# A REVISED DATASET OF REAL WAGES IN LATIN AMERICA, 1920-2011

## PABLO ASTORGA D

Institut Barcelona d'Estudis Internacionals<sup>a</sup>

#### ABSTRACT

This research note documents the revision of a dataset of real wages in Argentina, Brazil, Chile, Colombia, Mexico and Venezuela during 1920-2011. This resource was originally published by this journal in Astorga (2017). The revision affected all eighteen basic wage series plus six weighted-average series, with varying degrees of modification. The revised dataset is made available as supplementary material. Regardless of changes to the data, the key findings and conclusions of the 2017 paper still hold.

**Keywords:** economic development, real wages, Latin America

JEL codes: 015, 054, J31

#### RESUMEN

Esta nota de investigación documenta la revisión de una base de datos sobre salarios reales en Argentina, Brasil, Chile, Colombia, México y Venezuela durante el período 1920-2011. Originalmente este recurso fue publicado por esta Revista en Astorga (2017). La revisión afecta al total de las 18 series básicas de salarios más 6 series de salarios promedio ponderados, con diferentes grados de modificaciones. La base de datos revisada está disponible como parte del material suplementario. A pesar de los cambios introducidos, se confirman los hallazgos principales y las conclusiones del artículo de 2017 siguen siendo validas.

Palabras clave: desarrollo económico, salarios reales, América Latina

<sup>&</sup>lt;sup>a</sup> IBEI Institut Barcelona d'Estudis Internacionals. pastorga@ibei.org

Revista de Historia Económica / Journal of Iberian and Latin American Economic History 553 Vol. 41, No. 3: 553–564. doi:10.1017/S0212610923000095 © The Author(s), 2024. Published by Cambridge University Press on behalf of Instituto Figuerola de Historia y Ciencias Sociales, Universidad Carlos III de Madrid.

### 1. INTRODUCTION

This research note documents the revision of a dataset on real wages in Argentina, Brazil, Chile, Colombia, Mexico and Venezuela (LA6) during 1920-2011. This resource was originally published in this journal 6 years ago as supplementary material in Astorga (2017) with the time coverage beginning in 1900. Since then, I have worked on a related paper on income inequality in the LA6 over the period 1920-2011 (Astorga 2024), which used the wage series as a key input in the estimation. This offered me the opportunity to revise the series. I benefited from a much-improved online availability of official publications with historical wage statistics (for example, industrial surveys). Also, some data that I had previously been unaware of came to my attention. The changes made are of a different nature: new wage series that fitted better a particular skill level and/or have a longer time coverage; adjustments to benchmark estimates affecting the calculation of wage levels; and the correction of errors.

The revision affected all eighteen basic wage series plus six weightedaverage series (w), with varying degrees of modification. In general, there are limited changes to trajectories in all six countries. However, the revision resulted in some significant level adjustments, particularly in Mexico, Venezuela and, to a lesser extent, Colombia. In Mexico there is a downward adjustment in the unskilled-wage series from 1920 to the mid-1980s, and an upward adjustment from the mid-1980s to 2011. The latter is the result of addressing an underestimation of unskilled wages in the 2017 dataset because of the use of the official minimum wage.<sup>1</sup> Meanwhile, the semi-skilled series was adjusted downward between 1950 and 1980, and 1990-2011; whereas, the level of skilled wages is lower between 1920 and the early-1940s in the revised dataset. In Venezuela, the unskilled-wage series was adjusted upward from 1920 to the mid-1970s and downward from there to 2000. In Colombia, the revision resulted in an upward lift of the unskilled-wage series between the late-1970s and 2011, and a combination of lower levels of the skilled-wage series in 1920-2000 and higher levels during 2000-2011. The latter reflects a correction of a steep fall in the 2017 series. In addition, all six series of real income per worker (v) were revised using estimates of net national income.<sup>2</sup> Notwithstanding data amendments, the key findings of the 2017 paper are confirmed and the conclusions still hold.

