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INCOME SHARES SOUTH OF THE RIO BRAVO, 1920-2011*

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Abstract

This paper analyses, for the first time, comparable income shares of the top 10%, the middle 50% and the bottom 40% of the labour force in Argentina, Brazil, Chile, Colombia, Mexico and Venezuela (LA6) from 1920 to 2011 using a new dataset. The main findings are: i) over the whole period the LA6 exhibited a recurrent very high income concentration at the top 10% (an average share of 48.1%) and a relatively low share for those of the bottom 40% (13.9%), with a Palma ratio of 3.5; ii) although the three shares varied over time and showed important differences across countries and developmental epochs, the region did not show a lasting equalising outcome resembling the Great Levelling experienced by developed economies during the middle decades of the last century; iii) there is no support over time for the "Palma proposition" stating a relative stability of the income share of the middle 50%. Despite policy efforts in the 2000s to raise the income of the bottom 40%, altogether, a more equitable income distribution is still a pending task in Latin America .

Keywords: economic development, industrialisation, income inequality, Latin America

JEL Classification: O10, N1, O15, O54

Resumen

Este artículo analiza, por primera vez, participaciones de ingreso comparables para el 10% superior, el 50% intermedio y el 40% inferior de la fuerza laboral en Argentina, Brasil, Chile, Colombia, México y Venezuela (LA6) entre 1920 y 2011 usando una nueva base de datos. Los hallazgos principales son: i) durante todo el período el LA6 exhibió de manera recurrente un nivel muy alto de concentración del ingreso en el 10% superior (una participación promedio de 48,1%) y una relativamente baja participación del 40% inferior (13,9%), con un ratio de Palma de 3,5; ii) si bien las tres participaciones variaron a lo largo del tiempo con diferencias importantes entre países y épocas de desarrollo, la región no tuvo nada semejante a la "Gran Nivelación" experimentada en los EE.UU. y el Reino Unido durante las décadas intermedias del siglo pasado; iii) la evidencia temporal no da apoyo a la "Proposición de Palma" que establece una estabilidad relativa de la participación del ingreso del 50% intermedio. A pesar de los esfuerzos de política en los años 2000 para aumentar el ingreso del 40% inferior, en general, una distribución más equitativa del ingreso sigue siendo una tarea pendiente en América Latina.

Palabras clave: desarrollo económico, industrialización, desigualdad del ingreso, América Latina.

Clasificación JEL: O10, N1, O15, O54

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1. Introduction

The study of concentration at the top of the income distribution is already established in the inequality literature. Outcomes are placed in historical perspective by the construction of distribution tables based on tax records (Atkinson et al., 2011; Piketty, 2014). In Latin America there has also been increasing attention on historical top incomes (mostly on the top 1%) at a country level (Alvaredo, 2010; Alvaredo and Londoño, 2013; Flores et al., 2019; Souza, 2018; Rodríguez Weber, 2018). These studies indicate a relatively very high concentration, as well as the dominance of a rising or stable top share since 2000 or so – in contrast with the downward trend in the household Ginis (Gasparini et al., 2011).

The use of tax records not only makes it possible to track top incomes during periods without official household budget surveys (HBS), but also to better capture the income of the rich the underestimation of which is well known in such surveys (Székely & Hilgert, 1999). However, scarcity of fiscal data, compounded by pervasive tax evasion and avoidance plus methodological breaks, limit the use of this approach to shed light on income concentration in Latin America over the long term[1]. Besides, the tax-records undertaking has paid little attention to those at the bottom of the distribution as the poor do not file tax returns. This is unfortunate, as their income take is of paramount importance for assessing the distributional dynamics during periods defined by particular growth and development strategies.

The tails and the middle of the income distribution have been the centre of attention of Palma (2011; 2016; 2019). Moreover, the income-share ratio of the top 10% to the bottom 40% (the Palma ratio) is now used as an alternative inequality measure to the Gini coefficient[2]. The focus on the top 10% income share is justified since, according to HBS data, the share of such decile (D10) shows a distinct behaviour when compared to the ninth decile (D9); a contrast that is especially acute in Latin America with a D10 average of 41.8% in c.2005 compared to a D9 average of 15.8% (2.6 times higher). The same figures for the non-Latin American regions were 29.5% and 15.3% (1.9 times). Meanwhile, the income share of the bottom 40% in the region was below 10%, the lowest after Southern Africa.

A key result of Palma's research is that variations in inequality across countries in the first two decades of this century have been largely determined by differences in income shares of the top 10% (T10) and the bottom 40% (B40) of the distribution, whereas the share of the middle 50% (M50) holds a relatively stable half of total income. The generalisation of this finding is known as the "Palma proposition" (Cobham et al., 2016).

This paper offers, for the first time, estimates of T10, M50, and B40 of the labour force for Argentina, Brazil, Chile, Colombia, Mexico and Venezuela (LA6) during the period 1920-2011. These series are comparable across countries and consistently defined over time in a suffi-

1 Jiménez et al. (2010) estimate average tax evasion c.2005 equivalent to 4.6% of GDP in a sample of seven Latin American countries including Argentina, Chile, and Mexico. See also Alvaredo (2010) for concerns on the use of historical tax data in Argentina.

2 Although the Palma ratio implicitly includes information on changes in the aggregate middle 50%, it is insensitive to distributional changes within the three shares. The Gini coefficient is inherently oversensitive to changes in the middle and less so to changes in the tails – therefore, it is less responsive to high concentration in the top. As a rule of thumb, a Palma ratio of 4 is close to a Gini of 0.50.

cient number of countries as to give a regional perspective[3]. Importantly, they shed light on both income concentration and inequality in decades with limited income tax records and no official household surveys. My work adopts an innovative methodology that largely relies on wage data, but that also makes allowances for non–labour income. A key feature of the estimation is the reallocation of sections of the labour force and their income shares to move from a distributional structure of four occupational groups defined by their skill level (Astorga, 2024) to a breakdown of three fixed shares of the labour force[4].

When discussing the evidence, I adopt a periodisation defined by two inflexion points in the series of GDP per capita, literacy, and urbanisation in the LA6 (Astorga et al., 2005) around 1940 and 1980 (preceding an acceleration in the first date, and levelling off in the second). This division also reflects the implementation of particular development and growth strategies and follows a tradition of economic historians studying the region (e.g., Bértola and Ocampo, 2012). Roughly speaking, 1920–1939 (Period 1) includes the transition years that followed the end of the First Globalisation; 1940–1979 (Period 2) comprises the core years of state–led, protected industrialisation; and 1980–2011 (Period 3) covers an episode of export–led growth and neoliberal reforms – starting earlier in the 1970s in Chile and Argentina.

This paper answers four interrelated questions: i) Is the Latin American tendency for a high income concentration at the top 10% and a low share of the bottom 40% a recent phenomenon?; ii) Are there significant distributional differences across developmental periods?; iii) Is there support for the Palma proposition over time?; iv) How did the T10 and the B40 in the LA6 compare to those in the industrial leaders?

Table 1. Income shares and Palma ratios, 1920–2011

	T10	M50	B40	T10/B40	T10	M50	B40	T10/B40	T10	M50	B40	T10/B40	T10	M50	B40	T10/B40
	share %			*ratio*	*share %*			*ratio*	*share %*			*ratio*	*share %*			*ratio*
	1920-2011				1920-1939				1940-1979				1980-2011			
Argentina	49.8	35.2	14.9	*3.3*	48.5	36.0	15.5	*3.1*	50.3	34.0	15.7	*3.2*	50.0	36.4	13.6	*3.7*
Brazil	51.3	36.3	12.4	*4.1*	47.3	37.1	15.5	*3.0*	56.1	31.7	12.2	*4.6*	47.5	41.9	10.6	*4.5*
Chile	47.0	39.2	13.8	*3.4*	48.1	36.3	15.6	*3.1*	44.0	41.6	14.5	*3.0*	50.2	38.2	11.6	*4.3*
Colombia	48.6	38.6	12.8	*3.8*	43.9	42.0	14.1	*3.1*	51.2	37.6	11.2	*4.6*	48.3	37.7	14.0	*3.5*
Mexico	45.3	39.4	15.3	*3.0*	37.6	43.1	19.3	*1.9*	48.3	36.9	14.7	*3.3*	46.8	39.9	13.2	*3.5*
Venezuela	45.9	40.2	13.9	*3.3*	39.9	44.0	16.0	*2.5*	44.7	41.1	14.1	*3.2*	51.5	36.4	12.1	*4.2*
LA6	48.1	38.2	13.9	*3.5*	44.2	39.8	16.0	*2.8*	49.1	37.2	13.7	*3.6*	49.1	38.4	12.5	*3.9*
C.V.	*11.2%*	*11.5%*	*15.1%*	*23.0%*	*12.3%*	*11.3%*	*11.8%*	*20.0%*	*13.0%*	*13.5%*	*17.6%*	*26.9%*	*8.0%*	*9.0%*	*14.0%*	*19.4%*

Note: LA6: simple averages; *C.V.* stands for the coefficient of variation over the respective period. Calculations are based on 3–years average series.

3 The LA6 accounted for about three quarters of the population and economic activity of Latin America over the last century and thus are representative of the region as a whole. However, my sample misses the rich variety of a wider country coverage.

4 My data do not allow for the estimation of the top 1% share with any level of accuracy. Note that, as shown in the case of Brazil, trajectories in the top 10% and the top 1% can differ substantially (Souza, 2018, Figure 1).

Table 1 summarises key results on income shares and Palma ratios[5]. Over the whole period the LA6 exhibits a very high concentration at the top 10% (an average share of 48.1%), a moderate share of the middle 50% (38.2%) and a relatively low share for those of the bottom 40% (13.9%), with a Palma ratio of 3.5. When looking across the three periods, although the LA6 share of the middle 50% fluctuates from 39.8%, to 37.2% and 38.4, the Palma ratio shows a significant rise after 1940, indicating worsening inequality. Also, there is a contrast between high dispersion in Period 2 and homogeneous outcomes in Period 3. At a country level, Palma ratios show in a number of cases a move towards more polarised tails within countries across the three periods (e.g., in Argentina a rise from 3.1, to 3.2 and, then, to 3.7); a pattern which is also reflected in the LA6 (2.8, 3.6 and 3.9)[6]. Altogether, the picture that emerges from the historical evidence is one of a combination of very high – or, at times, extreme – top income shares, moderate and fluctuating middle shares, and low and largely stagnant bottom shares.

I found no support for a relative stability of M50 in the time series analysis. My evidence suggests that those in the top 10% of the labour force are the ones that have acquired strong property rights over half of the total income. And that those of the bottom 40% have been particularly weak politically and unable to defend a sustainable rise in their income share.

Moreover, despite significant country differences in T10 between 1940 and 1979, the region largely missed the Great Levelling experienced by developed economies (Lindert and Williamson, 2016) confirming previous findings (Arroyo & Astorga, 2017; Astorga, 2024). The T10 stayed above 44% in all six countries and the LA6 average was 49.1%. This contrasts with T10s of about 35% and 30% in the US and the UK respectively (see Figure 3 further down). Also, there were notable differences at the lower tail of the distribution. An average B40 of 13.7% in Period 2 and 12.5% in Period 3 in the LA6 were significantly below equivalent shares in Great Britain of 27% between 1960–1979 and 23% in Period 3.

