# RESEARCH IN ECONOMIC HISTORY

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Series Editors: Christopher Hanes and Susan Wolcott

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# INTRODUCTION

*Research in Economic History* is a refereed journal, specializing in economic history, in the form of a book. We publish articles that follow the standard formats of economics journals, but we can also accommodate longer pieces, historical narratives, and articles that primarily present newly constructed data sets.

In this volume, Molly Ball presents and analyzes newly constructed indices of nominal wages, the cost of living, and real wages in São Paulo, Brazil, over 1891−1930. This is an important addition to basic historical data on one of the most important cities in South America.

Howard Bodenhorn uses surveys of working-class households in late nineteenth-century New Jersey, along with other information, to study the motivations of working-class savers and the institutions in which they invested their savings − mainly life insurance companies, fraternal societies, savings banks and building, and loan associations.

Gregori Galofré-Vilà, Andrew Hinde, and Aravinda Meera Guntupalli present a newly constructed longitudinal series on heights in England over the last 2000 years. They use the series to assess the credibility of other estimated measures of well-being in England, including gross domestic product (GDP) per capita, and real wages. Further, they compare the height series to other series measuring health.

Mary Rodgers and James E. Payne present a novel view and new evidence about the famous American financial Panic of 1907. Traditional accounts of the panic give a large role to the failure of the Heinze copper corner in precipitating runs on New York banks. Modern literature notes that the panic followed monetary-policy tightening by the Bank of England and other European central banks. Rodgers and Payne argue that the copper corner failed because the monetary-policy tightening caused a drop in prices of copper, among other commodities.

Christian Stohr uses the wealth of available Swiss data on agriculture and employment to create GDP measures for subregions in Switzerland. He uses these data to argue that aggregate inequality in Switzerland was low in the initial push to industrialization because there were multiple, similar centers industrializing simultaneously, thus mitigating inequality across regions.

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# PRICES, WAGES, AND THE COST OF LIVING IN OLD REPUBLIC SÃO PAULO: 1891–1930

Molly C. Ball

## ABSTRACT

*Using archival and primary source evidence, this chapter introduces the first real wage series from 1891 to 1930 for Brazil's most important immigrant and industrial city, São Paulo. This is the first price series, nominal wage series, and real wage series for the city that covers the duration of the Old Republic. While scholars look to Rio de Janeiro evidence to compare Brazil's cost of living to other southern cone and immigrant-receiving countries, it is preferable to use evidence from the primary destination city. Price deviations between the two cities underscore the need for these series. The results show foodstuff prices increased steadily over the period and more dramatically in the period during and after World War I. Hedonic wage regressions show hourly wages for unskilled, low-skilled, and medium-skilled workers did not increase accordingly. While the decline in real wages tapered off in the 1920s, real wages across skill levels did not recover to prewar levels. This new index suggests the city of São Paulo's labor market was more integrated with Buenos Aires's than with Rio de Janeiro's and that Paulistano real wages did not recover in the 1920s to the extent that they did in other southern cone cities. Given these results, the puzzle as to why migrants continued to flock to the city prove more intriguing. The results also suggest that*

*Vargas-era labor legislation had the potential to greatly improve the lives of the city's working class, perhaps more so than in other cities.*

**Keywords:** São Paulo; price series; real wage; nominal wage; cost of living; Brazil

**JEL classifications:** J3; N3; N16; N36; N96

# 1. INTRODUCTION

Latin America and Brazil experienced dramatic demographic and economic changes between 1890 and 1930. However, a lack of reliable historical data for the region, and particularly for Brazil, makes the period also one of the most enigmatic. Brazil abolished slavery in 1888 and just one year later, the Empire fell. The subsequent Old Republic government started in 1891 and was effectively an oligarchy dominated by coffee interests. The period saw dramatic social and economic changes. The Old Republic endured until another revolution in 1930, which would put Getúlio Vargas in power as the provisional President. Just some of the important changes taking place include the sizeable European immigrant groups arriving in Brazil, and in particular in São Paulo; coffee valorization schemes in which Brazil artificially withheld or released coffee onto the world market to reach target prices; economic uncertainty brought about by World War I; increased urbanization; and significant growth in the country's industrial production and capacity. The city of São Paulo, the capital of the state of São Paulo, experienced the greatest demographic and industrial growth over the period, and by 1920, was an important national and hemispheric urban center. By 1933, the city that in 1890 counted just over 65,000 residents was home to over one million individuals.

