of this result is that although the inequality outcome over time differs across the six countries, this reflects a different timing and starting point of a common underlying process (e.g., of a Kuznets-Lewis type) that would eventually lead to a similar end (like the dynamics of a fugue composition).

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 is the case during the middle decades). To address this limitation Figure 2 (chart on the right) 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*). See details in Table B-3). They are constructed in two steps: i) in each country we identify the dominant trend pattern in each decade (rising, constant, falling; or a combination of these options). Then, we add up the number of times that a given pattern occurs (assigning a “1” for a dominant trend over a given decade or a “0.5”

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<sup>35</sup> The pattern of between-country dispersion (not shown) for *GI%* and *Gini\_wage* resembles that of the between-groups Gini.

when there are two salient patterns). Those partial results (e.g., for the B-trend\_LA7 in the 1980s: rising=4.5; constant=0, falling=2.5) are multiplied by itself and then added up to obtain an overall score ( $4.5^2+0^2+2.5^2 = 26.5$ ). Finally, to calculate the ratios included in the chart the overall score is divided by the maximum possible score ( $26.5/49 = 0.54$ ). A high value in a given natural decade (depicted as an observation in the middle of the decade) indicates that most countries were experiencing similar trends.

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 markers (e.g., minimum wage legislation and unionisation) than in the forces affecting incomes at the top (e.g., different outcomes in the countries' income terms of trade). Movements in both ratios show diverging trends in the first half of the 20th century (consistent with high values for the coefficient of variation) but a clear move towards synchronicity during the second half. There are four decades with relatively high ratios of trend behaviour in wage inequality: 1920s (dominated by upward trends); 1970s (downward trends); 1980s (upward); and 1990s (upward). Overall, based on this evidence, the 1980s comes out as the decade with the highest commonality in inequality outcomes.

## **6. Conclusions**

We have presented a new set of functional income Ginis for the period 1900-2011 for six Latin American countries calculated from newly assembled wage series for three occupational categories. This offers a consistent and comprehensive view of long-term inequality that can motivate further work and discussion. But our method and data have limitations and our findings would need to be corroborated – or refuted – by detailed country studies. That said, the news of this study can be summarised as follows:

Inequality exhibits changing secular trends as well as fluctuations in the shorter to medium term, with important country variations, particularly prior to 1960. Argentina and Brazil are examples of contrasting experiences. The former shows rising inequality in the early decades, a narrowing trend in the middle decades, and rising inequality in the closing decades. The latter shows stable inequality in the early decades followed by a rising trend in the middle decades which levels off in the closing decades. Our series do not show a common rising trend in inequality during the end of the First Globalisation and exhibit mixed results in the middle decades. But what seems to be

common to most countries is that by the early 1960s inequality was on the rise reaching a peak in the closing decades of the last century amid the implementation of the “Washington Consensus” policies. It is a moot point whether the inequality impact of both (de)globalisation and industrialisation - plus the response in terms of education and skills formation - would have been different under another institutional setting during the Colonial period (i.e., with more inclusive institutions). This is a counterfactual issue which seems to be difficult to settle.

The regional Gini averages (single and population-weighted average) of our six economies plus Uruguay shows a “reclined-S” shape with an inflection point around 1940 and a peak in the 1990s (a decade or so earlier in the population-weighted curve). The pattern for the Southern Cone is one of a reclined “M” shape. However, apart from country diversity, the identification of an overall pattern and its interpretation also depends on whether a development in a particular period is considered to be an “anomaly” or to be part of an underlying long-term process that will reaffirm itself with time. For instance, if the outcome in the early decades is thought to be a deviation from the long-term trend (or a response to data limitations), then the regional pattern over time could resemble a reclined inverted “U”. Also, although we have found that within-group wage dispersion tends to reinforce the patterns shown by the between-group Ginis, geographical wage dispersion was important in the early decades (particularly in Brazil and Mexico, and also likely in Colombia and Venezuela), so in that period our Ginis are likely to underestimate the extent of inequality.

Regarding the relative contribution of capital and labour income, our evidence indicates: first, the absence of episodes in which falling capital shares and wage compression reinforced each other, generating a sustained fall in secular functional inequality. And, second, that in the majority of the LA-6 (also in Uruguay) there was a sustained, though moderate, narrowing wage inequality in the middle decades of the last century – at the time of the Great Levelling in the developed economies – but whose impact was more than off-set by a rising share of the top group, so that overall inequality widen during the period in all six economies with the exception of Mexico. The action of centrifugal forces dominated the second half - especially after 1970 - resulting in a falling labour share and rising mean income of the top earners, the clear winners of the last century.

Inequality in the 20th century is a story of increased polarisation but at the same time one of significant social mobility. In the LA-6 (using simple averages) the mean

income of top earners went from representing 17 times the income of the unskilled worker in circa 1900 to 30 times in circa 1970 and 27 times in circa 2000. In absolute terms, those at the top experienced a 3.3 fold rise in their mean real income between 1900 and 2000 far above the 2.4 fold increase of those at the bottom (for whom the closing decades represented a serious income setback). A second key development was the expansion of the middle groups, which went from representing only about 32% of the overall EAP at the start of the century to account for 62% by the end; while the share of the top and bottom groups dropped from 68% circa 1900 to 38% circa 2000. The mean income of those at the middle grew 2.9 fold between 1900 and 2000. But in all three cases, absolute mean income at the end of the century was not higher than the values reached in circa 1970.