The remainder of the paper is structured as follows. Section 2 summarises the methodology used to estimate the three income shares. Section 3 presents and discusses the outcome of the tails and the middle. Section 4 examines the Palma proposition over time. Section 5 compares the LA6 trajectories of the tails with those in the UK and the US. Section 6 offers an overview of long-term income inequality as measured by the Palma ratio and three other metrics from previous publications. Section 7 concludes.

2. Moving from occupational groups to eap quantiles

The starting point is a new inequality dataset for the LA6 with income estimates derived from dynamic occupational tables based on four groups defined by their skill level. Here, I present a brief summary; see Astorga (2024) for a full account. For each country, the economically active population (EAP) is divided into: Group 1 (employers, managers, and professio-

5 To be precise, because I am not using perfectly-sorted HBS data, T10/B40 should be taken as a Palma-like ratio.

6 There are outliers in T10 and B40 in Period 1. Mexico shows a T10 of 37.6% and a B40 of 19.3%, with a Palma ratio of 1.9. These outcomes were driven by the aftermath of the 1910s Revolution. Venezuela also displays a T10 just under 40% and a B40 of 16%, though owing to scarcity of data these results should be approached with caution.

nals), Group 2 (technicians and administrators – white collar workers), 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 services – including domestic servants – plus unskilled urban workers). The size of the groups changes over time in response to developments in education, demography, and living standards (Astorga et al., 2005). The distribution of income per occupational group is defined as:

$$(1) \quad \sum_{i=1}^{4} e_i r_i = 1$$

where e_i is the EAP share of group i and r_i is the ratio of the mean income of group i to the mean income of the EAP as a whole ($r_i=y_i/y$). The income share of each group s_i is obtained as $e_i r_i$.

The overall measure of income per person engaged reflects, where possible, the pre–fisc household income concept of the national accounts. I prefer using this concept rather than net national income to avoid an overestimation of the income share of Group 1 that would result if items such as the net surplus of the public sector, and indirect and corporate taxes were included[7]. Although there is enough data to account for net taxes since the 1980s, availability is more problematic for the previous years. In any case, there was limited redistribution via direct transfers in the region during most of the 20th century (Goñi et al., 2011) and the analysis of the series pre–fisc or post–fisc should lead to similar conclusions. Also, I omit the distributive impact of social spending (e.g., health and education) which has risen throughout the region since around 1950, though exhibiting high volatility and following the swings in economic activity (Arroyo Abad and Lindert, 2017).

From (1) the income share for Group 1 (s_1) is calculated as a residual by subtracting the corresponding shares for the other three groups:

$$(2) \quad s_1 = e_1 r_1 = \left\{ 1 - \sum_{i=2}^{4} e_i r_i \right\}$$

This top share is likely to capture most of the property income (distributed profits, rents and interest payments) for all the labour force, together with earnings from highly skilled workers[8]. Natural resource rents – particularly important in Chile and Venezuela during most of the period – are included to the extent that they are reflected in household income, but not when they were used to finance publicly provided services or to pay for subsidies. Because of the way it is calculated, s_1 may be potentially subject to a significant margin of error. However,

7 The use of household income rather than national income means lower T10s (as a gross approximation 2.5 percentage points - pp) and higher M50s (1.5 pp) and B40s (1pp). However, trajectories are robust to the change in the income concept.

8 The long–term evidence in developed economies shows that income from property tends to be concentrated in the top 10% income group (Piketty, 2014).

in general, when data allows for comparisons, trends in s_1 are broadly consistent with those in the income share of gross profits in the national accounts as well as with available series of top income shares based on tax records (Astorga, 2024, Figure A1). To estimate the mean income in the remaining three occupational groups I rely on wage series assembled to reflect differences in skills (Astorga, 2017; 2023).

2.1 Fixed EAP shares

The next task is to move from a structure with changing EAP shares to one of fixed shares for the top 10%, the middle 50%, and the bottom 40%[9]. A main advantage of using fixed EAP shares is that it allows for comparisons with other long-term estimates of income concentration, as well as with income shares and inequality metrics calculated from HBS for the more recent period. This breakdown is also convenient for the distributional assessment of broadly-defined social groups such as the elite included in the top 10%, the administrative classes which constitute the bulk of the middle 50% and that are also dominated by jobs in the formal economy, and the bottom 40% dominated by the historically excluded groups – largely unskilled – which jobs are usually found in the subsistence and the informal economy. However, this labour rearrangement comes with an information loss, as the three quantiles can no longer be identified with a particular education or skill level. In addition, when the labour share of Group 1 is significantly smaller that 10%, there is the need to include a large number of individuals from the adjacent Group 2 with a much lower income which hardly can be considered as members of the elite.

The first step is to identify in each of the four occupational groups the part of the EAP that needs to be reallocated. At the lower end of the distribution, if $e_4 > 0.4$ a fraction equal to $e_4 - 0.4$ is to be moved from Group 4 to the middle 50%; whereas if $e_4 < 0.4$ a fraction equal to $0.4 - e_4$ needs to be taken from e_3 and, if necessary, from e_2 to complete the bottom 40%. At the top end, if $e_1 < 0.1$, $(0.1 - e_1)$ is to be moved out of e_2 and, if necessary, from e_3 to complete the top 10%; whereas if $e_1 > 0.1$, $(e_1 - 0.1)$ needs to be move out from Group 1 to form the middle 50%. Only in the special case when $e_1 = 0.1$ & $e_4 = 0.4$ it is unnecessary to reallocate labour.

The second step is to estimate the corresponding income share of the reallocated labour force. This requires information about the income distribution within groups. To that end, I assembled a dataset on income dispersion with a sufficient number of benchmark observations over the whole period in the three lower groups (Astorga, 2024: OA2). For Group 2 and Group 3 I use wage dispersion across industries for white-collar and blue-collar workers respectively sourced from industrial surveys. For Group 4 I use wages of low-skilled occupations sourced from official surveys and social tables compiled by economic historians. For Group 1, when $e_1 > 0.1$ (usually occurring in the most recent years), I rely on the percentile income distribution from household budget surveys.

9 This procedure finds initial support in the fact that Group 4 forms the core of the labour force in deciles 1-4, Group 3 and Group 2 of the deciles 5-9, and Group 1 of the decile 10.

2.2 Income overlaps

Any income overlap across the four groups is a departure from the standard assumption of perfectly–sorted quantiles which is required when calculating Gini coefficients and Palma ratios using HBS. However, when moving to the fixed–EAP shares breakdown, the potential distortions caused by income overlaps should only appear on the frontier between Group 4 and Group 3, and between Groups 1 and Group 2, as any overlap occurring in the frontier between Group 3 and Group 2 should be part of the middle 50%. Thus, I focus my attention on the first two cases.

When considering the lower two groups, the reallocation of labour implies either moving a fraction of Group 4's EAP in excess of 0.4 to form the middle 50%; or moving some Group 3's EAP to complete the bottom 40%. In both cases, the reallocation should minimise income overlaps. Regarding the frontier between Group 2 and Group 1, there is evidence of very limited overlap between them. Detailed social tables in Mexico in 1930 and 1940 show Group1–to–Group 2 income ratios of 13 and 6.3 respectively (Castañeda and Bengtsson, 2020). And according ECLAC's Panorama Social (2000), based on data around 1997 for eight Latin American countries, Group 1's mean income was about 3 times higher than that of Group 2[10]. In any case, the reallocation across these two groups to form the top 10% should remove most of any income overlap that may exists.

However, there is no guarantee that, once all reallocations are made, there will be no overlap left, particularly around the years where e_4 is close to 0.4. To address such a possibility, I implement a procedure where simulated individuals and their income located in the wrong quantile are swapped.

2.3 Reallocation and swapping

I calculate the income shares associated with any labour reallocation based on the information offered by the within–group income distribution. For the three lower occupational groups, such distribution is assumed to be Normal – which is supported by the results of normality tests – with a mean y_i *(i*=2 to 4*)* and standard deviation (σ_i) in a given year (Astorga, 2024). The general procedure is as follows:

First, e_i' is the fraction of the EAP share of group *i* (e_i) to be reallocated. $BTi=e_i'/e_i$ is a threshold in the [0–1] interval and defines the density area <u>below</u> its corresponding income value (y_i^{BTi}); whereas $ATi=(1- e_i'/e_i)$ corresponds to a threshold limiting the area <u>above</u> y_i^{ATi} . Secondly, the evaluation of the NORM.INV function in Excel returns, depending on the case, a simulated income starting at BTi (y_i^{BTi}) and ATi (y_i^{ATi})[11]. To compute a succession of income points

10 Note that, because of the underestimation of high incomes in the household surveys, these ratios should be taken as lower-bound values.

11 In general, an inverse Normal distribution is a way to work backwards from a known probability to find an x-value, with such a probability defined by the area to the left of the x-value. In my case, the area under the threshold resembles the known probability and the inverse function finds the corresponding income value. Only positive values are considered.

below and above the thresholds, I add at each iteration a 0.01 differential (equivalent to one percent) to *ATi* until reaching y_i^{99} or subtract 0.01 from *BTi* until reaching y_i^{1}[12]. Thirdly, each y_i^j is divided by the mean income of the whole EAP (y) to obtain the corresponding income ratios $r_i^j = y_i^j / y$. And, then, such ratios are multiplied by their corresponding EAP fraction to obtain the income shares $s_i^j = 0.01 r_i^j$ to be reallocated. To clarify the use of this procedure Appendix A.1 includes a numerical example for each of the three relevant reallocation cases.

The formulae to calculate B40^R, M50^R, and T10^R, where the superscript "R" stands for "after reallocation", are as follows[13]:

For B40^R:

(3a) $B40^R = e_4 r_4 - 0.01 \sum_{(j=AT4)}^{99} r_4^j$,if $e_4 \geq 0.4$;

(3b) $B40^R = e_4 r_4 + 0.01 \sum_{j=1}^{BT3-1} r_3^{BT3-j}$, if $e_4 < 0.4$ & $(e_4 + e_3) \geq 0.4$;

(3c) $B40^R = e_4 r_4 + e_3 r_3 + 0.01 \sum_{j=1}^{BT2-1} r_2^{BT2-j}$, if $e_4 < 0.4$ & $(e_4 + e_3) < 0.4$.

The first term in (3a) is the income share accruing to Group 4, and he second term adds up the income share of the reallocated labour from Group 4 to complete M50 in a given year. The second term in (3b) calculates the income of the reallocated labour force from Group 3 into Group 4 to form B40^R. The second term in (3c) is the income share of Group 3, and the third term computes the income share removed from Group 2 to complete B40^R.

For T10^R:

(4a) $T10^R = e_1 r_1 + 0.01 \sum_{j=AT2}^{99} r_2^j$, if $e_1 \leq 0.1$ & $(e_1 + e_2) \geq 0.1$;

(4b) $T10^R = e_1 r_1 + e_2 r_2 + 0.01 \sum_{j=AT3}^{99} r_3^j$, if $e_1 \leq 0.1$ & $(e_1 + e_2) < 0.1$.