Despite this impressive population increase, many aspects of the city's growth and development remain a mystery. Contemporaries in the city often commented on the unreliability and inconsistency of official data collection. Many state-level efforts were directed toward data collection related to coffee, the state's most important product, providing more evidence on rural wages and landholding than on urban settings. At the municipal level, the growing pains associated with rapid expansion made it difficult to keep consistent records. Evidence on industrial accidents and injuries provide some insight into the urban labor market, and should be used more extensively by social and economic historians. These statistics, however, simply cannot provide the prices and wages facing the city's urban laborers. Compounding this challenge, many municipal officials were more concerned with getting an accurate census of the city's streetlights than they were with interviewing or doing population counts of the city's marginal populations. The former signified progress while the latter

reminded officials of just how much more improvement was needed. At the federal level, 1920 stands as the only reliable federal census between 1872 and 1940 is telling of this shortcoming. Brazil's 1900 Census epitomizes Brazil's statistical lacunae. Non-Brazilian historians likely wonder why the 1900 Census is so rarely cited in scholarly studies. While evidence for São Paulo was valuable and somewhat reliable, showing that the city's population had grown to 240,000, roughly 25% of Brazilian *municipios* failed to report any information.[1]

These statistical challenges have left researchers without systematic, longitudinal compilations of either prices or wages in the city's markets. The state archive reflects the relative chaos of the era. While documents from the Empire and post-1930 have subseries within the cabinet-level organization, documents for the Old Republic are merely organized at the cabinet-level by year, leaving researchers of the Old Republic to sift through boxes of "diverse documents." This dearth of information is unfortunate, because we know relatively little about the early development of São Paulo, one of today's largest cities in the world. Lacking information on worker wages and prices makes it difficult to accurately situate São Paulo and Brazil in southern cone, Latin American and global labor markets.

The aim of this chapter, thus, is relatively straightforward: to recover and present evidence on nominal wages and prices for the period and to estimate real wages. For economists, recovering this valuable information will improve comparisons between major southern cone immigration destinations, mainly Buenos Aires and Montevideo. For example, Bértola and Ocampo (2012) and Williamson (1998, 2009) rely on wage estimates for Rio de Janeiro to account for how potential immigrants viewed the Brazilian labor market as compared to Buenos Aires or Montevideo. Considering that São Paulo was by far Brazil's largest immigrant destination, an estimate of real wages for São Paulo is preferable to one for Rio de Janeiro. For historians, being able to estimate cost of living for the typical working-class Paulistano and to be able speak to the expectations most residents faced complements research that documents important shifts in finance and industry occurring with World War I (Hanley, 2005; Musacchio, 2009). This is not to suggest that important research related to the working classes living in the city has not been undertaken; however, as the real wage evidence in this chapter demonstrates, prices, and cost of living were the foremost consideration among São Paulo's working class.[2]

The chapter proceeds in three sections by developing three different series: a price series, a nominal wages series, and a real wage series. Each section presents the sources and methodology used to create the respective series and follows with the results. The first section constructs four Laspeyres indexes to show how consumer prices increased dramatically for most of the Old Republic. The indexes are a "bare bones" estimate, two typical consumption baskets based on a 1920 comment, and one utilized by Wells (1983) that derives from Davis's (1935) study of the Paulistano working class in 1934. When prices were at their highest, in the mid-1920s, prices had increased by between roughly

five and seven times their 1891 value. The second section follows the work of Margo and Villaflor (1987) and uses hedonic regressions to estimate the natural log hourly wages of unskilled, low-skilled, and medium-skilled workers and to construct a nominal wage series for the city. The section also elaborates on the firm-level employment data from three distinct companies used to provide the wage observations. The evidence shows there was nominal wage growth with workers in the last five years of the Old Republic receiving roughly double the hourly wages offered at the beginning of the period. The disparate growth rates of prices and nominal wages reported in the first and second sections are combined in the third section to report a real wage series. This section deflates nominal wages and estimates real wages for unskilled, low-skilled, and medium-skilled workers. While the most jarring drop in real wages occurred following Brazil's *Encilhamento* in 1891, the more problematic trend is the steady decrease in real wages over the period. A short conclusion follows the three sections outlined above, drawing connections to other real wage research and suggesting future avenues for research and applications.