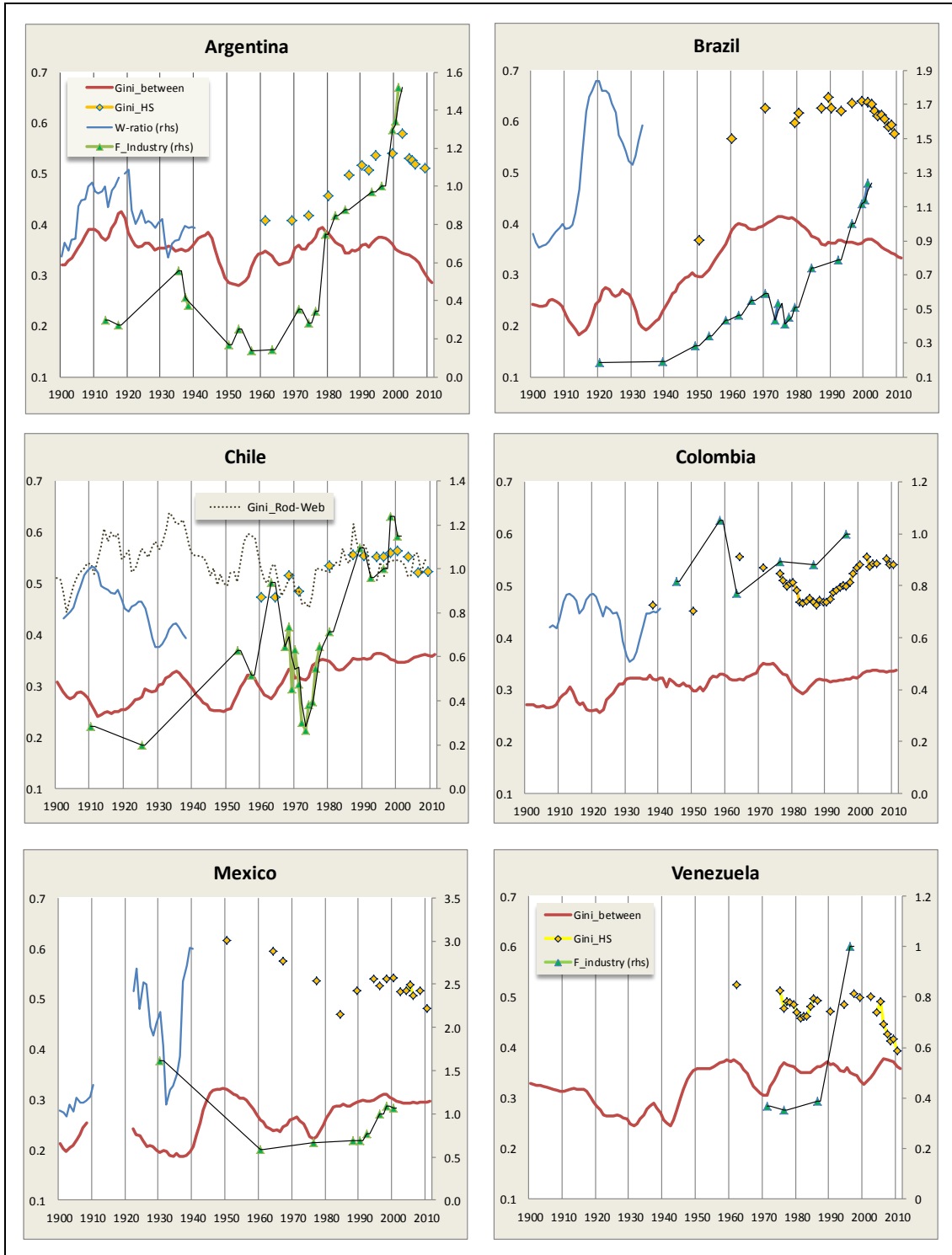
Our evidence on prices (relative incomes) and quantities (employment shares) are broadly consistent with the Kuznets-Lewis process. The early decades were characterised by a high proportion of rural unskilled labour with polarised income between the earnings of the top group and the bottom group. Here the gap between rich and poor largely reflected disparities between capital or land owners and relatively low skilled workers. As the structural change got underway, the reallocation of labour from low to higher productivity sectors translated into rising wage gaps. As a result of internal migration 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. Industrialization stagnated in the final quarter of the last century and workforce growth swelled the urban informal sector creating the conditions for a worsening in inequality.

Still more research is needed on the role of skills formation and its consequences to the wage structure, as well as on the role of labour policies and institutions. Although the second period of export-led growth fits better a story of technology ahead of education, the tendency for wage compression or slow wage expansion during the decades of industrialisation under protection suggests that potentially inegalitarian 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 the workings of minimum wage policies. However, overall, they could not offset the distributive effect of growing disparities between those at the top and the rest that was dominant

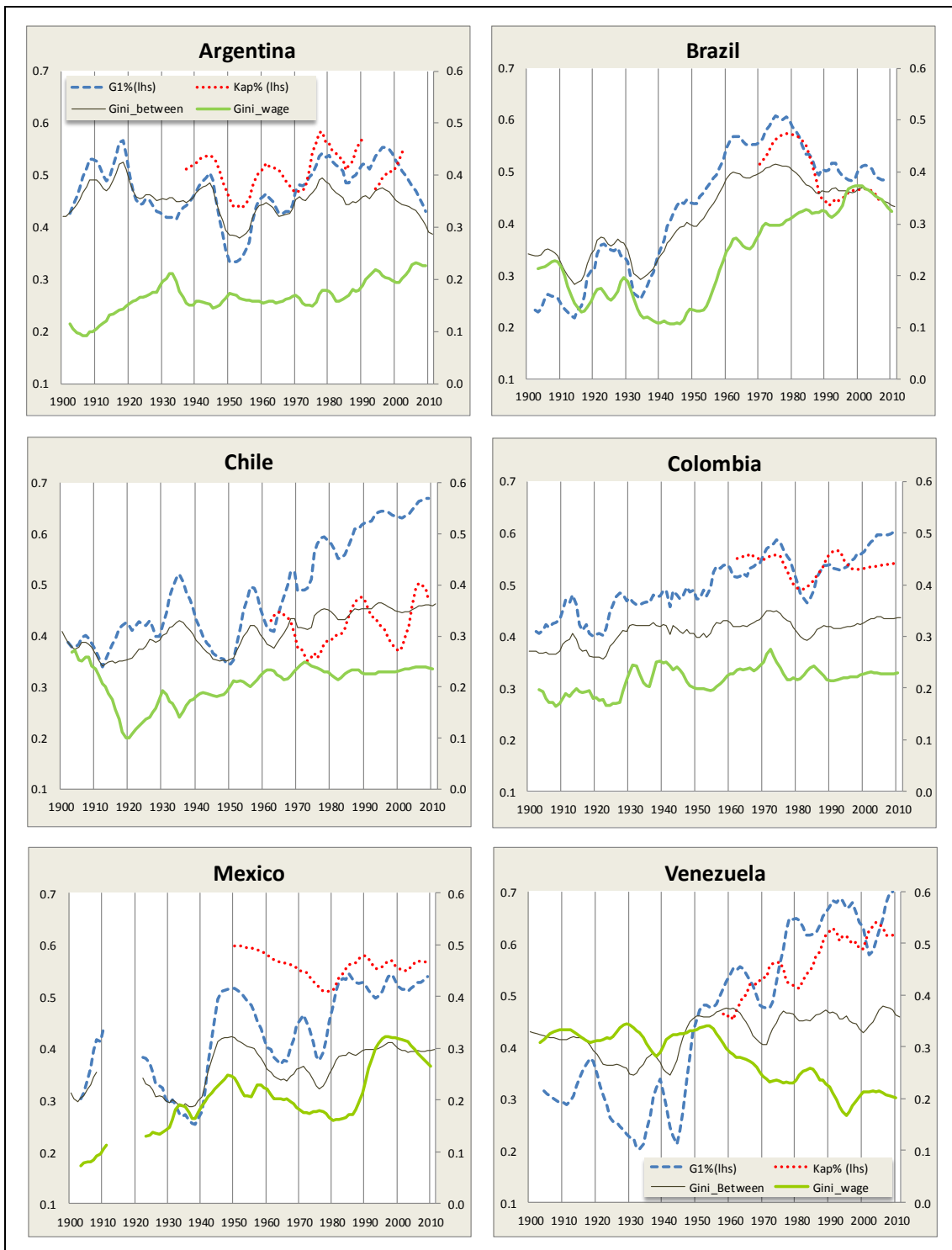
particularly in the closing decades. Also, the tendency for rising relative gains at the top group is a key result that needs a more careful analysis bringing in factors such as assets distribution, oligopolistic structure, resource rents, fiscal policy and the power of elites.