The first term in (4a) is the income share accruing to Group 1, and the second term captures

12 The income of the 100th percentile of Groups 4 and 2 is excluded in calculations as they are very unlikely values in both groups and would introduce a bias. Also, I use 1 percent in all calculations when this procedure is applied. Lower or higher values for the basic fraction (e.g., within the range 0.5-1.5 percent), do not alter the size of the reallocated shares significantly.

13 For the sake of notation simplicity, I omit a subfix for years in the formulae. Also, to simplify the presentation of the equations, I assume that AT4 and BT3 are integer numbers. For instance, a more general formula in (3a) is: $B40^R = e_4 r_4 - 0.01 \sum_{j=INT[AT4]}^{99} r_4^j$ + (AT4–INT[AT4])*0.01 $r_4^{INT[AT4]}$, where INT[…] stands for the integer function.

the income share of the reallocated labour force from Group 2 to complete T10. The second term in (4b) is the income share accruing to Group 2, and the third term is the income share of the labour force taken from Group 3 to complete T10.

The calculation of $T10^R$ when $e_1 > 0.1$ requires a different method as there is limited information about income dispersion in the top group. This is only necessary for Argentina (1989–2011), Chile (1983–2011), Colombia (2004–2011), and Venezuela (1977–2011). I use the percentile structure of the HBS for the whole distribution[14]. In this setting, e_1 becomes $e_1h = e_1*100$, r_1h is the average income ratio of e_1h, and rh_{10} is the average income ratio of the top 10% of the distribution (eh_{10}).

(4c) $T10^R = e_1r_1\,[eh_{10}rh_{10}/e_1hr_1h]$.

The term in brackets in (4c) divides the income share of the top 10% by the income share of the upper-tail quantile of the percentile distribution that matches e_1. Assuming that proportionality holds, the outcome is then multiplied by Group 1's income share to obtain $T10^R$.

Finally, $M50^R$ is obtained as a residual:

(5) $M50^R = 1 - T10^R - B40^R$

At this point of the estimation there is an arrangement of three segments of the EAP (e_{10}, e_{50}, e_{40}), and their corresponding income shares ($T10^R$, $M50^R$, $B40^R$), with individuals within each quantile arranged in ascending order according to their income (y^1_{B40} *to* y^{40}_{B40}, y^{41}_{B50} *to* y^{90}_{B50}, y^{41}_{T10} *to* y^{100}_{T10}) but still not necessarily across the three quantiles[15]. The final step is to identify any remaining overlap in the post-reallocation income parade and to make the necessary adjustments by swapping those individuals and their income who are in the wrong position in such a parade. This is more likely to affect the lower two groups in those years where e_4 is close to 0.4 and, therefore, subject to minor labour reallocations. See details of this procedure in Appendix A.2. In most cases the income adjustments made to $B40^R$ and $M50^R$ are minor with share fractions no higher than 1% at any time and country (Table A1).

The final B40 is the result of subtracting any income swapping from the $B40^R$:

(6) $B40 = B40^R - Swapping$;

14 Data sources: Chile per-capita income for 1992, 94, 96, 98, 2000, 06, 2009 from LIS. Colombia per-capita income for 2007, 2010 from LIS. Venezuela per-capita labour income in 1985, 87, 89, 90, 91, 93, 96, 99, 2002, 05, 08, 2011 from Maldonado (2021). For Argentina I use the percentile structure of Chile between 1992 to 2009. Because Venezuela's HBS percentile data only includes labour income, an adjustment is needed to account for the omitted property income. This was done by boosting the income of the top 5% by a factor which generates shares for deciles D7, D8, D9, D10 matching those estimated by ECLAC in 1990 (D7=9.4%, D8=12%, D9=16.4%, D10=35.6%).

15 Note that the reallocations alter the original mean and standard deviation of the occupational groups which are now subsumed in the three EAP quantiles. Another consequence is that the normality assumption of income distribution of the bottom 40% and the middle 50% may not hold. However, for the purpose of this paper, what is important is to know T10, M50, B40; not the distributions within them.

whereas T10 matches $T10^R$, as there is no swapping applied,

(7) $T10 = T10^R$;

and, as before, the income share of the middle 50% is obtained as a residual,

(8) M50 = 1 – T10 – B40.

The reallocation and swapping procedures deliver estimates of T10, M50 and B40 in a given year and country with minimum violations of the assumption of a perfectly ordered income parade along the whole labour force.

2.4 Sensitivity analysis

Finally, I perform a sensitivity analysis to assess the effect on T10, M50 and B40 of a potential misestimation of the "true" income dispersion of each of the lower three occupational groups. Table A2 shows for each country the central values (baseline) for T10, M50, B40 in a selected number of benchmarks. They are accompanied by upper–bound (+20% from baseline of the relevant income dispersion) and lower–bound (–20%) estimates and the corresponding percentage differences to the baseline. The confidence intervals do not exceed ±0.5% in T10 and ±1.9% in M50. The margins for B40 are more significant, reaching a maximum interval of around ±6.4% in Brazil (in 1980) and Chile (1950). Figure A1 shows the trajectories of B40 and their confidence intervals by country. Notice that, a boost of 20% for the underlying income dispersion in Groups 4 and 3 results in lower values relative to the baseline for the upper–bound series; whereas the opposite occurs after a 20% reduction. Such an outcome reflects the workings of a higher dispersion on the income share of the reallocated labour. When $e_4 \geq 0$, those reallocated from Group 4 carry a higher income shares relative to the baseline reducing the upper–bound B40. Whereas when $e_4 < 0.4$, those moved out from Group 3's lower tail to complete B40 contribute with a lower income share relative to baseline, equally reducing the upper–bound B40. Altogether, the sensitivity analysis shows that income shares trajectories are largely unaffected by changes in the dispersion in the lower three groups, and that the conclusions drawn from them hold true.

Next, I present the evidence in detail. First, I introduce income shares by country and highlight salient patterns and possible explanations[16]. Secondly, I discuss the Palma proposition and, then, compare the tails of the LA6 with those of the industrial leaders (the US and the UK). Finally, I focus my attention on income inequality as measured by the Palma ratio together with other three metrics used in previous publications.

16 Because of the word limit this is necessarily a selective account of developments.

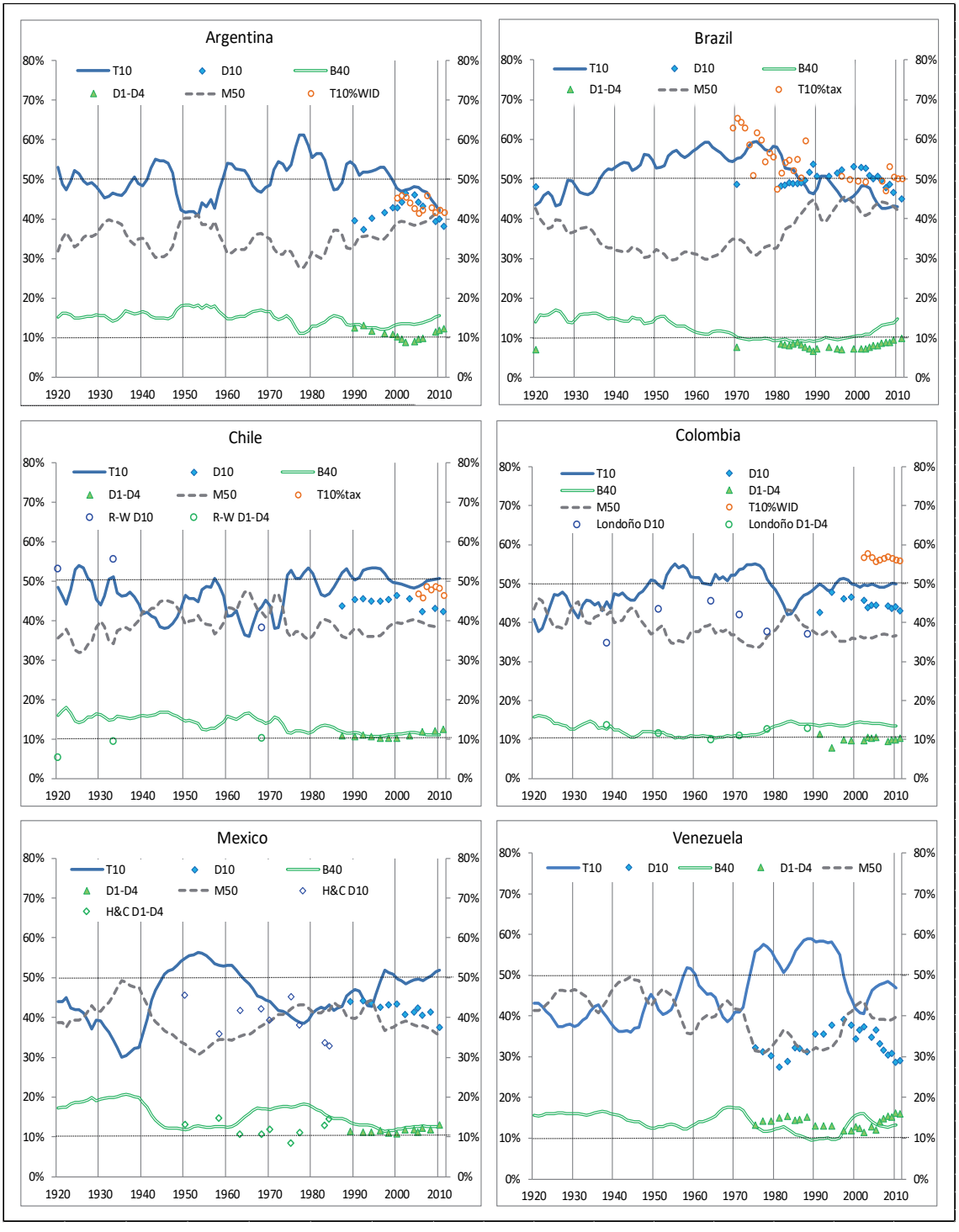
3. The Tails and the Middle

Figure 1 shows country charts with my T10, M50 and B40 yearly series. They are compared with alternative estimates to assess consistency across available income shares. For the more recent decades it also includes both the top 10% and the bottom 40% shares of the population based on HBS (D10 and D1–4 respectively). Altogether, the comparison between the D10s since 1990 and my T10s shows little coincidence in both trends and levels. This is to be expected as top incomes are grossly underestimated in the surveys. Indeed, D10 trajectories tend to match those in M50. By contrast, trends and levels of B40 are broadly in tune with D1–4. The dominance of rising trends in the 2000s is consistent with pro–labour developments such as rising minimum wages and lower unemployment.

Overall, Period 2 is dominated by a rising secular trend in T10 in Argentina, Brazil, Colombia and Venezuela. Chile combines a rise in concentration from the mid–1940s to the late 1950s followed by a fall the 1960s, whilst Mexico displays a falling trend from the mid–1950s to the late–1970s. Relative gains and losses in T10 and largely matched by opposite outcomes in M50 (I discuss this pattern in Section 4). In addition, there is a tendency for constant or declining trends in B40 (Mexico is an exception) resulted in a rise in inequality – i.e., a widening gap between the shares of the tails. Such an outcome can be associated with an acceleration of urbanisation and industrialisation generating downward pressures on unskilled wages of increasingly urban workers, and skills scarcity boosting skill premiums. A contributing factor for rising T10s is the likely increase in market power and, consequently profits, during protected industrialisation.