This long-term dataset makes three contributions to the statistics of the region. First, it offers yearly series of real wages, consistently defined over time and comparable across the LA6, informing about trajectories and

<sup>&</sup>lt;sup>1</sup> During the last two decades or so of the last century, Mexico implemented an anti-inflationary policy consisting in delaying the adjustment of the minimum wage, which increasingly undermined its capacity to reflect the evolution of unskilled wages.

<sup>&</sup>lt;sup>2</sup> Or, to be more precise, real income per person engaged.

turning points across distinct development and growth periods. Secondly, the addition of compatible series of income per worker makes it possible to calculate variables on interest such as a proxy for a wage share of income and the wage-to-income ratio (w/y). And, thirdly, by including series reflecting three skill levels, the data allows for the calculation of skill premiums, and in particular the skilled-to-unskilled wage ratio.

The note continues with a section of comments on the methodology and documents the revisions. Three supplementary online files are included: the revised dataset (Astorga WageDataset2023.xls), a set of charts comparing the revised wage series and the 2017 series (Astorga WageCompare.xls), and the 2017 Online Annex (Astorga 2017Online Annex.pdf).

#### 2. ABOUT THE SERIES

To define wages by skill level, I rely on the four broad occupational groups used by the International Labour Organization (ILO), namely: Group 1 (employers, managers and professionals), Group 2 (technicians and administrators), Group 3 (blue-collar workers, other urban workers in relatively low productivity sectors such as retailing and transport, and artisans) and Group 4 (rural and urban unskilled workers – including domestic servants and street vendors). I lack enough data to assemble the corresponding wage series for managers or professionals, therefore my «skilled wages» excludes highly skilled workers. In accordance with the above breakdown of the economically active population (EAP), I denote the three wage series as  $w_2$  (for skilled labour),  $w_3$  (semi-skilled) and  $w_4$  (unskilled). The missing wage series  $w_1$  stands for highly skilled workers. An EAP-weighted average (w) is calculated using the corresponding EAP shares of the lower three categories ( $e_2$ ,  $e_3$ ,  $e_4$ ).

It needs to be emphasised that all series are subject to estimation shortcomings – with different degrees of severity depending on the country and period – with changes in definitions, sources and coverage. The ideal uninterrupted series of one source, one definition, reflecting the appropriate skill level for the whole period does not exist at present, and is unlikely to exist in the future. One critical aspect during the estimation work was deciding which series to choose for a country in a given period. When presented with two or more options, I favoured the series which better matched the skill definition and that offered a longer time coverage. An overriding constraint was that the three wage series of a given country cannot cross over time as this would imply negative returns to skills.

Finally, I rely on representative wages or wage averages in order to deal with the complexity within a given occupational group in terms of skills, experience, gender, sectors (e.g., tradable and non-tradable), and location (rural and urban areas, and regions). Therefore, there is always the risk of missing out important wage variations within a group or across space. No

allowances are made for fringe payments (e.g., overtime pay and bonuses); therefore, my series must be taken as representing lower-bound values of labour earnings in each of the lower three occupational groups. In general, the years before 1940 face greater data limitations in terms of availability and quality. Argentina and Chile tend to have more and better data, while Venezuela is the country with less data and of poorer quality in this period.

#### 3. REVISIONS

#### 3.1. Real Wages

To assemble the series as comparable as possible across countries, wage levels are set in a given core period usually within 1965-1980 using data from PREALC (1982) and the ILO's October Inquiry/Part I – ILO (1936-1964).<sup>3</sup> To move back and forth outside the core period, I use changes of relevant original series. In those cases where the data are at current prices, the consumer price index (CPI) is usually used as a deflator. To have wages in a single currency across countries I calculate purchasing power parity values (PPP\$) using the PPP exchange rates to the US dollar available for circa 1970 (ECLA, 1978). All series are expressed in monthly terms in PPP\$ at 1970 prices.<sup>4</sup>

To capture the dynamics of internal migration, unskilled wages are calculated as a weighted average of the real wage for the unskilled rural and urban workers. In general, to set the levels I rely on comparable series of unskilled wages in agriculture and the urban minimum wage from PREALC (1982). In each case the weight for the rural unskilled wage is calculated as the share of the traditional agricultural sector in the low-income EAP using data *circa* 1970 from the same source. The c.1970 weights are adjusted back and forth with the use of census benchmarks of the rural population shares. The weight of the urban unskilled wage is the complement of the rural weight.