## Annex A: Figures by Country

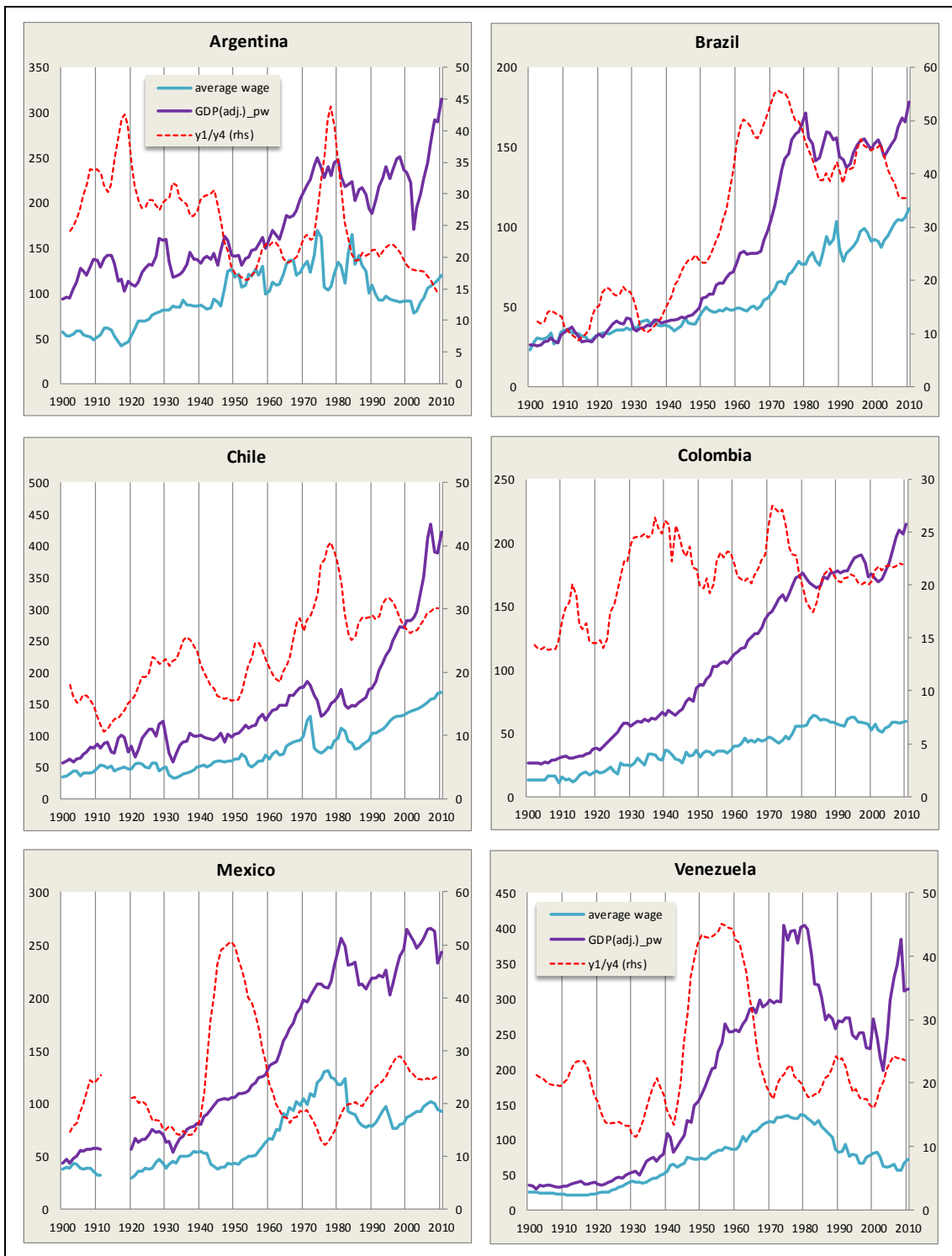
**Figure A-1: Inequality measures by country**  
(lhs axes: Gini coefficients.; rhs axes: ratios)