Meanwhile, institutional, political and demographic changes are likely to have played their part in explaining widening inequality in the closing decades of the last century. The military regimes in Argentina (1976–1983), Brazil (1964–1985), and Chile (1973–1990) 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). In addition, the delayed impact on the labour force of high population growth rates in the 1950s and 1960s (Argentina is the exception), together with increasing participations rates –particularly female rates (Camou & Maubrigades, 2017)– undermined unskilled wages and the income share of the bottom 40%. The effects of these underlying developments in the labour market were compounded by a wave of deregulation and privatisations that shifted formal employment to an already large informal sector (PREALC, 1982).

Figure 1. Top 10%, middle 50% and bottom 40% income shares by country



Note: T10, M50 and B40 are three-year moving averages.

Sources: T10, tax uses tax records for Brazil (Souza, 2018) and Chile (Flores et al., 2019). T10, WID in Argentina and Colombia sourced from the World Inequality Database. Bértola et al. (2010) for Brazil in 1920 using population census and GDP as overall income. For Chile R-W D10 and R-W D1-4 based on Bértola et al. (2010) in 1920, and Rodríguez Weber (2014) in c.1934 (1929-35) and c.1968 (1965-71) using national income. For Colombia Londoño D10 and D1-4 from Londoño (1995) in 1938, 50, 64, 71, 78, 88, using national accounts and employment data and household surveys. For Mexico H&C D10 and H&C D1-4 based on Hernández and Córdoba (1979) in 1950, 58, 63, 68, 70, 77, using official surveys (not always fully compatible). Baptista (1997) for Venezuela 1975-89, using HBS covering only labour income. D10 and D1-4 I use comparable HBS: CEDLAS for Brazil 1981-90, Chile 1987; otherwise, ECLAC.

3.1 Country-specific developments

In Argentina there is a short-lived equalising episode after a peak in T10 in the mid-1940s. This is likely to reflect a more regulated labour market and the implementation of pro-labour policies during the first Peron government (1943–1955). Meanwhile, a steep rise in T10 and a fall in B40 in the 1970s was driven by a collapse in wages in 1976/77 as the Videla government imposed a wage freeze in an attempt to stop hyperinflation (Thorp, 1998). The comparison of T10 with T10%WID in the 2000s shows consistency in levels and trends.

In Brazil, my series shows a steady rise in income inequality from the late-1930s to the mid-1960s and falling trends in M50 and B40. This outcome has been interpreted as being driven by an ongoing Kuznets-type structural change amid limited education levels, especially during the 1960s (Langoni, 1973); but, also, as the consequence of a shift in the government's political orientation that brought about policies that curved the power of trade unions and weakened wage regulations (Frankema, 2012). Another possible factor for rising concentration is increased profits during protected industrialisation. The 1980s shows a subdued B40 likely to reflect the incomplete indexation of the minimum wage (Baer, 2001). Regarding a comparison with Bertola et al. (2010) in 1920, my top share is significantly lower (44% vs. 48%) and my bottom share higher (14% vs. 7%). Such discrepancies are likely to reflect the use of different income concepts. Whereas T10 and Top10%tax are broadly in tune between c.1975 and c.1985, and during the 2000s.

In Chile the years between the mid-1950s and the early 1970s was a time of a growing importance of the middle sectors in society and of an increasing role of the state in promoting industrialisation. On balance, despite a hike in income concentration in the mid-1950s – largely associated with a freeze on wages as part of the policy response to high inflation – there were relative gains for M50 and B40. Two key underlying forces behind this outcome were, first, a process of structural change reallocating resources from a highly unequal agriculture in favour of the urban sector with lower inequality; and, second, the equalising effect of rises in the minimum wage and the expansion of unions (Rodríguez Weber, 2018). A growing gap between T10 and B40 in the final decades of the last century is largely associated with the neoliberal reforms under the Pinochet regime. During the 1970s T10 exhibits a fall in the early years and a sudden jump after the 1973 military coup. These were years dominated by economic contraction with a drastic fall in real wages and a drop in the labour share of income (Astorga, 2023). Regarding comparisons, the direction of changes in c.1920, c.1934 and c.1968 are similar in T10 and D10; but levels differ, likely because of differences in the income concept. Meanwhile, T10 and T10%tax show broadly matching levels and trends in the second half of the 2000s.

In Colombia, the rising trend in T10 during Period 2 is consistent with a disequalising process of structural change characterised by rising skill premiums and a widening in the productivity gap between agriculture and manufacturing (Astorga, 2017). There are coinciding trends in my T10 and Londoño's series in the 1938–1988 period, but my estimates are consistently higher (on average, 50% vs. 40%). My B40 is fairly constant during the middle period, in tune with Londoño's estimates. These are decades of modest growth in unskilled real wages (with cons-

tant annual growth of 1.3%, compared to 1.5% in income per worker), despite substantial rises in the minimum wage in the 1950s and 1960s that proved to be largely ineffective (Londoño, 1995). In the 2000s, T10 and T10%WID are both broadly trendless, but my levels are lower.

Mexico shows an exceptional rise in B40 and a decline in T10 over the two decades following the Revolution[17]. These trends are consistent with drastic changes in institutions and policies (e.g., strides in agrarian reform and a clamp down on labour–coercive practices), as well as with the destruction of productive assets during the revolution years which undermined property income. According to my estimates, this distributional episode is unparalleled in the region and came to an end in the late 1930s with a pronounced drop in B40 and a steep rise in T10. This latter outcome is associated with the surge of business opportunities in the country created by the war effort in the US amid subdued wages. In the 1960s and 1970s, minimum–wage policies and high unionisation rates (Márquez Padilla, 1981) contributed to a recovery in M50 and B40 at the expense of T10.

In Venezuela, the general picture of the labour market was one dominated by the private sector, largely based on agriculture with roughly constant wages and a stable wage structure up to the mid–1930s. Then, wages started to rise gradually driven by the growing importance of the oil industry (Valecillos, 2007). The rising trend in T10 in the 1950s may reflect a boost to property income and highly skilled wages driven by public spending funded by taxes on foreign oil multinationals. The causes for the falling trends in M50 and B40 during the end of the 1970s and the mid–1990s are to be found in the growth implosion which particularly affected the income of those in the middle sections of the labour force as well as unskilled workers. The comparison with alternative estimates shows broadly matching trends in T10 and D10 during 1975–1995. But D10 levels are consistently lower (on average, 56% vs. 30.5%), which is to be expected as they are calculated with labour income only. Meanwhile, trends and levels tend to coincide in B40 and D1–D4.

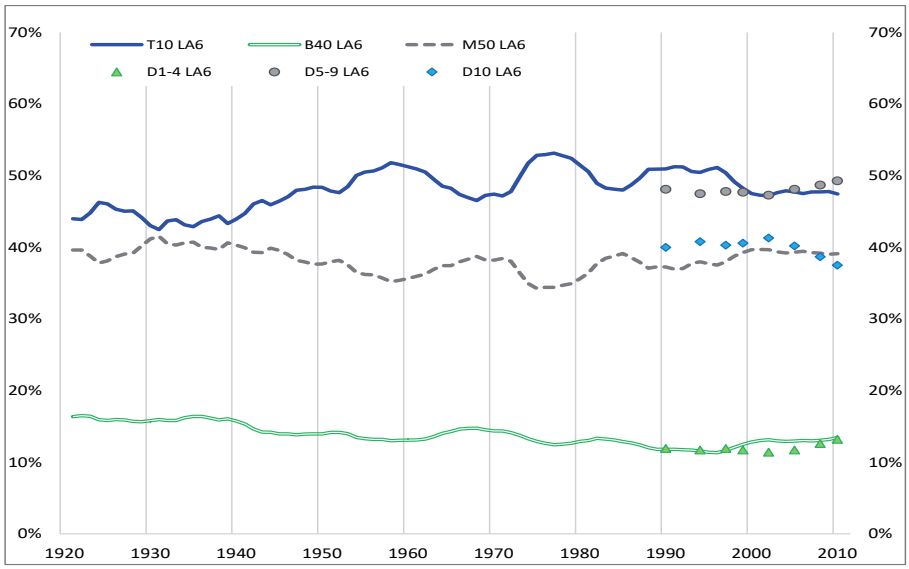
4. The Relative Stability of the Middle Share

The Palma proposition states that movements in income inequality are primarily driven by changes in T10 and B40 amid a relative stability of M50. According to Palma (2011) "half of the world's population (the middle and upper–middle classes) have acquired strong 'property rights' over half of their respective national incomes; the other half, however, is increasingly up for grabs between the very rich and the poor" (abstract). Most of the evidence used to test the validity of this proposition comes from cross–country analysis based on official household budget data[18]. A greater challenge is to assess the relative stability of the middle 50% over the longer term. Figure 2 shows LA6 trajectories for T10, M50, and B40, together with the corresponding shares obtained from HBS between 1980 and 2011.

17 The 1917 Constitution brought about agrarian and labour reforms, setting new minimum wage levels and profit sharing. Higher real wages and living standards were priorities for the post-Revolution government (Bortz, 2005).

18 For instance, by Palma himself using data of 2005 & 2012 and by Cobham et al. (2016) in c.1990, c.2012, c.2016.

Figure 2. The tails and the middle in the LA6



Note: T10 LA6 and B40 LA6 are three-years moving average income shares.

Sources: ECLAC for data on household budget surveys.

There are two key points to highlight: a mirror image between T10 and M50, and a relatively low and more stable (though falling between Periods 1 and 2) B40[19]. The mirror pattern is also present in the series calculated with HBS since 1990 and in trajectories in the six countries (Figure 1). The differences in levels between my T10 and M50 series and those calculated from household surveys are largely caused by the underestimation of the income of the richest 10% in the surveys. According to these data, the three income shares around 2000 are D10=40%, D5–9=48%, and D1–4=12% (with a Palma ratio of 3.5), whereas mine are T10=48%, M50=40% and B40=12% (a Palma ratio of 4.0)[20]. Altogether, a visual inspection of Figure 2 indicates that the main distributional conflict in the region was primarily between those in the top 10% and the middle classes, casting doubts on the validity of the Palma proposition over time.

However, a more rigorous testing is needed. Table 2 include income–share dispersion in the LA6 in the period 1920–2011 and the three sub–periods as measured by the mean absolute deviation (MAD)[21]. The relative stability of the three shares can be assessed by looking first at the average value of the MAD in a given sub–period (for the LA6 and the six countries) and, secondly, by comparing the average dispersion across the three sub–periods.

19 The mirror pattern is also present when comparing the income shares of Group 1 with an aggregate of Groups 2 and 3, which means that it is not generated by the reallocation of the labour force.

20 In Figure 2, a correction for the underestimation of top incomes would result in a swap in the schedules of the D10 and D5-9 and a downward shift in D1-4.

21 It is defined as the mean of the absolute difference between the values of a series and the series' median. The MAD is my preferred dispersion measure as it is not linked to the mean.