When necessary two interpolations procedures are employed to fill the gap between two given data points  $y_0$  and  $y_n$  in a series y: linear interpolation, and pattern interpolation which uses information of a known series x to fill the gap in y.<sup>5</sup> Unless otherwise indicated, linear interpolation is the default procedure.

<sup>&</sup>lt;sup>3</sup> Since 1924, the ILO has conducted an October Inquiry to obtain data on wages worldwide, which leads to an annual wage survey containing data for 161 occupations in over 130 countries (Harsch & Kleinert, 2011). In the LA6, the first publication of data from the October Inquiry was for Argentina (Buenos Aires), Brazil (Rio de Janeiro & São Paulo) and Chile (Santiago) in 1936; then Colombia (Bogotá) in 1938 and Mexico and Venezuela in 1940 for various cities.

<sup>&</sup>lt;sup>4</sup> Original hourly wages are converted into monthly terms by assuming 8 hours per day and 24 days per month.

<sup>&</sup>lt;sup>5</sup> For a given year «*t*» in the interpolated period  $y_0-y_n$ , the in-between values are estimated according to the following formula:  $y_t = y_{t-1} * [(x_t/x_{t-1})]/[(x_n/x_0)/(y_n/y_0)]1/n$ .

In what follows I only include information about the years with revisions. For details on procedure and sources in the remaining years see the 2017 Online Annex. Core periods are preceded with an asterisk. Figure 1 at the end of this section shows country charts with  $w_2$ ,  $w_3$ ,  $w_4$ and w between 1920 and 2011. All series can be extended back to 1900 using changes from the equivalent series in the 2017 dataset.

## Argentina

Unskilled wages  $(w_4)$ :

1920-1929: a simple average of real wages for unskilled men from Shipley (1977). Data points in 1921-22, 1926 and 1929.

1929-1935: average real wage in agriculture from IEERAL (1986) in australes of 1960.

1935-1968: weighted average of two series: (i) average real wage in agriculture from IEERAL (1986) in australes of 1960; and (ii) unskilled real wages (*salarios básicos de convenio*) from González (2004).

\*1968-1978 (in levels): weighted average of the real unskilled wage in agriculture (national level) and the minimum urban real wage. Both series in pesos of 1970 from PREALC (1982).

### Semi-skilled wages $(w_3)$ :

1920-1955: real average wage excluding agriculture and government in australes of 1960 from IEERAL (1986).

1955-1967: average hourly wage in seven occupations in the construction industry sourced from ILO (1936-64). Data points in 1951, 1954-67. I made a correction of the splicing of the series. Now it is done in 1954-55 with data in both years rather than in 1953-54 that included an interpolation in 1953.

## Brazil

Semi-skilled wages  $(w_3)$ :

1936-1971: I made two corrections. First, the splicing with the precedent series now starts with the first observation in 1936 of the wage series for seven occupations in the construction industry from ILO (1936-64). Secondly, I fixed a problem in the formula of pattern interpolation used between 1958 and 1971.

## Chile

Semi-skilled wages  $(w_3)$ :

(\*)1965 (in levels): it uses the average hourly wage between 1964 and 1966 in seven occupations in the construction industry sourced from ILO (1936-64). Previously the average included, wrongly, the 1962-1964 period.

## Colombia

Unskilled wages ( $w_4$ ): 1935-1939: rural daily wages from Londoño (1995).