## 2. PRICE INDEX

Scholars have been unable to track food prices in São Paulo largely because official statistics did not systematically document food prices. Wells (1983) analyzed working-class living standards in the city from the mid-1930s to the mid-1970s, and the efforts of Mario Cardim (1936) produced cost-of-living estimates for the city for 1913−1932, but there are no estimates for the pre-World War I period, arguably the time of greatest structural changes in the city. Our understanding of prices during this period is restricted to wholesale or price observations from Rio de Janeiro. Catão's (1992) wholesale price index uses Rio de Janeiro observations for the 1870−1913 period. Many scholars turn to carefully constructed consumer price index for Rio de Janeiro as a measure of increasing prices for the Old Republic because it spans from 1820 to 1930 (Lobo, Canavarros, Elias, Novais, & Madureira, 1973; Lobo, Madureira, Canavarros, Feres, & Gonçalves, 1971). However, as Fig. 1 indicates, the Cardim (1936) and Lobo et al. (1971) indexes, although they move in the same general direction, do deviate for the period where they overlap. This deviation is important, because although Catão (1992) suggests the Rio "price quotations adequately represent price trends of the respective commodity at the national level" (p. 521), the price variations between São Paulo and major coastal cities like Rio, Salvador, and Recife were likely more significant than scholars have suggested (Catão, 1992; Lobo et al., 1971, 1973).

Most of Brazil's major cities developed along the coast so fluvial transport was the easiest way to integrate markets. São Paulo was the exception and transportation prices to the city included either rail transport or difficult
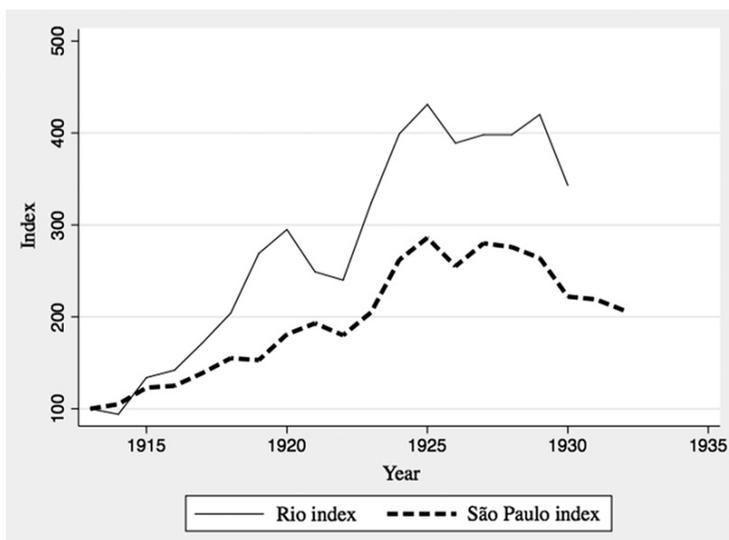
*Fig. 1.* Rio versus São Paulo Index: 1913 Base Year. *Note*: Rio index based on Lobo et al. (1971) 1919 index. São Paulo based on Cardim (1936).

overland passage by foot or mule trains. To drive between the cities of Rio de Janeiro and São Paulo today takes less than 7 hours, but during the Old Republic, transport was not nearly as simple. Rail transport did not connect the two cities until 1890. Roads were little improved by 1908, when the adventurer and car sportsmen, Count Lesdain, left Rio de Janeiro on March 6th bound for São Paulo. Over one month later, after navigating roads that were "often made impassable by fallen trees and deep pools of mud," he arrived to a cheering crowd in São Paulo on 11 April (Wolfe, 2010, p. 30).

Through piecing together evidence from a variety of sources and using careful estimation techniques, we can understand the degree that food prices in São Paulo increased from the beginning of the Old Republic through the start of World War I. The following sources complement Cardim's (1936) observations for the 1913−1934 period. The state's daily newspaper, the *Estado de São Paulo (ESP)*, formerly the *Província de São Paulo (PSP)*, reported maximum and minimum price observations for the city's municipal market in most years between 1889 and 1898 and then wholesale prices for 1908−1912. Price observations were seemingly reported sporadically, thus the series uses the prices most often reported in the months of May or June, the months that most consistently recorded price information.[3] The state's *Boletim do Departamento Estadual de Trabalho (BDET)* provides additional municipal market observations and prices are estimated using the city's immigrant-receiving station's foodstuffs contracts as reported in the state's *Relatório da Secretaria de*