Table 2. Income shares stability over time

	T10	M50	B40	T10	M50	B40	T10	M50	B40	T10	M50	B40
	1920-2011			1920-1939			1940-1979			1980-2011		
	mean absolute variation											
Argentina	4.1	3.3	1.5	2.7	2.5	0.8	5.2	3.5	1.6	3.6	2.8	1.0
Brazil	4.7	4.5	2.3	2.7	2.1	0.8	2.0	1.4	1.8	3.5	2.7	1.5
Chile	4.5	3.1	2.0	3.9	3.2	1.1	4.9	3.4	1.6	1.9	1.5	0.7
Colombia	3.4	2.8	1.5	3.6	3.1	1.4	3.0	2.6	0.7	2.0	1.8	0.4
Mexico	5.6	3.5	2.7	4.5	3.6	1.1	5.6	3.4	2.3	3.5	2.3	1.2
Venezuela	6.2	4.5	1.9	1.9	1.9	0.3	5.6	4.6	1.5	5.5	3.8	1.8
LA6	4.8	3.6	2.0	3.2	2.7	0.9	4.4	3.2	1.6	3.3	2.5	1.1

The LA6 B40 is relatively most stable and T10 the least stable in the overall period and in the three sub-periods. A relatively high volatility of T10 is consistent with the fact that property income flows – which are concentrated at the top of the distribution – tend to be more volatile than those of labour income, particularly of salaried workers. At a country level, of the total 24 results, in 23 cases B40 is the least volatile, and in all cases the MAD for T10 is higher than for M50. And across the three sub-periods the B40 is the most stable.

A second stability test looks at the correlation between T10 and M50 at the country level. If the Palma proposition holds, there should be only a weak association between both shares; that is, proving that changes in the middle 50% share are largely unresponsive to those in the top income share (Hazledine, 2014). Table A3 includes the results of pair correlations among the three shares by country and periods. It shows, first of all, a consistently strong negative relationship between T10 and M50. And, secondly, negative correlations between T10 and B40, particularly strong in Chile and Mexico.

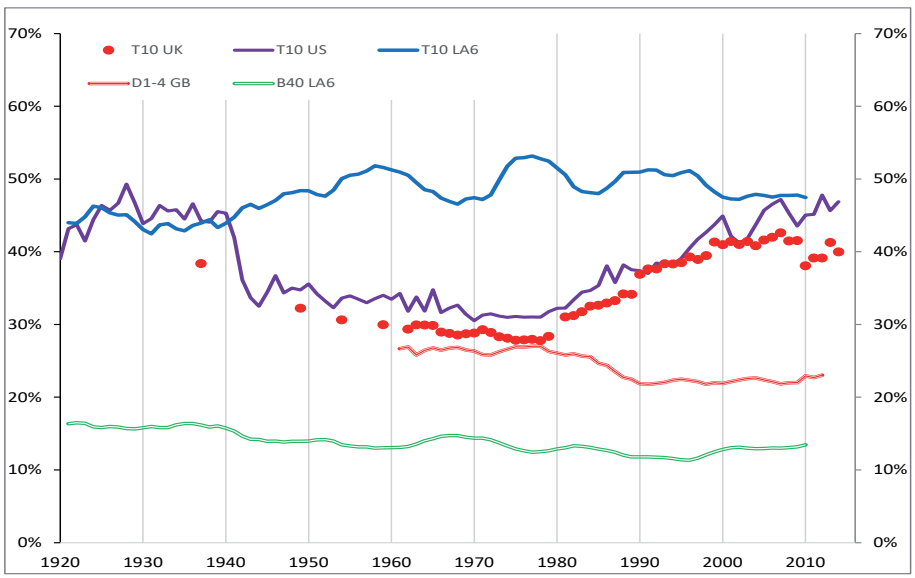
In sum, this assessment does not support the case of a relative stability of M50 over time in the LA6. This long-term evidence also suggests that the middle groups have had limited success in appropriating and/or defending an income close to 50%. And that those in the top 10% of the labour force were the ones that have acquired strong property rights over half of the total income. Moreover, that the bottom 40% has been particularly weak politically and unable to defend a sustainable rise in its income share. This seems to hold regardless of the adoption of different development and growth strategies. This outcome is consistent with the logic of collective action, as the elites should be in a better position to defend their income share than the more disperse and diverse middle- and low-income groups.

Although this evidence fails to confirm the inter-temporal validity of the Palma proposition in the LA6, it is not at odds with Palma's own time-series evidence in the case of Chile using household surveys from the Greater Santiago during 1957-2009 (Palma, 2011, Appendix 1). According to him, the Chilean middle and upper-middle groups were weak politically both in defending themselves against Pinochet's reforms, and in benefiting fully from the return to democracy.

5. The Tails in the LA6 and the Industrial Leaders

Figure 3 compares the LA6 average income share for the top 10% with similar shares in the US and the UK. It clearly highlights a crucial difference in the distribution dynamics in LA6 and the two industrial leaders: the absence in the former of the Great Levelling experienced by the latter largely between the Second World War and the end of the 1970s[22]. In general, this levelling episode was triggered by shocks to top property incomes during the world wars and the Great Depression (Atkinson et al., 2011). Inequality was then kept in check in the US and the UK and other North Europeans countries by significant policy efforts to rebalance the distribution of income including both pre-distribution and re-distribution measures. But liberal policies of the Reagan and Thatcher era set the conditions for rising inequality.

Figure 3. Top 10% income shares in the LA6, the UK and the US



Note and source: T10 LA6 and B40 LA6 are 3-year moving averages. T10 UK & T10 US are before taxes and transfers from the World Inequality Database. D1-4 GB is net of direct taxes and including state benefits and tax credits at the household level in Great Britain from the Institute of Fiscal Studies.

To be sure, this evidence does not rule out episodes of inequality levelling in the region. There were instances of significant moves to a more equitable income distribution in the middle decades of the 20th century in Argentina, Mexico and Uruguay, driven by policies affecting wage setting and developments in labour institutions (e.g., the introduction of minimum wages, wage collective bargaining, and a significant rise in unionisation). However, those improvements did not last (Astorga, 2024). The LA6 and the US show similar T10 shares around the mid-1930s, a considerable gap in the 1940–1980 period and convergence thereafter, as the share of the top earners in the US caught up with that of their counterparts in Latin American.

22 Although both sets of estimates come from different methodologies, the outcome is clear enough to support the point. And the use of pre-fisc income Ginis in the US and the UK (Atkinson, 2015) confirms the patterns.

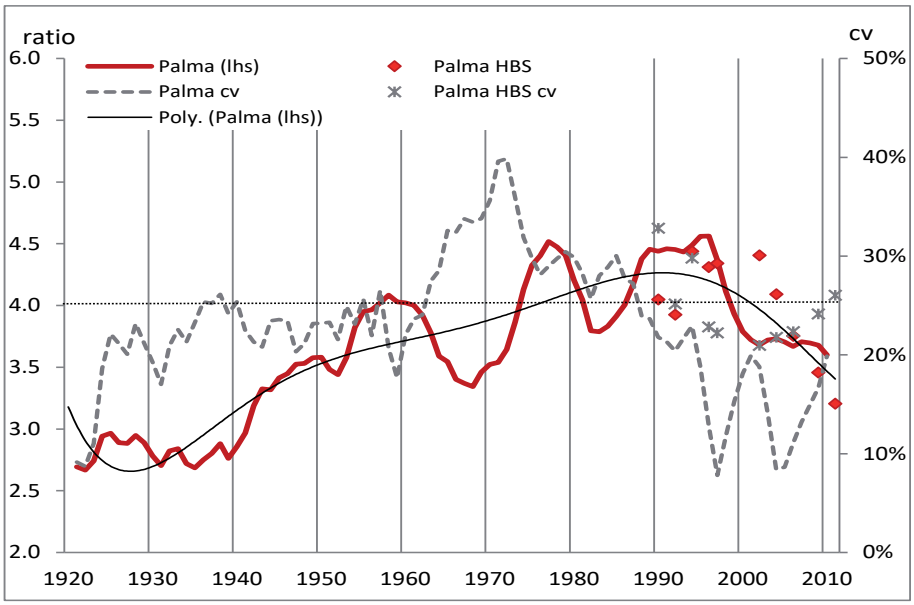
The figure also includes estimates for the bottom 40% income share in the LA6 and in Great Britain. The comparison between both series from the early 1960s to 2010 makes clear the relative disadvantage of those at the bottom of income distribution in Latin America: an average share of 13% in the LA6 versus 24% in Great Britain.

The convergence of top shares in the 1930s offers an example of similar concentration levels in economies with very different structural conditions, a largely pre-industrial Latin America, and a post-industrial UK and US. This suggests that the inequality forces in places adopting a form of peripheral capitalism (dependent on the export of natural resources and with a legacy of extractive colonial institutions) were able to generate a level of income concentration as high as that reached in capitalist societies in the core. Meanwhile, the Great Levelling in the rich economies and, to a lesser extent, the levelling episodes in Latin America are proof that there is nothing deterministic about high income concentration. Indeed, "inequality is a choice" (Stiglitz, 2013).

6. Income Inequality

Figure 4 offers a view of regional inequality based on Palma ratios, with a fitted polynomial trendline to capture a secular trend. It also includes the coefficient of variation (cv) of the LA6 average to reflect country dispersion. For comparison purposes, I add the corresponding metrics calculated from HBS for the period 1990–2011, which broadly match the trends of my series.

Figure 4. The Palma ratio in the LA6 and its dispersion



Note: My Palma ratio in the LA6 is a 3-year moving average. Palma poly is a polynomial trend, Palma HBS uses household budget surveys. Palma cv and Palma HBS cv are the coefficients of variation plotted on the right axes.

Sources: ECLAC for HBS data.

There are striking differences in the regional Palma ratio across the three periods. Period 1 shows a broadly trendless ratio averaging 2.8 (see Table 1). Period 2 exhibits a rising inequality

trend with a period average of 3.6, but with a fall in the 1960s and a rise in the 1970s. Period 3 shows an average ratio of 3.9 with significant fluctuations: a drastic fall in inequality in the 1980s, a move to a very high inequality level peaking at 4.5 in the mid–1990s, and a downward trend in the first decade of the new century. Another salient feature is significant changes in country dispersion over time with a contrast between increasing heterogeneity in inequality trajectories in Period 1, mixed results in Period 2, and increasing homogeneity in Period 3. The coefficient of variation started low at about 10% in the early 1920s and, then rose steadily – with significant fluctuations – peaking at about 40% in the early 1970s when it began a steady decline into the 1980s and 1990s. Overall, both the regional trend and its dispersion show that inequality in the six countries converged to a higher inequality level towards the end of the last century.

6.1 A coda: four inequality measures

This paper belongs to a trilogy dealing with wages and income inequality. I began with this undertaking in the early 2010s motivated by the need for a yearly measure of income inequality to explore the inequality–growth nexus in Latin America over the long term. Since then, I have costructed four inequality measures of differing complexity and distributional coverage involving an equal number of estimation rounds. First, is the most basic of all: the wage ratio between skilled and unskilled labour or skill premium (Astorga, 2017; 2023). The main advantage of the skill premium is its simplicity and relatively low data demands; but it ignores the population weights of the two skill categories as well as the contribution of a significant part of the labour force. Secondly, I added information on semi–skilled wages and population weights to construct a "Labour Gini" covering three wage–based occupational groups (see Section 3). However, the use of census data on economically active population (and the necessary interpolation between data benchmarks) undermines the "yearliness" of the series. Also, importantly, this measure omits the contribution of the high earners. Thirdly, to address this shortcoming I calculated the more encompassing "Overall Gini" by adding the contribution of those at the top of the distribution (Astorga, 2024). However, because the four groups' weights are changing over time, this metric is not comparable with the more familiar Gini based on fixed quantiles of the population. Finally, to move from occupational groups to EAP–fixed quantiles I reallocated fractions of the labour force and minimised departures from a perfectly ordered income parade to estimate income shares of the top 10%, the middle 50% and the bottom 40% as well as Palma ratios.