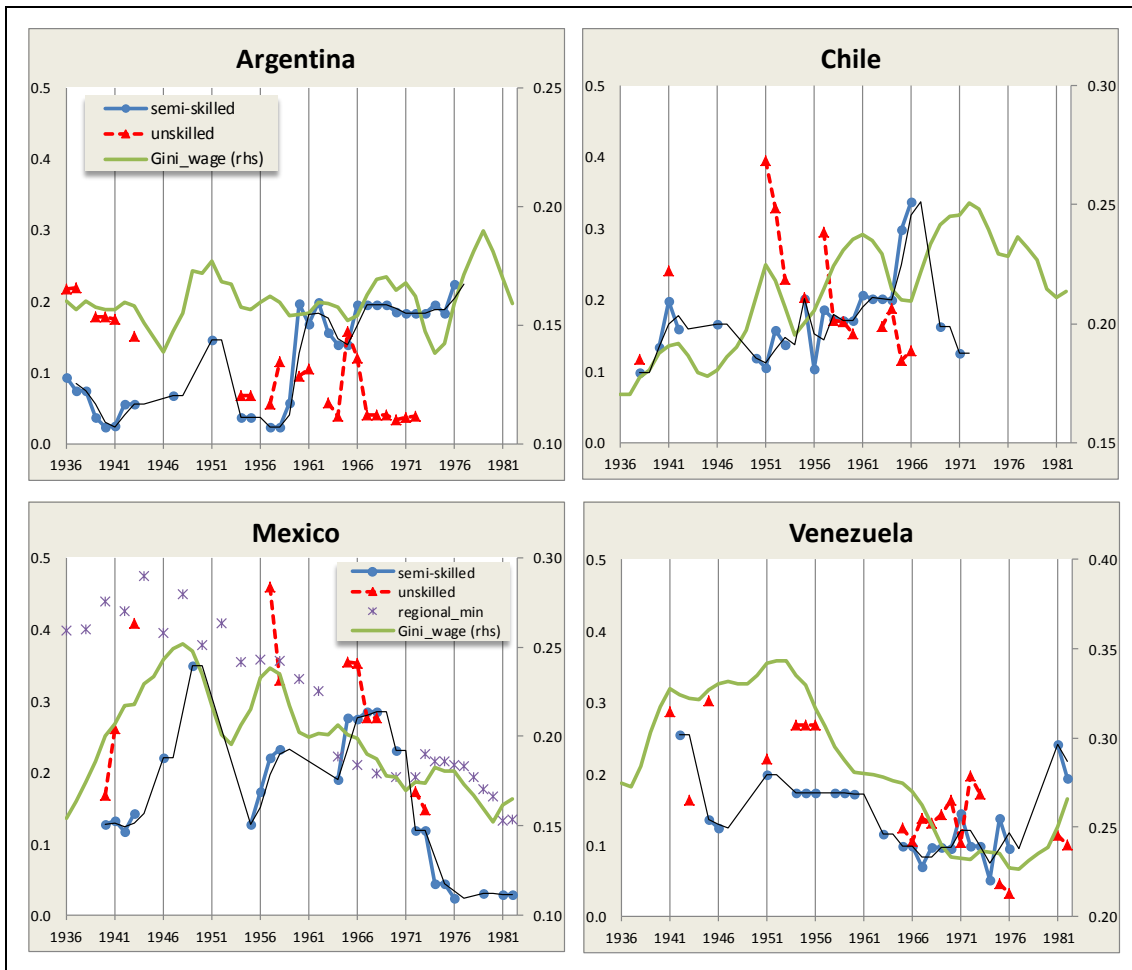
**Figure A-2: Concentration at the top and wage inequality**  
*(lhs axes: shares; rhs axes: Gini coefficients)*



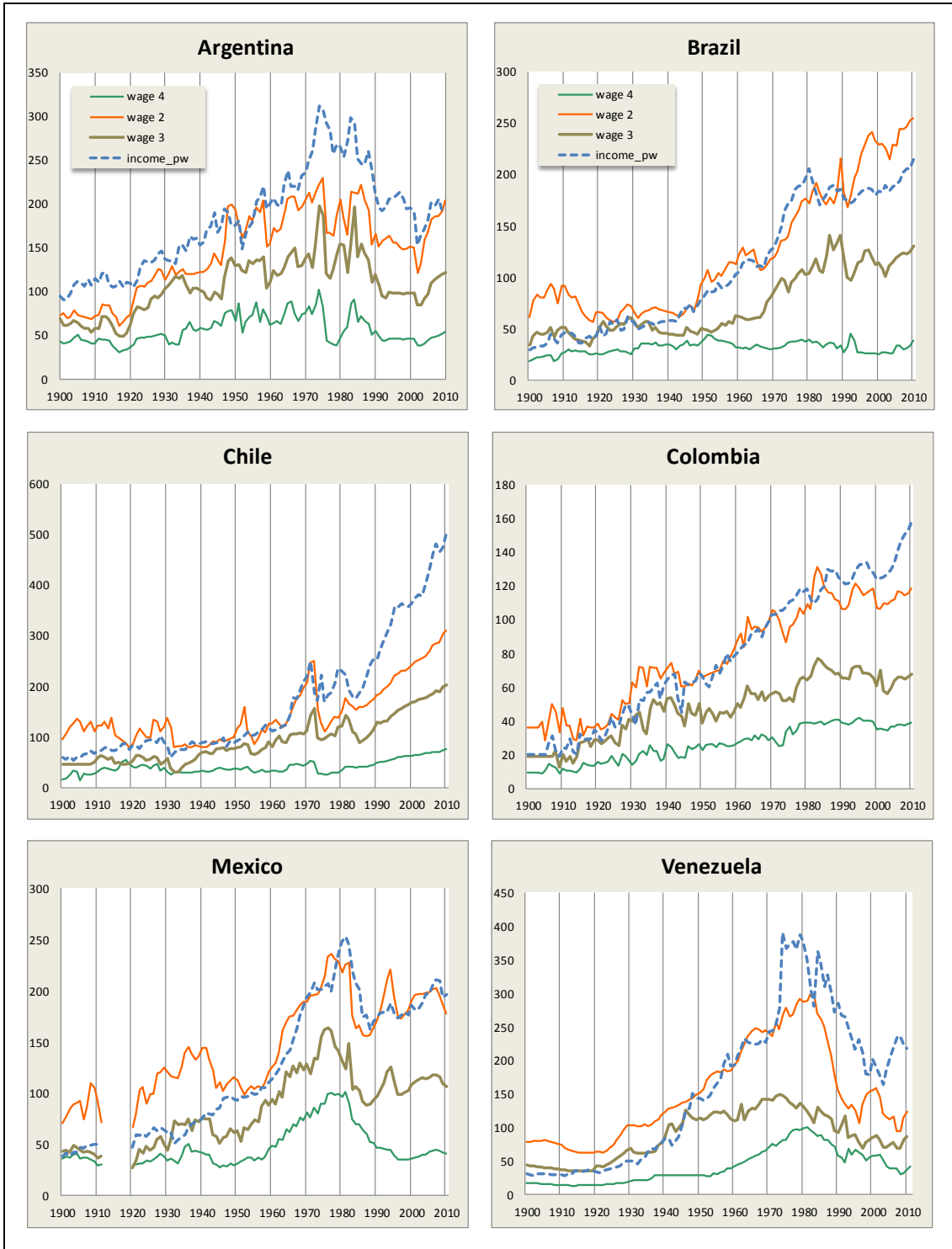
**Figure A-3: Average wage, GDP pw (terms of trade adj.) & top-bottom ratios**  
 (lhs axes: US\$ per worker/month, 1970 prices; rhs axes: ratio)