*Agricultura (RSA)*. This new price series includes prices per kilogram for important food products for most years during the Old Republic.[4]

São Paulo prices recorded for 13 food products in seven different consumption groups serve the basis of the price indexes that are described below. The food products included in the consumption groups are noted in parentheses. In years with existing price observations, the price used to create the indexes is the average of the reported prices. In years lacking observations, the price for the product is calculated using changes in prices reported for substitute products. I detail the specific sources for each product used to create the series and the methodology used to estimate prices below.[5]

## 2.1. Products

### 2.1.1. Fats (Bacon, Lard, and Butter)

The series include prices for bacon as reported in the *PSP* and the *ESP* for 1889, 1890, 1892−1893, 1895, 1896−1898, 1908−1912, and from the *1904 RSA*. The series also use prices for good bacon with meat from the *BDET* for 1913−1917. Additional prices include lard prices (*banha, banha alves, banha de lata, and banha com toucinho* ) from the *ESP* for 1892, 1893, and 1895−1898; the *1905 RSA*; the *BDET* for 1912−1914, 1919, and 1920; and Cardim's (1936) observations for 1913−1930. Butter (*manteiga fresca*) prices are included as reported in the *BDET* for 1907, 1910−1911, and 1913−1917 and in the *ESP* for 1908−1912.

### 2.1.2. Beans (Beans)

The price series include bean (*feijao*) prices as reported in the *PSP* and the *ESP* for 1889, 1891, 1892−1893, 1895, 1896−1898, 1908−1912; the *1902, 1903, 1904, 1908, and 1909 RSA*s; the *BDET* for 1912−1917, 1919, and 1920; and recorded by Cardim (1936) for 1913−1930. The indexes also incorporate prices the *BDET* reported for the following bean types between 1912 and 1917: *feijao bom, feijao mulatinho, feijao novo bom, feijao novo superior, feijao preto, feijao velho bom, and feijao velho superior*.

### 2.1.3. Meat (Meat, Hens, and Chicken Eggs)

The series include meat (*carne verde*) prices as reported in the *ESP* for 1896−1898; meat (*carne*) prices as reported in the *1902, 1903, 1908, and 1909 RSA*s; and those reported by Cardim (1936) for 1913−1930 and in the *1919 BDET* for 1919. Additional beef (*carne de vaca*) as reported in the *1904 and 1905 RSA* and the *BDET* for 1913−1917 and 1920 are also included. In years without price observations for meat, but that had observations for substitute products, the average percentage change of the substitute products was used to calculate the percentage change in meat prices. Changes in chicken (*c*), hen (*h*),

and egg (*e*) unit prices were used to estimate meat (*m*) prices for 1890−1895; 1899−1901; 1906−1907; and 1910−1911 using the following calculations, where *D*\* denotes the growth factor in a substitute product's average price:

$$D^*_{t_1+1,\, t_1+2,\, ...,t_2} = \left( \frac{P^*_{t_2}}{P^*_{t_1}} \right)^{\frac{1}{t_2-t_1}}$$

$$D_{\text{avg}} = \frac{D_c + D_h + D_e}{3}$$

$$P^m_{t-1} = \frac{P^m_t}{D^{\text{avg}}_t}$$

The *ESP* reported the chicken and hen prices for 1889, 1891−1893, 1895−1896, 1898, 1907−1898, and 1909−1811 and the *BDET* reported prices in 1907 and 1910−1912. Dozen egg prices also are included for 1890 from the *ESP* and for 1905, 1908, and 1909 from the *RSA*s.

### 2.1.4. Potatoes (Potatoes)
The prices series use potato (*batatinhas*, *batatas*) prices as reported in the *PSP* in 1889 and the *ESP* in 1890−1893, 1895−1896, 1898, and 1908−1912; the *RSA* in 1904, 1905, and 1908−1909; the *BDET* for 1907, 1910−1917, 1919, and 1920; and by Cardim (1936) for 1913−1930. Additional price observations for *batatinha nova superior* as reported in the *BDET* in 1911 and 1913−1917 are also included in the average price calculation.