Figure A2 presents all four measures by country. As expected, there are matching trajectories, on the one hand, between the Labour Ginis and the skill premiums; and, on the other, between the Overall Ginis and the Palma ratios. A more interesting result is a week association between movements of those measures which includes the top group and those which do not. Therefore, conclusions are largely contingent on the inclusion of the high–earners' income share. Also, having the wage–based measures makes it possible to study distributional dynamics which would be hidden if the focus were placed on the Overall Gini and the Palma ratio.

7. Conclusions

This work offers, for the first time, comparable income shares for the top 10%, the middle 50% and the bottom 40% of the labour force, as well as Palma ratios in six Latin American countries from 1920 to 2011. This new evidence sheds light on both income concentration and inequality in decades with limited income tax records and non or scant official household surveys using an innovative methodology that largely relies on wage data, but also encompasses non-labour income. But the approach adopted also has limitations, particularly the lack of direct estimates on non-labour income and potential biases in estimation of the three fixed quantiles of the labour force from four occupational categories. Beyond virtues and shortcomings, I hope that this work will motivate further research that could confirm, improve or refute – as the case may be – its findings and look at other countries outside the LA6.

The answers to the central questions of the paper are as follows:

First, there is a recurrent very high income concentration in the top 10% (an LA6 average share of 48.1% over the whole period) and a low income share going to the bottom 40% (13.9%), with the Palma ratio rising since the 1950s and peaking at 4.6 in the mid-1990s. In my estimates, a persistently high gap between both tails is largely the result of unskilled wages lagging behind the overall average income. Important efforts to expand mass education and skills upgrading (Frankema, 2009) were not enough, at least until 2000, to drive a sustained improvement in the income share of those at the bottom.

Secondly, there are notable differences between the three developmental periods. The transition years of the 1920s and 1930s show a broadly trendless secular regional Palma ratio with rising country diversity within the LA6; the middle decades of state-led, protected industrialisation exhibit a rising inequality trend levelling off by the end of the 1970s with increasing country divergence after 1960. The final period of neoliberal reforms and the return to export-led growth is one of relative stability at a very high inequality level to c.2000, followed by a downward trend in the 2000s. By contrast, this is a period characterised by more homogeneous shares and inequality convergence across the six countries.

Thirdly, despite significant changes in trajectories of income shares in the LA6, a recurrent very high concentration in the top 10% and relatively high Palma ratios point to the success of the elites in defending their income take. Contrary to the Palma proposition, inequality over time is primarily a story of a distributional contest between the top 10% and the middle 50%. Those at the top were able to keep their claim on about half the income total, whilst those in the middle were unable to grow their share consistently. Meanwhile, those of the bottom 40% failed to make any significant and sustained relative gains, with the exception of Mexico during the two decades following the Revolution.

Lastly, comparisons with the UK and the US show the absence in Latin America of a shared and sustained inequality levelling in the middle decades of the 20th century as experienced by the two industrial leaders. Also, that the estimated top 10%'s income share in the LA6 in the 1930s was similar to that in the US. One implication of this finding is that capitalism, either in the post-industrial core or in the pre-industrial periphery, could be, in itself, a sufficient force to generate high concentration and inequality. And that the presence of a significant and

sustained distributional levelling largely comes down to the effective implementation of pro-equality policies and institutional reform.

The analysis of relative inequality based on income shares shows a tendency for a regression to the mean with many examples of similar shares at different points in time (e.g., T10s close to 48% in c.1950, mid-1980s and c.2000). But this secular distributional pattern hides significant differences in absolute income between individuals belonging to the three quantiles of the income distribution[23]. I would like to end by drawing attention to the evolution of the gap between the mean income of the top 10% (y_{T10}) and that of the bottom 40% (y_{B40}) between 1920 and 2011. This is important because income disparities have welfare implications in terms of access to resources and consumption.

Table 3. Absolute mean income of the top 10% and the bottom 40%

	$(y_{T10} - y_{B40})$				y_{B40}			
	1920	1940	1980	2010	1920	1940	1980	2010
Argentina	432	608	1296	689	39	57	79	70
Brazil	170	291	920	701	17	22	38	66
Chile	262	268	935	1867	27	29	57	108
Colombia	103	294	543	766	12	21	40	55
Mexico	179	194	736	812	20	29	87	52
Venezuela	152	263	1515	717	15	32	92	54

Note: $(y_{T10} - y_{B40})$ = absolute gaps; y_{B40} = mean income of the bottom 40%. Figures are 3-years monthly averages at constant 1970 prices in $PPP (dollars at purchasing power parity).

Table 3 (with benchmarks) and Figure A3 (with trajectories of income gaps and y_{B40}) show that after modest rises in the gaps between the tails and in y_{B40} during the 1920–1940 period, the absolute income gap widened notably between 1940 and 1980 within a context of sustained expansion in real incomes. In oil-rich Venezuela the gap went from PPP$263 in 1940 to PPP$1515 in 1980 (up 5.8 times) and in Brazil from PPP$291 to PPP$920 (3.2 times). There were also advances across all countries in y_{B40}, particularly in Venezuela (up 2.9 times) and Mexico (3.0 times). The rich got much richer; the poor, variably, got less poor. Whereas the 1980s were dominated by a reduction in income gaps – primarily driven by falls in y_{T10} amid the Debt Crisis, the 1990s show mixed trajectories with the return of widening gaps in Chile, Colombia and Mexico, roughly constant in Brazil, and the continuation of narrowing gaps in Argentina and Venezuela amid falling mean incomes. Chile experienced a steady rise in its income gap (up 1.9 times) but also in y_{B40} (up 1.8) from 1990 –the return to democracy– to 2011. By contrast, in Argentina and Venezuela the gaps by 2010 were about half their values in 1980; the rich got poorer, the poor even more so.

23 To clarify the point, consider two situations in a given country. First, a low overall real income per capita y_l=100 pesos at constant prices (P); with income shares T10=0.50, B40=0.10, and population shares e_{T10}=0.10 and e_{B40}=0.40. These inputs result in income per capita of the top 10% y_{lT10} = T10* y_l /e_{T10}=P400, and of the bottom 40% y_{lB40} = B40* y_l/e_{B40}= P25, and an absolute income gap y_{lT10}–y_{lB40}=P475. Secondly, a high income per capita y_h=P1000 and equal income and population shares; with y_{hT10}= P5000 and y_{hB40}= P475 and an absolute gap = P4750 - ten times higher, in line with the rise in income per capita.

Regarding welfare implications, assuming a monthly subsistence consumer basket of PPP$10 per person, the evidence in Table 3 can be expressed as the number of baskets that can be bought with a given amount of money. For instance, in Venezuela, a gap of PPP$1515 in 1980 means 151.5 additional baskets that could have been bought by the average individual of the top 10% compared to 26.3 baskets in 1940. Whereas the baskets for the mean worker of the bottom 40% were 9.2 and 3.2 respectively. However, by 2010 the mean extra baskets of those at the top came down to 71.7, whereas the average worker of the bottom tail experienced a reduction in consumption equivalent to 5.4 subsistence baskets. By contrast, in Chile the additional subsistence baskets received by the average high earner doubled from 93.5 in 1980 to 186.7 in 2010, and the consumption potential of the average worker of the bottom 40% equally saw a two-fold increase in subsistence baskets during the same period[24].

As in the musical form "Theme and variations", this new long-term evidence shows that income distribution in Latin America can be characterised as one of significant country variations around a dominant theme of very high concentration in the top 10% and a low and largely stagnant income share of the bottom 40%. Regional income inequality, as measured by the Palma ratio, was at a relatively low level in the early 1920s reflecting the equalising impact of the Mexican Revolution. But the story between the early 1940s and the late 1990s is one of rising secular inequality. Despite policy efforts in the 2000s to raise the income of the bottom 40% via pro-labour policies and conditional cash transfers, a more equitable income distribution still evades Latin America.

24 I concentrate the discussion on the tails. But developments in the middle 50% deserve more attention. In particular, the new evidence on income shares and real mean income of the middle can shed light on the formation of the middle classes.

Appendix

A.1 Examples of calculations of labour reallocation

This section presents a numerical example for each of the three relevant reallocation cases.

1. Suppose e_4=0.5 and that e_4'=0.1 needs to be reallocated to complete B40. *AT4*=1–e_4'/e_4=0.80 is a threshold at the upper end of a Normal distribution with y_4=40 and σ_4=10. The evaluation of Normal.Inv[0.80, 40, 10] offers a first simulated income for *AT4* y_4^{80} =48.4. To obtain y_4^{81} add 0.01 and calculate Normal.Inv[0.81,40,10]=48.8, and continue with these iterations in increasing order until reaching the end of the upper tail with y_4^{99} =63.3. At the end of this process a total of 20 income points are calculated (0.2/0.01). Assuming *y*=140, the corresponding income ratios are: r_4^{80} =48.4/140=0.34; r_4^{81} =48.8/140=0.35; ... r_4^{99} =63.3/140=0.45.

2. Suppose e_4=0.35 and that e'_3=0.05 needs to be taken from e_3=0.3 to complete B40. *BT3*=e_3'/e_3=0.17 is a threshold at the lower end of a Normal distribution with y_3=70 and σ_3=15. The evaluation of Normal.Inv[0.17,70,15] computes the income for *BT3* y_3^{17} =55.7. Then, subtract 0.01 and evaluate Normal.Inv[0.16, 70, 15] to compute y_3^{16} =55.1, and continue with these iterations (a total of 17) in decreasing order until Normal.Inv[0.01, 70, 15] and y_3^{1} =35.1. The corresponding income ratios are: r_3^{17} =55.7/140=0.40; r_3^{16} =0.39; ... r_3^{1} =0.25.

3. Suppose e_1=0.06 and that e'_2=0.04 needs to be taken from e_2=0.16 to complete T10. *AT2*=1–e_2'/e_2=0.75 is the threshold at the upper end of a Normal distribution with y_2=150 and σ_2=20. The evaluation of Normal.Inv[0.75,150,20] computes the income for *AT2* y_2^{75} =163.5. For the next simulated income add 0.01 and evaluate Normal.Inv[0.76, 150, 20] to compute y_2^{76} =164.1. And continue with these iterations in increasing order until evaluating Normal.Inv[1.0, 150, 20] to compute y_2^{99} =196.5. The corresponding income ratios are: r_3^{75} =163.5/140=1.17; r_3^{76} =1.17; r_3^{99} =1.40.

A.2 Swapping procedure

This section describes the procedure followed to identify any remaining income overlaps in the post–reallocation income parade and to make the necessary adjustments. The latter consist in transferring the net difference in income shares between individuals who are in the wrong position in such a parade. To that end, I sort out possible remaining overlapping between Group 4 and Group 3 over a period of at least 13 years centred around the year where e_4 is closest to 0.4.