#### FIGURE 1

Wage series by skill level and country.  $w_2$  = skilled wage,  $w_3$  = semi-skilled wage,  $w_4$  = unskilled wage, w = weighted-average wage. In Chile and Venezuela  $w_2$  is plotted on the left axes. All series are monthly values in US\$ at 1970 prices adjusted by purchasing power parity.



Revista de Historia Económica / Journal of Iberian and Latin American Economic History

https://doi.org/10.1017/S0212610923000095 Published online by Cambridge University Press

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1939-1969: weighted average of two series: (i) rural daily wages (*jornales agrícolas sin alimentación ponderados por clima*) from Romero *et al.* (2000) starting in 1940; and (ii) urban daily unskilled wages from Londoño (1995). The series of rural daily wages is extended back to 1939 using changes in Londoño (1995)'s series of rural wages.

1976-2000: I made a correction of a steep fall in 2000 in the household-surveys income series of urban workers with 1 to 5 years of schooling in seven main cities owing to a break in the methodology (DANE, encuestas de hogares).

Semi-skilled wages  $(w_3)$ :

1931-1977: average urban real daily wages (low-skilled workers in the construction sector) from Romero *et al.* (2000) in main cities: Barranquilla and Medellín in 1931-1938; and Barranquilla, Bogotá, Cali and Medellín from 1939 onwards.

1982-2000: I made a correction of a steep fall in 2000 in the householdsurveys income series of urban workers with 6 to 10 years of schooling in seven main cities (DANE, 2021). These series are in current pesos with a quarterly frequency.

2000-2011: average real overall wage index (2000 = 100) from ECLAC (2020).

Skilled wages  $(w_2)$ :

1980-2000: I made a correction of a steep fall in 2000 in the householdsurveys income series of urban workers with 11 years of education in seven main cities (DANE, 2021).

2000-2011: index of average real wage in manufacturing (including coffee processing) from DANE (2021).

## Mexico

Unskilled wages  $(w_4)$ :

1920-1934: nominal minimum daily wage in agriculture from INEGI (1990) to 1933. The series is extended to 1934 using changes of an index of unskilled real wages (*jornales*) in Mexico City from Macín (1947).

1934-1965: a weighted average of two series: (i) the minimum nominal wage for regular day workers in agriculture from Frankema (2010) to 1950 and from INEGI's Anuarios Estadísticos de México to 1965; and, (ii) the official minimum wage from Wilkie (1974) with interpolations in 1936-37 and 1954-55.

\*1965-1982 (in levels): weighted average of the minimum real daily wage in agriculture (national level) and the minimum urban real wage from PREALC (1982). These series are extended to 1982 with the minimum wage for regular day workers in agriculture from Mitchell (2003) and with ECLAC's minimum real urban wage respectively.

1982-2000: the manufacturing average wage in industries 311-322 (dominated by relatively unskilled labour) from ILO's LABORSTAT (2021). Semi-skilled wages  $(w_3)$ :

1920-1934: as in unskilled wage series above.

1940-1965: earnings per hour in the construction sector from ILO (1936-64) and ILO (1964-82).. A gap in the series between 1948 and 1954 is filled with pattern interpolation using as auxiliary series the average hourly wage of six occupations in the construction industry from ILO (1936-64). Data points in 1947, 49, 52 and 1955.

\*1965-1977 (in levels): average monthly wage in the construction sector from PREALC (1982).

1977-1985: earnings per day in the construction sector from ILO's ILOSTAT (2021).

1985-1991: earnings per day in wholesale and retail trade plus hotels and restaurants from ILO's ILOSTAT (2021). There are no data on wages in the construction sector from this source.

1991-2000: earnings per month in the construction sector from ILO's ILOSTAT (2021). Note that an alternative is to use changes in earnings per month in wholesale and retail trade plus hotels and restaurants. This series, however, is in tune with that of the construction sector.