**Figure A-4: Wage dispersion in unskilled and semi-skilled labour**  
*(lhs axes: coefficient of variation; rhs axes: Ginis)*



**Figure A-5: Real wage by skill level and income per worker**  
*(monthly figures, US\$ at 1970 prices)*



## Annex B: Detailed Tables

Table B-1 presents the resulting EAP shares for the four groups by decades (circa values).

	Argentina				Brazil				Chile			
	<i>n</i> <sub>1</sub>	<i>n</i> <sub>2</sub>	<i>n</i> <sub>3</sub>	<i>n</i> <sub>4</sub>	<i>n</i> <sub>1</sub>	<i>n</i> <sub>2</sub>	<i>n</i> <sub>3</sub>	<i>n</i> <sub>4</sub>	<i>n</i> <sub>1</sub>	<i>n</i> <sub>2</sub>	<i>n</i> <sub>3</sub>	<i>n</i> <sub>4</sub>
1900	4.0	14.6	42.4	39.0	3.5	6.7	17.3	72.5	6.0	7.0	44.9	42.1
1910	4.1	15.0	46.6	34.3	3.6	7.3	18.1	70.9	6.8	7.0	44.1	42.1
1920	4.3	15.6	44.9	35.2	3.9	7.9	19.2	69.0	5.1	6.9	46.1	41.9
1930	4.4	16.7	43.6	35.2	3.9	6.6	22.8	66.7	4.7	7.0	45.3	43.1
1940	4.6	18.4	43.4	33.6	3.9	7.7	23.9	64.5	5.5	7.3	46.2	40.9
1950	5.1	17.6	51.9	25.5	3.9	9.3	26.4	60.4	5.6	8.4	48.2	37.7
1960	6.2	18.1	54.5	21.2	4.0	10.4	30.0	55.5	7.5	8.8	51.2	32.5
1970	6.7	20.2	53.3	19.8	4.6	10.9	35.1	49.5	8.4	13.1	54.0	24.5
1980	8.3	21.4	53.0	17.3	6.5	11.8	38.3	43.4	9.6	15.9	51.8	22.7
1990	10.4	26.0	47.0	16.6	6.7	13.7	44.0	35.6	12.1	14.7	50.6	22.7
2000	12.1	25.2	47.6	15.1	7.9	13.4	46.8	31.9	13.7	17.0	47.3	22.0
2010	11.4	25.4	46.3	16.9	8.4	13.0	51.8	26.7	14.5	16.5	49.0	20.1
	Colombia				Mexico				Venezuela			
	<i>n</i> <sub>1</sub>	<i>n</i> <sub>2</sub>	<i>n</i> <sub>3</sub>	<i>n</i> <sub>4</sub>	<i>n</i> <sub>1</sub>	<i>n</i> <sub>2</sub>	<i>n</i> <sub>3</sub>	<i>n</i> <sub>4</sub>	<i>n</i> <sub>1</sub>	<i>n</i> <sub>2</sub>	<i>n</i> <sub>3</sub>	<i>n</i> <sub>4</sub>
1900	6.2	5.1	23.2	65.5	3.3	4.9	21.0	70.8	4.1	6.4	19.8	69.6
1910	6.2	5.0	25.6	63.1	3.5	4.6	21.0	70.8	4.1	6.2	24.9	64.8
1920	6.0	4.5	28.9	60.7	3.5	4.8	20.9	70.8	4.6	6.3	29.1	60.0
1930	5.9	5.1	30.4	58.6	3.3	5.1	21.5	70.1	4.2	6.9	33.2	55.6
1940	5.7	5.4	32.0	56.9	2.9	5.6	25.5	66.0	4.2	7.5	37.9	50.3
1950	6.1	8.7	33.2	52.0	2.9	6.5	26.7	63.9	5.7	8.7	42.4	43.2
1960	7.3	9.9	33.9	48.9	4.0	8.0	32.6	55.3	5.8	11.1	45.2	37.8
1970	7.8	12.7	35.3	44.1	6.1	9.6	38.3	46.0	9.2	16.4	46.5	27.9
1980	7.5	13.9	38.8	39.8	7.2	11.4	40.8	40.5	12.5	17.4	45.9	24.3
1990	8.4	14.5	41.0	36.2	8.3	12.8	41.0	38.0	13.7	17.5	45.6	23.2
2000	9.1	14.0	40.9	36.0	9.5	14.1	43.9	32.4	12.3	17.5	46.5	23.7
2010	11.1	15.0	43.3	30.7	10.0	14.8	47.8	27.4	14.1	15.3	47.8	22.7

*All figures are three years averages except those for 1900 based on two years.  
Benchmark figures circa 2000 are from ECLAC (2000), except for Argentina which are based on ILO's data.*

Table B-2 presents the calculated relative income ratios for the four groups by decades (circa values).