As an illustration consider, first, a situation where e_4 = 0.40 in year 1950 in a given country, with 1944–1956 as the period to check for overlaps. Then suppose that e_4 = 0.42 in year 1948 and that during reallocations e'_4 = 0.02 and its corresponding income share was moved to Group 3 to complete M50. Therefore, by construction, y_{M50}^{41} (originally in Group 4) < y_{M50}^{43} (G4's highest income now in M50). But there are still potential overlaps between y_{B40}^{40} (Group 4' highest income after reallocation) and y_{M50}^{44} (originally Group 3's lowest income), between y_{B40}^{39} & y_{M50}^{45} and so on.

And, secondly, a situation where e_4 = 0.38 and e_3 = 0.33 in year 1952 and, as before, e_4 = 0.40

in year 1950. During reallocations e'_3 = 0.02 and its corresponding income share was added to Group 4 to complete B40. Therefore, by construction, y^{39}_{B40} (originally G3's lowest income before reallocation) < y^{40}_{B40}. But it is still possible to have overlaps between y^{38}_{B40} (G4's highest income) and y^{41}_{M50} (Group 3's lowest income after reallocation), between y^{37}_{B40} & y^{42}_{M50} and so on.

In each year between 1944 and 1956 I check for positive differences in income shares covering six percentiles at the upper tail of e_4 and at the lower tail e_3 after excluding any percentiles that were subject to reallocations. For instance, from the first example presented above, if ($y^{40}_{B40} - y^{44}_{M50}$) > 0, a swap between e^{40}_{B40} and e^{44}_{M50} equates to transferring an income share equivalent to ($s^{40}_{B40} - s^{44}_{M50}$) from B40^R to M50^R. Then, it is necessary to check if ($y^{39}_{B40} - y^{45}_{M50}$) > 0 and, in the affirmative, to transfer ($s^{39}_{B40} - s^{45}_{M50}$) to M50^R, and to continue with these checks until ($y^{41-j}_{B40} - y^{43+j}_{M50}$) $\leq$ 0 with j =3 to 6. The formulae for the calculations are as follows:

(a1) *Swapping* = $0.01\left[\sum_{J=1}^{6}(r^{40-J}_{B40} - r^{e4*100+j}_{M50})\right]^{+}$, if $e_4 \geq 0.4$;

(a2) *Swapping* = $0.01\left[\sum_{J=1}^{6}(r^{e4*100-j+1}_{B40} - r^{40+j}_{M50})\right]^{+}$, if $e_4 < 0.4$;

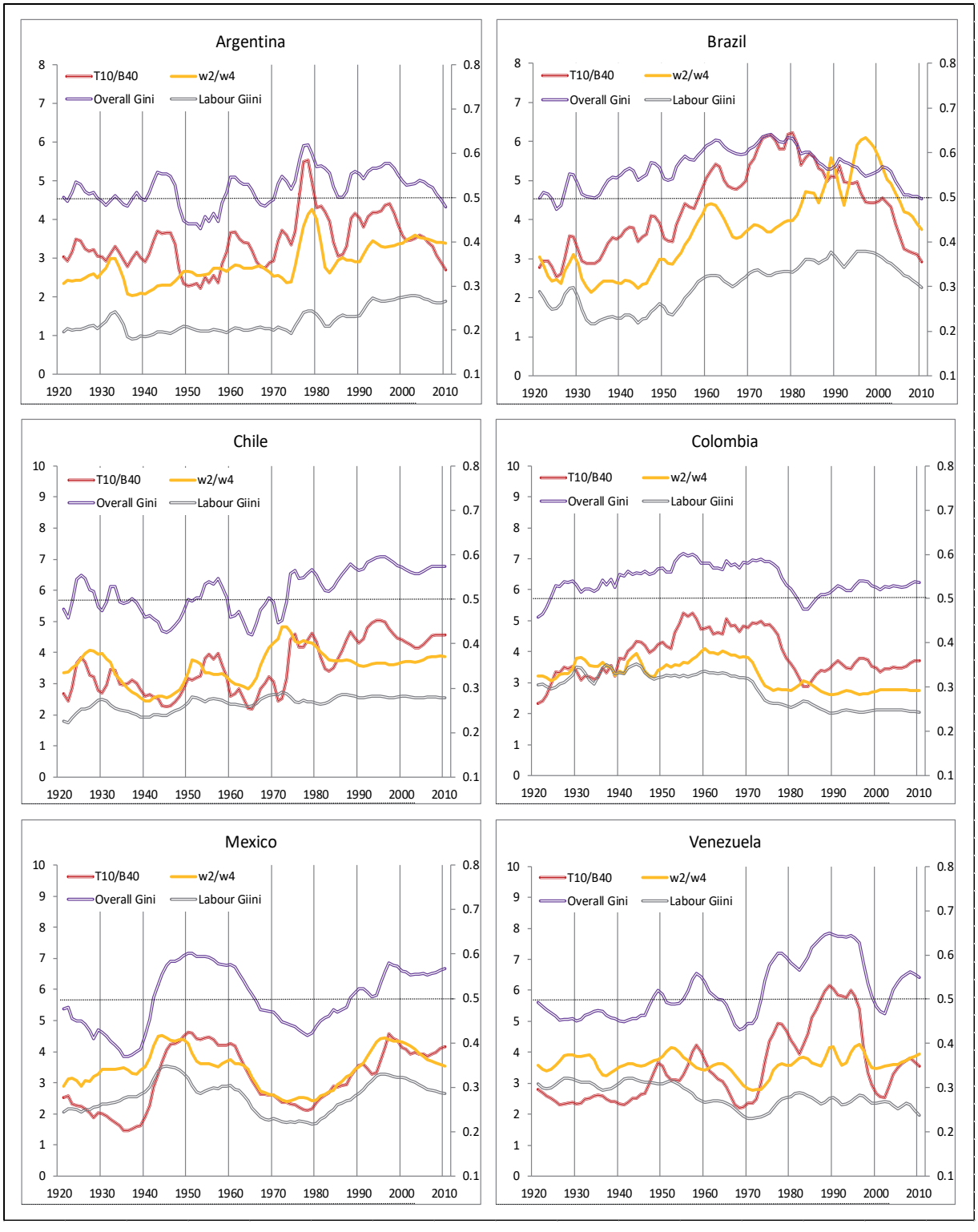
The expression [...]$^+$ means that only positive differences are taken into account for the calculation of *Swapping*. Note than in both cases the adjustment means transferring income from the bottom 40% to the middle 50%. This is so because to order the incomes of the EAP in increasing order no individual in e_{40} can have a higher income than any individual in e_{50}.

A.3. Complementary figures and tables

Figure A1. Sensitivity analysis of the impact of income overlap on B40

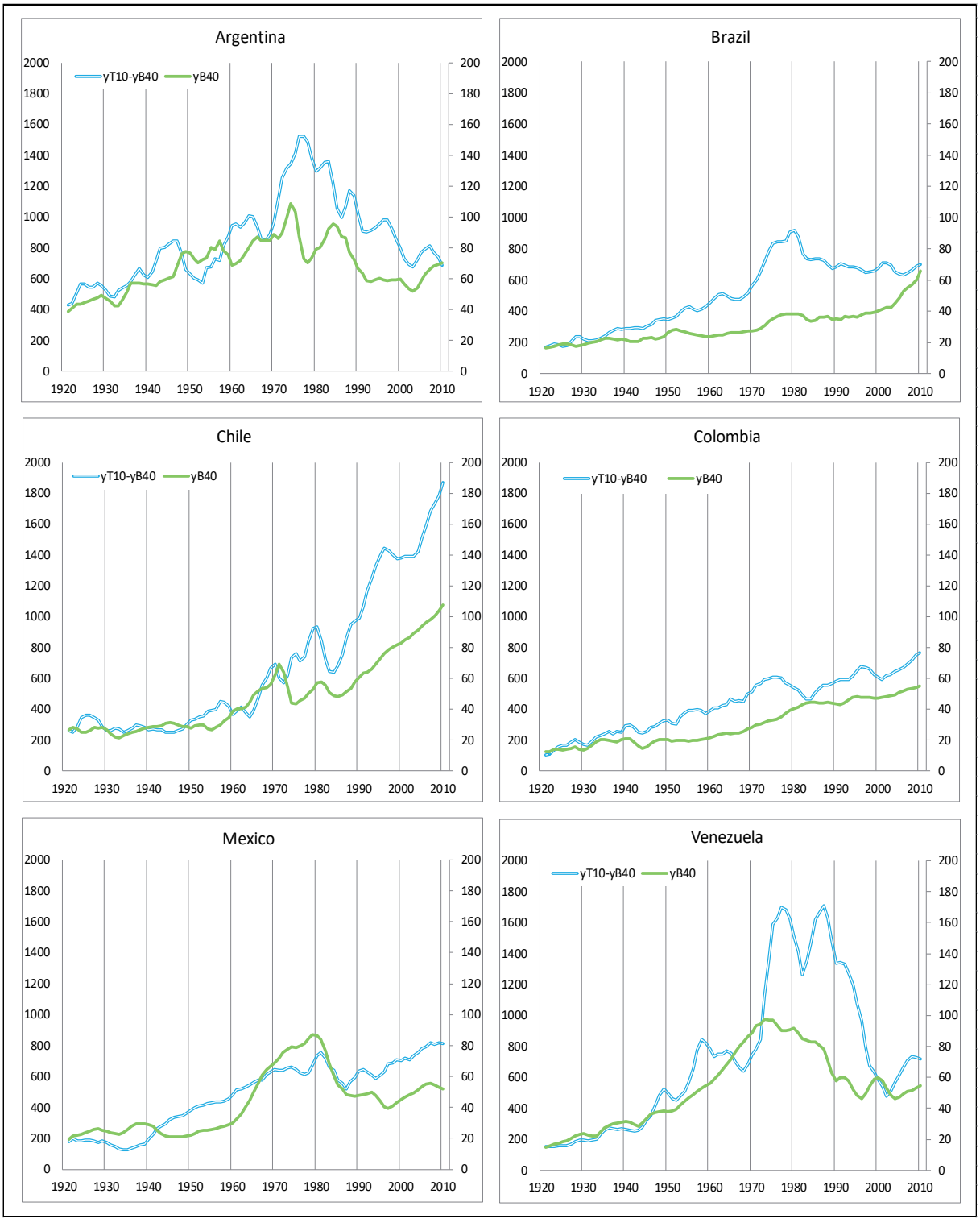
Note: B40-upper and B40-lower stand for upper and lower bound respectively.

Figure A2. Four measures of income inequality



Note: Overall Gini & Labour Gini are plotted on the right axis. All series are 3-years moving averages. T10/B40=Palma ratio; w2/w4 = skill premium.

Figure A3. Absolute mean income differences between the top 10% and the bottom 40%



Note: y_{T10} and y_{B40} stand for real mean income of the top 10% and the bottom 40% respectively; y_{B40} is plotted on the right axis. All series are three-years moving monthly averages in US$ at 1970 prices adjusted by purchasing power parity.