Skilled wages  $(w_2)$ :

1929-1934: nominal minimum daily wage in agriculture from INEGI (1990). This series is far from ideal but, to my knowledge, this is the only wage data available for these years (same data gap is present in Bleynat *et al.*, 2021). It is an improvement on the use of the growth rate of real value added per economically active worker in manufacturing in the 2017 dataset.

1934-1940: hourly wages of low-skilled workers (*obreros*) in eight relatively low capital-intensive manufacturing activities from INEGI's Anuarios Estadísticos de México.

1980-2000: real wage in manufacturing from ECLAC (2020).

## Venezuela

Unskilled wages  $(w_4)$ :

1920-1936: I made a correction in the formula of pattern interpolation between 1928 and 1936.

\*1974-1977 (in levels): weighted average of the monthly minimum rural wage and the minimum urban wage. Both series in bolivars of 1970 from PREALC (1982). Between 1974 and 1979 both minimum wages were the same at a constant Bs 450 per month.

1977-1990: weighted average of two series. First, monthly real mean earnings per worker in agriculture at 1984 prices from Valecillos (1990). Values for 1981 and 1982 are interpolated. Second, average real wage of unskilled workers in the construction industry calculated from hourly wages reported in ILOSTAT (2021). Data available for 1978, 1981, 1985 and

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1988; otherwise interpolated. In 1988-90 it uses minimum urban real wage index (1980 = 100) from ECLAC.

1990-1997: weighted average of two series: (i) monthly minimum real rural wage; (ii) monthly minimum real urban wage. Both series are sourced from the BCV (2021).

1997-2011: index of average real monthly wages in retailing and personal services from the BCV (2021). Interpolations in 2007 & 2008.

Semi-skilled wages  $(w_3)$ :

1936-1974: average hourly base-rate wage (largely in Caracas) for seven occupations in the building industry from ILO (1936-64) – as reported in Valecillos (1990). Data available for 1940, 42, 43, 45, 46, 51, 54-56, 58-62, 64-66, 68, 71, 75, 78, 81, 85 and 1988. Interpolations in 1947-49, 1954-55, 1960 and 1963.

Skilled wages  $(w_2)$ :

1990-1997: index of real average monthly wages in manufacturing from ECLAC (2020). Interpolation in 1993.

1997-2011: index (1997 = 100) of real wages in manufacturing (private sector) from BCV (2021). Interpolations in 2007 & 2008 are necessary to avoid a step change in the data.

## 3.2. Real Income per Worker

I used the concept of National Income (NI) to estimate overall income per worker.<sup>6</sup> I incorporated new NI data from the countries' national accounts using, where possible, net values (NNI) rather than the gross values used in the 2007 dataset. This resulted in a downward adjustment in the series across the board.

To obtain the real levels of income per worker, I first calculated NNI-to-GDP ratios (with both variables at current prices from the same source) and, then, applied them to the original series of GDP per worker at 1970 prices with the CPI as deflator. Unless otherwise indicated, all series used in the calculation of the NNI-to-GDP ratios are sourced from ECLAC's CEPALSTAT (2020), CEPAL's *Boletín Económico de América Latina* (BEAL 1961 & 1962), ECLA's Statistical Bulletins of Latin America (SBLA, 1961-72), and ECLAC's Statistical Yearbooks of Latin America (SYLA, 1973-2011). To move back and forth from the set levels, I use changes of relevant series. Estimation details and sources by country are as follows (unless otherwise indicated, series are expressed in net values): *Argentina*: the levels are set in the period 1950-1973 (BCRA 1976: v.3, p.177). Values are at factor cost, resulting in lower ratios to GDP than if

<sup>&</sup>lt;sup>6</sup> These series are used to calculate the wage-to-income ratios and a proxy of the wage share of income.

values at market prices were used. Between 1935 and 1949 it uses (BCRA 1976: v.3, p.55); in 1974-75 (SYLA, 1979); in 1976-79 and 1988-92 (Kacef and Manuelito 2008) at gross values; in 1980-87 and 1994-2011 CEPALSTAT at gross values. Prior to 1935 the adjustment equals the 1935-37 average of the NI-to-GDP ratio.