### 2.1.5. Rice (Rice)
Rice (*arroz*) and brown rice (*arroz cattete*, *arroz em casca*) prices constitute the rice portion of the price series. Paulistanos could purchase other types of rice, like Japanese rice, during the period, but in years the unspecified rice prices are most similar in price to the reported *arroz cattete* prices. Rice prices are reported in the *PSP* in 1889 and in the *ESP* in 1890−1893 and 1908−1912. The *RSA*s provide price observations for 1902−1905 and for 1908 and 1909. The *BDET* provides prices for 1912−1917 and for 1919 and 1920. Finally, Cardim (1936) provides rice prices for 1913−1930.

### 2.1.6. Sugar (Sugar)
Sugar (*açucar*, *açucar mascavo*) prices constitute the sugar portion of the series. The *RSA*s provide price observations for 1902−1907 and for 1908 and 1909.

The *BDET* reports prices for 1907, 1910−1911, 1913−1917, and 1919 and Cardim (1936) reports prices for 1913−1930.

### 2.1.7. Bread (Bread, Manioc)

In terms of primary carbohydrate consumption, most Paulistanos likely consumed a variety of products ranging from manioc flour to white bread. Personal and national preferences decidedly impacted these patterns: for example, Italian households consumed larger shares of pasta. Generalizing carbohydrate consumption patterns, however, is necessary to complete the price index. I include the prices of white bread and manioc flour in my price series calculations. Changes in white bread prices had the greatest impact on middle- and upper-class consumption patterns. These are the prices that Cardim (1936) records for 1913−1930. Manioc flour was by far the cheapest carbohydrate (cheaper than rice) and associated price changes would have had a greater impact on the lower classes. Unfortunately, a full set of price observations is lacking for both products. Only Cardim's (1936) records report bread prices for years after 1912. Similarly, there are no manioc flour price observations after 1920. Thus, I use the substitution method described for meat to use percentage changes in substitute prices to estimate product prices. Thus, the growth factors of average manioc flour prices between 1890 and 1912 provide bread price estimations for those years and the growth factors of bread prices Cardim (1936) reports for 1921−1930 are used to estimate manioc flour prices in those years. The *PSP* reported manioc flour prices for 1889 and the *ESP* reported prices for 1890−1893, 1896−1898, and 1908−1912. The *RSA*s reported manioc flour prices in 1904. The *BDET* reported prices for 1907, 1910−1917, and 1920.

   Even with this new series, there are still years for which price observations are missing. Linear interpolation fills in any missing price observation gaps for the wage series. Table 2, which reports the price series indexes, notes the years where interpolation and substitution are made. Fig. 2 plots the average logarithmic prices for products whose prices were reported consistently over the duration of the period. Those products with a thick line (beans, potatoes, and rice) denote products for which no price substitutions were used to calculate averages. Those products with thin lines (fats, meat, bread, and manioc) were calculated using the products described above. Missing observations prevents conclusions about annual price fluctuations; however, the general upward trend in prices over the period is evident.

### 2.2. Consumption Baskets

While price observations demonstrate a general upward trend, this information is most instructive when considered together in the form of a consumption basket. This chapter constructs four Laspeyres indexes for three competing
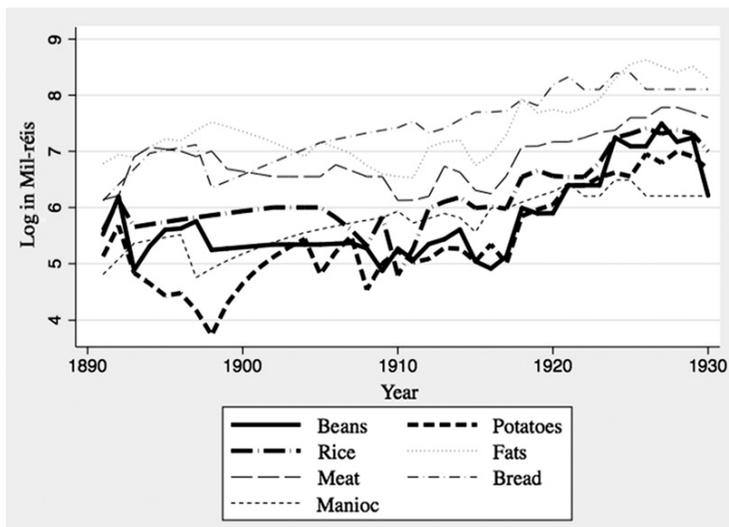
*Fig. 2.* Log of Average Foodstuffs' Prices: São Paulo, Brazil. *Note*: Based on prices as reported in text.