Table A1. Income swapping between B40 and M50

years	BRA	years	CHI	years	COL	years	MEX	years	VEN
		1935	0.16%						
1978	0.11%	1936	0.20%	1973	0.13%				
1979	0.22%	1937	0.25%	1974	0.27%	1975	0.03%	1950	0.00%
1980	0.43%	1938	0.37%	1975	0.42%	1976	0.09%	1951	0.00%
1981	0.68%	1939	0.52%	1976	0.25%	1977	0.12%	1952	0.00%
1982	0.23%	1940	0.68%	1977	0.27%	1978	0.19%	1953	0.02%
1983	0.44%	1941	0.36%	1978	0.45%	1979	0.20%	1954	0.07%
1984	0.31%	1942	0.67%	1979	0.47%	1980	0.28%	1955	0.09%
1985	0.39%	1943	0.68%	1980	0.65%	1981	0.31%	1956	0.11%
1986	0.15%	1944	0.62%	1981	0.45%	1982	0.17%	1957	0.05%
1987	0.24%	1945	0.71%	1982	0.26%	1983	0.27%	1958	0.06%
1988	0.00%	1946	0.64%	1983	0.26%	1984	0.03%	1959	0.11%
1989	0.03%	1947	0.95%	1984	0.12%	1985	0.01%	1960	0.13%
1990	0.01%	1948	0.85%	1985	0.09%	1986	0.00%	1961	0.08%
1991	0.35%	1949	0.60%	1986	0.27%	1987	0.12%	1962	0.00%
1992	0.41%	1950	0.42%	1987	0.19%				
		1951	0.29%						

Note: Values for the swapped income shares taken out of $B40^R$ are in percentages; years where e_4 is closest to 0.4 are highlighted in grey. BRA=Brazil, CHI=Chile, COL=Colombia, MEX= Mexico, VEN= Venezuela.

Table A2. Sensitivity analysis of the impact of income overlap on T10, M50 and B40

	T10					M50					B40				
	% diff	upper	base	lower	*% diff*	*% diff*	upper	base	lower	*% diff*	*% diff*	upper	base	lower	*% diff*
Argentina															
1920	*0.2%*	51.1	51.0	50.9	*-0.2%*	*0.3%*	33.7	33.5	33.5	*-0.2%*	*-1.7%*	15.2	15.5	15.7	*1.4%*
1940	*0.3%*	48.5	48.4	48.2	*-0.3%*	*0.2%*	35.1	35.0	35.0	*-0.2%*	*-1.5%*	16.3	16.6	16.8	*1.5%*
1950	*0.4%*	41.9	41.7	41.5	*-0.4%*	*0.5%*	40.4	40.1	39.9	*-0.5%*	*-2.3%*	17.7	18.2	18.6	*2.3%*
1960	*0.2%*	54.1	54.0	53.9	*-0.2%*	*0.5%*	31.5	31.3	31.1	*-0.5%*	*-2.0%*	14.4	14.7	15.0	*2.0%*
1980	*0.2%*	55.6	55.5	55.4	*-0.2%*	*0.9%*	31.9	31.6	31.3	*-0.9%*	*-3.1%*	12.5	12.9	13.3	*3.1%*
2000	*0.0%*	47.7	47.7	47.7	*0.0%*	*1.0%*	39.3	38.9	38.5	*-1.0%*	*-3.1%*	12.9	13.3	13.7	*3.1%*
Brazil															
1920	*0.3%*	43.6	43.5	43.4	*-0.3%*	*1.5%*	41.1	40.5	39.9	*-1.5%*	*-4.5%*	15.2	16.0	16.7	*4.5%*
1940	*0.2%*	53.2	53.1	53.0	*-0.2%*	*1.7%*	32.7	32.1	31.6	*-1.7%*	*-4.4%*	14.1	14.8	15.4	*4.4%*
1950	*0.3%*	52.9	52.7	52.6	*-0.3%*	*1.2%*	32.7	32.3	31.9	*-1.2%*	*-4.0%*	14.4	15.0	15.6	*4.0%*
1960	*0.3%*	57.9	57.7	57.5	*-0.3%*	*0.3%*	31.1	31.0	30.9	*-0.3%*	*-2.7%*	11.1	11.4	11.7	*2.7%*
1980	*0.3%*	58.2	58.0	57.9	*-0.3%*	*1.3%*	33.1	32.7	32.4	*-0.9%*	*-6.4%*	8.7	9.3	9.8	*5.0%*
2000	*0.5%*	47.0	46.8	46.6	*-0.5%*	*0.5%*	43.0	42.8	42.6	*-0.4%*	*-4.5%*	10.0	10.5	10.9	*4.0%*
Chile															
1920	*0.2%*	48.0	48.0	47.9	*-0.2%*	*-0.1%*	35.7	35.7	35.8	*0.1%*	*-0.4%*	16.3	16.3	16.4	*0.4%*
1940	*0.2%*	41.8	41.7	41.7	*-0.2%*	*1.5%*	42.9	42.2	41.9	*-0.8%*	*-4.6%*	15.3	16.0	16.5	*2.8%*
1950	*0.3%*	46.4	46.3	46.2	*-0.3%*	*1.8%*	39.9	39.1	38.4	*-1.9%*	*-6.0%*	13.7	14.6	15.5	*6.3%*
1960	*0.3%*	41.1	41.0	40.9	*-0.3%*	*0.8%*	43.7	43.3	43.0	*-0.8%*	*-3.2%*	15.2	15.7	16.2	*3.2%*
1980	*0.1%*	51.9	51.9	51.8	*-0.1%*	*1.6%*	36.7	36.2	35.6	*-1.6%*	*-5.1%*	11.4	12.0	12.6	*5.1%*
2000	*0.0%*	49.4	49.4	49.4	*0.0%*	*1.3%*	39.9	39.4	38.8	*-1.5%*	*-4.8%*	10.7	11.2	11.8	*5.4%*
Colombia															
1920	*0.2%*	38.4	38.4	38.3	*-0.2%*	*1.1%*	46.3	45.8	45.3	*-1.1%*	*-3.6%*	15.3	15.8	16.4	*3.6%*
1940	*0.1%*	47.5	47.4	47.4	*-0.1%*	*0.6%*	40.3	40.0	39.8	*-0.6%*	*-2.6%*	12.2	12.5	12.9	*2.6%*
1950	*0.3%*	51.0	50.8	50.6	*-0.3%*	*0.2%*	37.5	37.4	37.3	*-0.2%*	*-2.1%*	11.5	11.8	12.0	*2.1%*
1960	*0.3%*	51.7	51.5	51.4	*-0.3%*	*0.1%*	37.7	37.6	37.6	*-0.1%*	*-1.8%*	10.6	10.8	11.0	*1.8%*
1980	*0.3%*	48.6	48.4	48.3	*-0.3%*	*1.5%*	38.7	38.1	37.8	*-0.8%*	*-5.2%*	12.7	13.4	13.9	*3.2%*
2000	*0.1%*	49.8	49.7	49.7	*-0.1%*	*0.4%*	36.0	35.9	35.8	*-0.4%*	*-1.4%*	14.2	14.4	14.6	*1.4%*
Mexico															
1920	*0.3%*	44.0	43.9	43.8	*-0.3%*	*0.9%*	39.1	38.8	38.4	*-0.9%*	*-2.8%*	16.9	17.3	17.8	*2.8%*
1940	*0.3%*	35.9	35.8	35.7	*-0.3%*	*1.0%*	46.0	45.5	45.1	*-1.0%*	*-3.1%*	18.1	18.7	19.3	*3.1%*
1950	*0.1%*	54.9	54.9	54.8	*-0.1%*	*1.0%*	33.6	33.3	33.0	*-1.0%*	*-3.3%*	11.5	11.8	12.2	*3.3%*
1960	*0.2%*	53.2	53.0	52.9	*-0.2%*	*0.3%*	34.6	34.5	34.4	*-0.3%*	*-1.8%*	12.2	12.4	12.6	*1.8%*
1980	*0.3%*	41.4	41.3	41.1	*-0.3%*	*0.9%*	41.7	41.3	41.2	*-0.3%*	*-2.8%*	16.9	17.4	17.7	*1.5%*
2000	*0.1%*	49.7	49.6	49.5	*-0.1%*	*0.6%*	38.7	38.4	38.2	*-0.6%*	*-2.5%*	11.7	12.0	12.3	*2.5%*
Venezuela															
1920	*0.1%*	43.8	43.7	43.7	*-0.1%*	*0.9%*	41.5	41.1	40.7	*-0.9%*	*-2.8%*	14.8	15.2	15.6	*2.8%*
1940	*0.3%*	37.2	37.1	37.0	*-0.3%*	*0.4%*	47.2	47.0	46.8	*-0.4%*	*-2.1%*	15.5	15.9	16.2	*2.1%*
1950	*0.4%*	44.0	43.9	43.7	*-0.4%*	*-0.2%*	43.7	43.7	43.8	*0.2%*	*-0.9%*	12.3	12.4	12.5	*0.6%*
1960	*0.3%*	50.5	50.3	50.2	*-0.3%*	*0.6%*	36.4	36.2	36.2	*-0.1%*	*-2.9%*	13.1	13.5	13.7	*1.5%*
1980	*0.0%*	54.0	54.0	54.0	*0.0%*	*0.8%*	34.0	33.7	33.4	*-0.8%*	*-2.2%*	12.1	12.3	12.6	*2.2%*
2000	*0.0%*	41.8	41.8	41.8	*0.0%*	*0.8%*	42.9	42.6	42.2	*-0.8%*	*-2.3%*	15.3	15.6	16.0	*2.3%*

Note: upper and lower stand for upper–bound (+20%) and lower–bound (–20%) estimates respectively; *% diff* = percentage differences relative to the baseline.

Table A3. Correlations between T10, M50 and B40 by periods

	Overall 1920-2011	Period 1 1920-1939	Period 2 1940-1979	Period 3 1980-2011
Argentina				
T10&M50	-0.94	-0.94	-0.99	-0.98
T10&B40	-0.74	-0.39	-0.96	-0.76
M50&B40	0.47	0.04	0.92	0.59
Brazil				
T10&M50	-0.88	-0.96	-0.58	-0.91
T10&B40	-0.35	-0.73	-0.73	-0.64
M50&B40	-0.13	0.50	-0.13	0.26
Chile				
T10&M50	-0.94	-0.98	-0.99	-0.95
T10&B40	-0.77	-0.84	-0.94	-0.76
M50&B40	0.51	0.71	0.89	0.51
Colombia				
T10&M50	-0.94	-0.94	-0.97	-0.99
T10&B40	-0.67	-0.65	-0.47	-0.64
M50&B40	0.36	0.37	0.25	0.53
Mexico				
T10&M50	-0.95	-0.99	-0.98	-0.94
T10&B40	-0.89	-0.92	-0.94	-0.78
M50&B40	0.70	0.87	0.86	0.52
Venezuela				
T10&M50	0.72	0.17	0.41	0.94
T10&B40	-0.85	-0.35	-0.63	-0.97
M50&B40	0.72	0.17	0.41	0.94

Supplementary materials

For the dataset with the annual series of the three shares and the Palma ratios, together with series of mean income per person engaged in the three quantiles, please visit the online supplementary materials.

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