Table B-2: Relative income ratios by occupational categories by decades												
	Argentina				Brazil				Chile			
	$r_1$	$r_2$	$r_3$	$r_4$	$r_1$	$r_2$	$r_3$	$r_4$	$r_1$	$r_2$	$r_3$	$r_4$
1900	10.3	0.80	0.71	0.45	7.0	2.06	1.27	0.55	6.7	1.59	0.80	0.31
1910	13.0	0.64	0.51	0.38	6.4	1.98	1.11	0.60	5.3	1.65	0.78	0.43
1920	11.8	0.72	0.59	0.34	8.1	1.43	1.10	0.52	8.4	1.04	0.62	0.51
1930	9.6	0.86	0.72	0.33	8.4	1.22	1.04	0.54	8.4	1.64	0.69	0.42
1940	9.8	0.78	0.65	0.36	8.9	1.14	0.78	0.59	7.6	0.91	0.78	0.38
1950	6.5	1.05	0.75	0.38	11.2	1.20	0.60	0.49	6.0	1.23	0.86	0.40
1960	7.8	0.79	0.56	0.34	13.6	1.13	0.58	0.30	5.7	1.12	0.74	0.29
1970	7.2	0.83	0.55	0.31	12.1	0.91	0.66	0.23	5.5	1.09	0.64	0.24
1980	6.2	0.73	0.57	0.18	9.4	0.90	0.54	0.19	6.1	0.68	0.52	0.16
1990	5.0	0.74	0.53	0.24	7.5	1.06	0.67	0.18	5.1	0.70	0.48	0.19
2000	4.3	0.78	0.51	0.24	6.3	1.27	0.61	0.14	4.6	0.66	0.46	0.17
2010	3.6	0.99	0.63	0.28	5.7	1.20	0.61	0.17	4.6	0.62	0.41	0.15
	Colombia				Mexico				Venezuela			
	$r_1$	$r_2$	$r_3$	$r_4$	$r_1$	$r_2$	$r_3$	$r_4$	$r_1$	$r_2$	$r_3$	$r_4$
1900	6.6	1.41	0.95	0.46	9.6	1.71	0.97	0.56	7.9	2.63	1.30	0.36
1910	7.1	1.56	0.73	0.47	12.2	1.49	0.69	0.50	7.0	2.54	1.28	0.36
1920	6.8	1.15	0.89	0.47	11.5	1.54	0.65	0.55	6.2	1.88	1.20	0.41
1930	7.9	1.31	0.91	0.33	9.8	1.97	0.80	0.58	4.9	1.98	1.28	0.42
1940	8.5	1.12	0.79	0.35	9.4	1.90	0.99	0.56	6.1	1.52	1.17	0.37
1950	7.9	1.03	0.68	0.38	17.6	1.21	0.68	0.35	8.5	1.07	0.79	0.19
1960	7.3	1.08	0.59	0.33	9.9	1.12	0.83	0.43	9.5	0.97	0.56	0.22
1970	7.2	0.99	0.54	0.27	7.6	0.99	0.65	0.41	5.3	0.99	0.58	0.30
1980	6.8	0.92	0.57	0.34	7.0	0.94	0.55	0.41	5.1	0.78	0.35	0.26
1990	6.4	0.88	0.54	0.32	6.4	1.01	0.57	0.28	5.1	0.57	0.35	0.19
2000	6.1	0.88	0.52	0.29	5.4	1.07	0.61	0.20	4.7	0.85	0.44	0.29
2010	5.4	0.79	0.47	0.25	5.4	0.93	0.55	0.21	4.8	0.62	0.39	0.21

All figures are three years averages except those for 1900 based on two years.  
 Figures circa 2000 are our own estimates, using benchmark years from employment shares (see Table B-1).

Table B-3 presents the calculation of trend commonality by natural decades.

<b>Table B-3: Trend commonality by natural decades</b>													
Decades	<i>Trends in between-group Ginis (see Figure A-1)</i>							<i>partial scores (R, C, F)</i>			<b>total score</b>	<b>max score</b>	<b>score 0-1 B-trend_LA7</b>
	<b>Arg</b>	<b>Bra</b>	<b>Chi</b>	<b>Col</b>	<b>Mex</b>	<b>Ven</b>	<b>Uru</b>						
<b>1900s</b>	R	R	F	C	R	F	n.a.	3	1	2	14	36	0.39
<b>1910s</b>	R	F/R	R	F	n.a.	C	F/R	3	1	2	14	36	0.39
<b>1920s</b>	C	C	R	R	F	F	F	2	2	3	17	49	0.35
<b>1930s</b>	C	F/R	R/F	C	F	R/F	C	1.5	3	2.5	17.5	49	0.36
<b>1940s</b>	R/F	R	F	F	R	R	F	3.5	0	3.5	24.5	49	0.50
<b>1950s</b>	R	R	R/F	R	F	R	F	4.5	0	2.5	26.5	49	0.54
<b>1960s</b>	F/R	C	F/R	R	F/R	F	R	3.5	1	2.5	19.5	49	0.40
<b>1970s</b>	R	R	F/R	R/F	F/R	R	R	5	0	1.5	27.25	49	0.56
<b>1980s</b>	F	F	F/R	R	R	R	R	4.5	0	2.5	26.5	49	0.54
<b>1990s</b>	R	C	R/F	R	R	F	R	4.5	1	1.5	23.5	49	0.48
<b>2000s</b>	F	F	R	R	F/C	R/F	F	2.5	0.5	4	22.5	49	0.46
Decades	<i>Trends in wage Ginis (see Figure A-3)</i>						<i>partial scores (R, C, F)</i>			<b>total score</b>	<b>max score</b>	<b>score 0-1 W-trend_LA6</b>	
	<b>Arg</b>	<b>Bra</b>	<b>Chi</b>	<b>Col</b>	<b>Mex</b>	<b>Ven</b>							
<b>1900s</b>	F	R	F	C	R	C		2	2	2	12	36	0.33
<b>1910s</b>	R	F	F	C	n.a.	F		1	1	3	11	25	0.44
<b>1920s</b>	R	R	R	F/R	C	R		4.5	1	0.5	21.5	36	0.60
<b>1930s</b>	R/F	F	F/R	F/R	R/F	F		2	0	4	20	36	0.56
<b>1940s</b>	F/R	C/R	R	F	R	R		4	0.5	1.5	18.5	36	0.51
<b>1950s</b>	F	R	R	F/R	F	R/F		3	0	3	18	36	0.50
<b>1960s</b>	R	R/F	F/R	R	F	F		3	0	3	18	36	0.50
<b>1970s</b>	F/R	R	F	F	F	F		1.5	0	4.5	22.5	36	0.63
<b>1980s</b>	R	R	R	R/F	R	R/F		5	0	1	26	36	0.72
<b>1990s</b>	R/F	R	C/R	R	R	F/R		4.5	0.5	1	21.5	36	0.60
<b>2000s</b>	R	F	R	C	F	F		2	1	3	14	36	0.39