consumption baskets: the "bare bones" index, and upper- and lower-bound indexes for typical working-class families, and the Davis index. Ultimately, these indexes are used to calculate Paulistano real wages for the period. Creating the appropriate consumption basket for working-class families in the São Paulo case necessitates relying solely on food prices, the largest portion of the working-class budget, and excluding rent, energy, and clothing costs (Wells, 1983, pp. 305−308). Rent is the most problematic of the three; however, there simply are not enough rent observations during the period to include this expenditure in the calculation.[6] Even existing rent observations often fail to report detailed characteristics. For example, it is often impossible to tell whether the observation referred to location with or without running water and easy access to public transportation. This omission is particularly problematic in Old Republic São Paulo where access to running water alone could increase land value, and presumably rent, threefold (Rolnik, 1995, p. 205).

The first consumption basket adapts the "price of subsistence" measure that social scientists have used to compare relative wages across Eurasia to the Brazilian case. This is the first "bare bones" estimate for the Brazilian case during the Old Republic and uses a 1,940 calorie per day diet largely based on the cheapest available carbohydrate (Allen, Bassino, Ma, Moll-Murata, & Zanden, 2011, p. 21). A combination of sorghum, rice, polenta, and oats formed the base of European and Chinese peasant diets. In Brazil, rice may have been the preferred grain, but manioc flour was by far the cheapest grain available, thus,

I use manioc flour as the Paulistano "bare bones" basket base. One kilogram of manioc flour contains roughly 3,400 calories, but provides just 2 grams of protein.[7]

Prices for manioc flour (*mf*), meat (*m*), beans (*b*), and fats (*f*) are used to calculate the weekly bare bones diet for an adult male in São Paulo:

$$P_t^{BB} = \frac{\left(P_t^{mf}*178\right) + \left(P_t^m*5\right) + \left(P_t^b*20\right) + \left(P_t^f*3\right)}{52}$$

To suggest all working-class households subsisted on a "bare bones" food basket would be misleading: under 10% of households fit this model. Nationality and ethnicity impacted the share of budgetary spending to a small degree; however, socioeconomic status was the largest determiner of variances in expenditures. In 1934, some households spent over 4.5 times what others spent on food (Davis, 1935, pp. 143−146).[8] A more typical, five-person, working-class family's annual consumption as reported in the *BDET* (1920) included beans (*b*) (198K), rice (*r*) (268.8 K), potatoes (*p*) (115.2 K), meat (*m*) (482.4 K), lard and bacon (*f*) (50.4 K), bread (*br*) (770.4 K), and sugar (*s*) (93.6 K). Assuming a two-parent household with three children, one adult and two younger children, the annual adult male consumption is reflected in Table 1.[9] The relatively high beef consumption stands out, especially relative to consumption that Davis (1935) recorded in the mid-1930s. This reduction, however, does maintain the trend of reduced beef consumption that Wells (1983, p. 316) observed from 1934 to 1974.

The equations below, thus, reflect the upper- and lower-bound estimations for adult male weekly food prices in São Paulo from 1902 forward.[10] The lower-bound estimate substitutes manioc flour (*mf*) for bread (*br*) at an equal consumption ratio.

$$P_t^{TU} = \frac{(P_t^{br}*197)+(P_t^m*109)+(P_t^b*51)+\left(P_t^f*13\right)+(P_t^r*69)+(P_t^p*29)+(P_t^s*24)}{52}$$

$$P_t^{TL} = \frac{\left(P_t^{mf}*197\right)+(P_t^m*109)+(P_t^b*51)+\left(P_t^f*13\right)+(P_t^r*69)+(P_t^p*29)+(P_t^s*24)}{52}$$

As there were no sugar price observations prior to 1902, the pre-1902 consumption basket prices include a share of the food budget households spent on sugar as reported by Davis (1935). For the upper-bound index, this share is 8%, and for the lower-bound, the share is 11%.