*Brazil*: levels are set in 1939, and 1947-1968 (SBLA, 1972). The 1938-46 gap is filled with linear interpolation. To move from 1969 to 1980 it uses changes in SYLA (1980 & 1983); and from 1981 to 2011 it uses gross values from CEPALSTAT. The underlying GDP series includes an upward adjustment pre-1980. See Astorga (2024, Online Appendix 1).

*Chile*: levels are set in 1960-1985 from CEPALSTAT. To move backward to 1940, I use series in SBLA (1972), and from 1940 to 1920 a proxy for national income calculated by deducting profits from foreign mining companies (Rodriguéz Weber 2014) from GDP at current prices (Haindl 2007). I use series from CEPALSTAT to move forward to 2011.

*Colombia*: levels are set in 1947-1970 (SBLA, 1972). I use series of gross values to move backward to 1936 from Londoño (1995), and from CEPALSTAT to move forward to 2011.

*Mexico*: levels are set in 1950-1960 (SBLA 1972). To move back to 1939, I use gross values in *Anuario de Mexico* 1951-52 (DGE, 1954). To move forward, I use net values from SBLA (1967) in 1961-65, SYLA (1976) in 1966-71, SYLA (1980 & 1981) in 1972-80, SYLA (1989 & 1992) in 1981-88, and CEPALSTAT in 1989-2011.

*Venezuela*: levels are set in 1950-1998 (BCV, series históricas). To move back to 1935, I use series in Baptista (1997); and, to move forward from 1998 to 2011, gross values from CEPALSTAT.

## **3.3. Economically Active Population Shares**

I made a correction in Group 1's EAP share in Colombia resulting in a level reduction before c.1970. The adjustment also affected  $e_2$  an  $e_3$ . In Venezuela, I made a correction in  $e_1$  resulting in a downward adjustment across the board, also affecting  $e_3$  which is calculated as a residual (an upward adjustment). In Brazil's  $e_1$  I made interpolations between census benchmarks in 1950, 1960, 1970 and 1980. This resulted in a more gradual rise in the top group's share during the period 1950-80 compared to the 2017 profile. In addition, I ironed out a number of spikes in EAP shares in a number of years across the six countries.<sup>7</sup> This smoothing is justified because the EAP is a stock variable and changes over the short term should be gradual. Otherwise, values are as in Astorga (2017).

<sup>&</sup>lt;sup>7</sup> For example, in Argentina c.1947 in  $e_4$ . In Chile c.1997, c.1986 and 1998 in  $e_1$ ; c.1986 in  $e_2$ . In Colombia c.1998 & c.2006 in  $e_1$ . In Mexico c.1993 & c.1997 in  $e_1$ ; c.1976 & c.1988 in  $e_4$ .

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#### Supplementary material

The supplementary material for this article can be found at https://doi. org/10.1017/S0212610923000095.

#### ACKNOWLEDGEMENTS

Received 2 October 2023. Accepted 27 October 2023.

Assembling this dataset of real wages was only made possible by the generous help of a number of colleagues. During the early stage of the research, I was fortunate to reach (perhaps to their regret) Leticia Arroyo Abad, Ame Berges, Valpy FitzGerald, Ewout Frankema, Michael Huberman, Javier Rodríguez Weber, Héctor Valecillos, Henry Willebald, Jeffrey Williamson, and Alan Wittrup for advice and data. At a country level, I am greatly in debt to Marcelo Abreu, Florencia Aráoz, Raymundo Campos Vázquez, Eduardo Martín Cuesta, José Díaz, Aurora Gómez Galvarriato, María Gómez León, María López Uribe, Gerardo Lucas, Mario Matus, Brian McBeth, Oscar Nupia, Marco Palacios, Eustáquio Reis, Carmen A. Romero, and Héctor Valecillos. This research has received financial support from the project PGC2018-095821-B-I00: (MCIU/AEI/FEDER, UE).

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