*R = rising trend; C = constant trend; F = falling trend. Partial score = number of times that a particular trend type occurs*

**Total score = (R<sup>2</sup> + C<sup>2</sup> + F<sup>2</sup>); max score = number of countries with data<sup>2</sup>; score 0-1 = total score/max score**

## Annex C. Estimation Procedures and Adjustments

### C.1. Employment shares

We follow two different procedures to estimate the shares of the EAP per each of the four occupational categories:

#### *Period 1950-2011*

The employment shares of the four groups are estimated by aggregating categories for the distribution of the EAP by occupational groups according to data collected by the International Labour Organization (ILO) and ECLAC. We use four different classifications:

1. ECLAC, *Panorama Social de América Latina*, circa 2000. *Group 1*: employers, managers and professionals. *Group 2*: technicians and administrators (clerks). *Group 3*: urban workers (retailing and transport, excluding low skilled workers and street vendors), artisans and blue collar workers. *Group 4*: rural workers and personal services (includes domestic servants) plus low skilled urban workers and street vendors.
2. ILO, ISCO-88. *Group 1*: 1 legislators, senior officials and managers; 2 professionals. *Group 2*: 3 technicians and associate professionals; 4 clerks; plus 6 skilled agricultural and fishery workers. *Group 3*: 5 service workers and shop and market sales workers; 7 craft and related trade workers; 8 plant and machine operators and assemblers; 0 armed forces; *Group 4*: 9 elementary occupations; plus X not classifiable by occupation.
3. ILO, ISCO-68. *Group 1*: 0/1 professional, technical and related workers; 2 administrative and managerial workers. *Group 2*: 3 clerical and related workers; (1/2)\* 4 sales workers. *Group 3*: (1/2)\* 4 sales workers; 7/8/9 production and related workers, transport equipment operators and labourers; X not classifiable by occupation. *Group 4*: 5 Service workers; 6 agriculture, animal husbandry and forestry workers, fishermen and hunters
4. PREALC (1982). *Group 1*: 0 professional, technical and related workers; 1 managerial workers. *Group 2*: 2 clerical and related workers; (1/2)\* 3 sales workers. *Group 3*: (1/2)\* 3 sales workers; 5 transport; 6-7 artisans and blue collar workers. *Group 4*: 4 agriculture; 8 service workers.

We use simple interpolation to fill the gaps in each of the occupational structures calculated with the above sources. We take the ECLAC figures for circa 2000 to set the share levels and then go backwards using information on changes in each of the four categories provided by the additional three classification systems (in ISCO-88, ISCO-68 and PREALC). To splice series from two different occupational structures we use a common year and then apply rate of changes to go backwards. The data available in each of the classifications by country are.

**Argentina.** ISCO-88 in 1998-2006. PREALC (1982) in 1960, 1970. Interpolations: 1960-70. 2000-06: uses ISCO-88 with a correction for the methodological break in 2003. **Brazil.** ISCO-88 in 2000, 2002-07. ISCO-68 in 1981-90; 1992-93; 1995-99; 2001, 1971, and 1983 (in ILO Yearbooks) and 1976-2006 available online. PREALC (1982) in 1950, 1960, 1970. Interpolations: 1951-59; 1961-69; 1991; 1994; 2000. 2000-07: uses ISCO-88. Shares in 2000 and 2001 are as in 2002. **Chile.** ISCO-88 in 2002. ISCO-68 in 1960, 1971, and 1983 (in ILO Yearbooks), and 1976-2006 available online. The categories “mining” and “armed forces” are included in Group 3. PREALC

(1982) 1952, 1960, 1970. In 1952 the total of categories 0 to 3 are split according to the structure in 1960. Interpolations: 1953-59; 1961-70; 1972-75. 2000-08: uses ISCO-68.

**Colombia.** ISCO-68 in 1975-80; 1985-87; 1989-90; 1992-2000; 2001-08. Data exclude the armed forces and are based on surveys on seven main cities. PREALC (1982) and ILO (yearbooks) in 1951, 1964, 1973 (only ILO, yearbook), and 1980. In 1951 the categories “managerial workers” and “clerical and related workers” are split according to the structure in 1964. Interpolations: 1952-63; 1965-72; 1974-79. 2000-08: uses ISCO-68. Shares in 2000 are as in 2001. **Mexico.** ISCO-88 in 2000. ISCO-68 in 1988; 1991; 1993; 1995-2008. PREALC (1982) and ILO (yearbooks, compatible with ISCO-68) in 1950, 1960, 1970, 1975 (ILO), 1980 (ILO). Interpolations: 1951-59; 1961-69; 1971-74; 1976-79; 1981-87. 2000-08: uses ISCO-88. **Venezuela.** ISCO-68 in 1976-2008. PREALC (1982) and ILO (yearbooks, compatible with ISCO-68) in 1950, 1961, 1971 (ILO), 1981 (ILO). In 1950 the categories “professionals”, “managerial workers” and “clerical and related workers” are split according to the structure in 1961. Interpolations: 1951-60; 1962-70; 1972-80. 2000-08: uses ISCO-68.

In all six countries for the final years of the current century the estimation is as follows: shares of Group 1 are kept equal to the last data point; those of Group 2 are estimated based on changes in the EAP share of manufacturing (ECLAC); for Group 4 we use changes in the share of agriculture; shares for Group 3 are estimated as a residual.

#### *Period 1900-1950*

To complete the employment shares back from 1950 to 1900 we rely on changes in three indicators constructed by FitzGerald (2008) as follows: **Group 1**, the stock of university graduates as a proportion of the total of those with primary education. The stock of educational graduates is found using the perpetual inventory method applied to the data on enrolment in primary and tertiary education. **Group 2**, total employment in manufacturing and public administration as a proportion of the EAP. Manufacturing employment comes from census data and public administration employment is estimated from levels of government expenditure. **Group 3** is estimated as the residual from the other three groups. **Group 4**, the agricultural share of the EAP, from census data. This includes not only agricultural workers as such, but also small farmers (i.e. peasants) and family labour on a non-wage basis.