***Table 1.*** Adult Male Annual Consumption Baskets.

| | "Bare Bones" | | | Typical | Davis |
|---|---|---|---|---|---|
| | Europe (kg) | North China (kg) | São Paulo (kg) | São Paulo (kg) | São Paulo (kg) |
| Oats | 155 | | | | |
| Sorghum | | 179 | | | |
| Manioc flour | | | 178 | | |
| Rice | | | | 69 | 33 |
| Bread | | | | 197 | 93 |
| Beans and peas | 20 | 20 | 20 | 51 | 23 |
| Potatoes | | | | 29 | 21 |
| Meat and fish | 5 | 3 | 5 | 109 | 30 |
| Butter and lard | 3 | | 3 | 13 | 15 |
| Sugar | | | | 24 | 29 |
| Oil | | 3 | | | |

*Sources*: "Bare bones" baskets for Europe and North China from Allen et al. (2011, p. 25); São Paulo "typical" basket from 1920 *BDET*; and Davis São Paulo basket from Wells (1983).

$$P_t^{TU} = \left( \frac{\left(P_t^{br}*197\right) + \left(P_t^m*109\right) + \left(P_t^b*51\right) + \left(P_t^f*13\right) + \left(P_t^r*69\right) + \left(P_t^p*29\right)}{52} \right) *1.08$$

$$P_t^{TL} = \left( \frac{\left(P_t^{br}*197\right) + \left(P_t^m*109\right) + \left(P_t^b*51\right) + \left(P_t^f*13\right) + \left(P_t^r*69\right) + \left(P_t^p*29\right)}{52} \right) *1.11$$

The final consumption basket index uses the values associates with bread, rice, beans, potatoes, sugar, beef, and fats consumption that Wells (1983, p. 312) derived from Davis's (1935) study to calculate consumption patterns for the mid-1930s. The values are as follows[11]:

$$P_t^D = \frac{\left(P_t^{br}*93\right) + \left(P_t^m*30\right) + \left(P_t^b*23\right) + \left(P_t^f*15\right) + \left(P_t^r*33\right) + \left(P_t^p*21\right) + \left(P_t^s*29\right)}{52}$$

The calculation for years without sugar observations follows:

$$P_t^D = \left( \frac{\left(P_t^{br}*93\right) + \left(P_t^m*30\right) + \left(P_t^b*23\right) + \left(P_t^f*15\right) + \left(P_t^r*33\right) + \left(P_t^p*21\right)}{52} \right) *1.08$$

Table 2 reports the prices indexed to 1920.

*Table 2.*  São Paulo Price Indexes: 1890−1930.

| Year | Index BB | Index TL | Index TU | Index D |
|------|----------|----------|----------|---------|
| 1890[a,b] | 22 | 30 | 21 | 19 |
| 1891 | 27 | 35 | 20 | 19 |
| 1892 | 38 | 47 | 27 | 26 |
| 1893 | 42 | 55 | 34 | 29 |
| 1894 | 46 | 63 | 42 | 37 |
| 1895 | 49 | 64 | 43 | 39 |
| 1896 | 51 | 64 | 44 | 40 |
| 1897 | 32 | 55 | 45 | 41 |
| 1898 | 34 | 58 | 32 | 29 |
| 1899 | 35 | 50 | 30 | 28 |
| 1900 | 38 | 50 | 31 | 29 |
| 1901 | 41 | 50 | 33 | 31 |
| 1902 | 43 | 49 | 33 | 33 |
| 1903 | 46 | 49 | 35 | 34 |
| 1904 | 49 | 50 | 37 | 37 |
| 1905 | 52 | 51 | 40 | 40 |
| 1906 | 55 | 55 | 43 | 41 |
| 1907 | 57 | 51 | 43 | 41 |
| 1908 | 58 | 48 | 43 | 41 |
| 1909 | 59 | 49 | 44 | 42 |
| 1910 | 65 | 41 | 42 | 40 |
| 1911 | 53 | 38 | 46 | 44 |
| 1912 | 60 | 47 | 42 | 42 |
| 1913 | 66 | 60 | 49 | 47 |
| 1914 | 63 | 58 | 55 | 53 |
| 1915 | 47 | 43 | 56 | 54 |
| 1916 | 68 | 51 | 56 | 55 |
| 1917 | 71 | 58 | 60 | 59 |
| 1918 | 87 | 93 | 82 | 84 |
| 1919 | 92 | 94 | 76 | 77 |
| 1920 | 100 | 100 | 100 | 100 |
| 1921 | 116 | 105 | 111 | 109 |
| 1922 | 98 | 101 | 96 | 94 |
| 1923 | 100 | 116 | 101 | 102 |
| 1924 | 142 | 151 | 134 | 137 |
| 1925 | 144 | 161 | 138 | 139 |
| 1926 | 120 | 160 | 119 | 122 |
| 1927 | 130 | 172 | 124 | 122 |

| Year | Index BB | Index TL | Index TU | Index D |
|------|----------|----------|----------|---------|
| 1928 | 120 | 168 | 122 | 122 |
| 1929 | 122 | 164 | 121 | 122 |
| 1930 | 103 | 131 | 108 | 106 |