#### **C.2. National income**

Ideally, we need to estimate national income deflated by the CPI so as to be consistent with the real wage series. This is done in two steps:

1. The original GDP series at 1970 prices are multiplied by a ratio of the implicit deflator to the CPI.
2. To convert the CPI deflated GDP series into National Income - when data or estimates are available - we construct a ratio of National Income to GDP and apply that ratio to the GDP series. In general, such a ratio is calculated using the data on both National Income and GDP available at ECLAC website (usually from 1970 onwards) and then we complete the series back to 1950 from other sources. During the period 1900-50 we rely on the growth rates of the unemployment-adjusted GDP series.

In order to calculate the relative income levels, we need average overall income per worker series consistent with our wage data. We proceed as follows. First we calculate a weighted average monthly wage from our series in 1970 (using the groups' EAP shares

as weights). Second, we use estimates of the wage share of total national income in that year in order to calculate an average income per worker value in 1970 consistent with our estimated average wage level. Then we use the growth rate of the adjusted income per worker (at 1970 prices) series to go back to 1900 and forth to 2011. The level adjustment in 1970 is also used to calibrate our series and to take into account some of the fringe payments and non-wage labour income that are included at the time of calculating the labour share on overall income but that are largely excluded from our wage data. Eriksson (1966, 22) found that in Chile, Colombia and Venezuela during the middle decades of the last century skills differentials measured by total remuneration were either close to or greater than differentials measured in basic wages.

*Sources for National Income:* **Argentina:** 1993-2011 uses ECLAC website; 1950-1993 uses estimates in Kacef and Manuelito (2008). **Brazil:** IBGE from 1947 to 2011. **Chile:** 1960-2011 uses ECLAC website; 1950-60 uses estimates in Kacef and Manuelito (2008). **Colombia:** 1970-2011 use ECLAC website; 1962-70 uses ILO yearbooks; 1950-62 uses estimates in Kacef and Manuelito (2008). **Mexico:** 1970-2011 uses ECLAC website; 1950-70 uses estimates from Kacef and Manuelito (2008). **Venezuela:** 1998-2011 uses ECLAC website; 1950-98 uses BCV website (Venezuela Central Bank). *Sources for GDP at constant prices and CPIs:* Chile 1900-1940, we deflate the nominal GDP series in Haindl (2006) with the CPI. Mexico 1900-1910 uses *Estadísticas Económicas del Porfiriato* available at the ITAM webpage. In Venezuela we use De Corso (2013). Otherwise we use MOxLAD. CPI series are as in Astorga (2012). In Argentina to avoid the under-reporting of CPI inflation by INDEC in 2006-11, we use a CPI index reported by seven provinces compiled by CENDA.

### **C.3. Unemployment adjustment**

To adjust for unemployment the income per person engaged series we do as follows:

1. We calculate a long-term unemployment rate as a 10-year moving average of the yearly unemployment rates (outliers are smoothed out, see below for years).
2. We calculate the deviations between yearly unemployment rates and the long-term rate. Those deviations are multiplied by our original EAP series to estimate the number of unemployed people (relative to the natural rate), which are then subtracted from the EAP series to obtain adjusted EAP series.
3. A ratio of the original EAP series and the adjusted EAP series is then applied to the series of income per person engaged.

Because of lack of unemployment rates at group level, in all cases we assume that the overall jobless rate affects all groups equally. We use the ECLAC website as source for unemployment rates in 1980-2011 in all cases. The sources for the remaining years are:

**Argentina:** 1970-80 uses ILO website. We smooth out outliers in 1976, 1995-96, and 2000-03. In 1931-42 we apply the same adjustment as in Mexico. **Brazil:** 1977-80 uses ILO website. Outliers in 1981, 1984, and 2002. In 1931-42 we apply the same adjustment as in Mexico. **Chile:** 1975-80 uses ILO website. Outliers in 1982, 1985, 1991, 1999, 2004, and 2009. In 1931-43 uses as proxy estimates of “applicants for work” from the League of Nations website. **Colombia:** 1975-80 uses ILO website. Outliers in 1980, 1984, 1986, 1999-2003, and 2009-10. In 1931-42 we apply the same adjustment as in Mexico. **Mexico:** 1973-80 uses ITAM website. Outliers in 1977, 1983, 1995, 2004, and 2009. In 1931-42 uses official estimates reported in Keesing (1977). **Venezuela:** 1928-80 uses Valecillos (2007). Outliers in 1984-85, 1990, and 1999-2004.

#### ***C.4. Real wage series by skill level***

We have assembled these wage series with the aim of reflecting different skill levels and to make them comparable across the six countries and over time. We first set comparable wage levels in the core period of 1965-1980 and then proceed to complete the series back and forth by using rate of growth of a number of wage series from various sources. To set comparable levels across the LA-6 we do the following:

- For the unskilled workers circa 1970 we rely on comparable series of agricultural wages for unskilled workers in agriculture and the urban minimum wage from PREALC (1982) and ECLAC website.
- For semi- skilled workers we use the average wage in most cases including seven occupations (bricklayers & masons, structural iron workers, concrete workers, carpenters and joiners, painters, plumbers, and electrical fitters) in the construction industry collected in ILO's October Enquiry, Part I.
- For relatively skilled workers, where possible, we use monthly wages for clerks (an average of bank tellers and accountants) available in ILO's October Enquiry, Part II, or average wages in manufacturing from PREALC (1982) otherwise.
- Finally, to have comparable wages in a single currency across countries we calculate PPP\$ values using the PPP exchange rates available for 1970 (ECLA, 1978).

Regarding rate of growth: for Group 2 we use series of manufacturing wages, and, when this is not an option, wages in the public sector for relatively skilled employees such as mechanics or mid-range officers (e.g. Colombia). For Group 3 we tend to use wage series in the construction sector or in other relatively low skilled sectors such as retailing. For Argentina we use average wages of non-agricultural sectors (excluding government) pre 1965. Chile pre 1930 uses wages in low productivity sectors (food and drinks, and textiles). For Mexico we tend to rely on changes in minimum wages for the early decades. For Group 4, pre-1965, we primarily use wages in agriculture for unskilled workers, which in some cases are complemented by wages for unskilled government employees (e.g. Colombia). And in the post-1980 period we use a combination of rural and urban minimum wages, or relatively low productivity sectors such as retailing and personal services. Figure A-5 shows the real wage series by the three occupational groups together with the estimated income per worker series (deflated by the CPI).

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