*Sources*: As described in text.
*Notes*: [a]The indexes use changes in substitute prices to calculate prices for the following products:
meat (1890, 1983, 1895, and 1910−1911), manioc (1921−1930), and bread (1890−1912).
[b]Linear interpolation provides missing price observations for the following products in the following
years: fats (1891, 1894, 1899−1904, and 1906), beans (1890, and 1899−1901), potatoes (1894,
1899−1903, and 1906), rice (1894−1901, and 1906−1907), sugar (1906), manioc (1894−1895,
1898−1903, 1905−1906, and 1918−1919), meat (1894, 1899−1901, 1906). Sugar prices as a share of
consumption are estimated as described in the text for 1891−1901.

Considering the importance coffee played in Brazil's export market, it is pos-
sible that coffee prices played a role in determining domestic foodstuff prices
over the period. The product's importance (between 50% and 60% of Brazilian
exports during the period) led to large-scale farms and state-implemented poli-
cies that favored coffee production and limited small-scale farmers ability to
produce other foodstuffs (Abreu & Bavilaqua, 2000). This incentivized coffee
production would have reduced domestic foodstuff supply and increased prices.
High world coffee prices also discouraged large-scale planters from diversifying
into other products. Comparing Fig. 2 and Fig. 3 shows that although food
and coffee export prices experienced similar movements, there were key differ-
ences over the period of the Old Republic. First, coffee prices may have
slumped starting in the late 1890s; however, Brazil's coffee valorization scheme
from 1906, which effectively limited world coffee supply by having the
Brazilian government buy and store surplus coffee, was instrumental to the rise
in coffee prices experienced between 1906 and the start of World War I. During
the war, while coffee prices dropped, foodstuff prices did not. In the years fol-
lowing World War I, while food prices and coffee prices increased, coffee prices
exhibited much greater volatility, especially with a more dramatic drop before
the 1921 valorization. Although coffee undoubtedly impacted the cost of living,
it was far from being the index's sole determiner.

Fig. 4 depicts the evolution of weekly costs associated with food prices
indexed to 1920. As a whole, the price series show increasing food prices during
the Old Republic. In the period between the start of the Old Republic and the
onset of World War I, prices had already doubled at best and tripled at worst.
These increases meant that food prices for Paulistanos increased by 8−13%
annually in the first part of the Old Republic. The interwar years saw price
increases accelerate and Paulistanos had to confront average annual price
increases of between 20% and 36%. After the war, the average annual increase
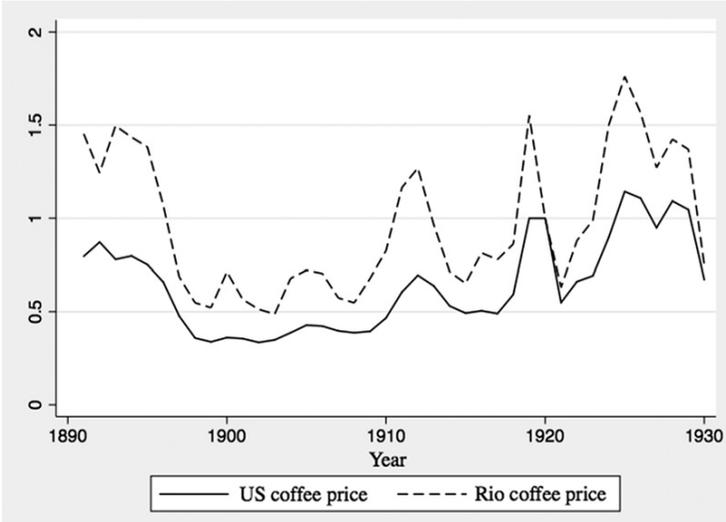in food prices remained high through 1925 when prices peaked. These results

*Fig. 3.* Coffee Export Price Index: 1890−1930. *Source*: Martins and Johnston (1992, Table 1.8). *Note*: Indexed to 1920.
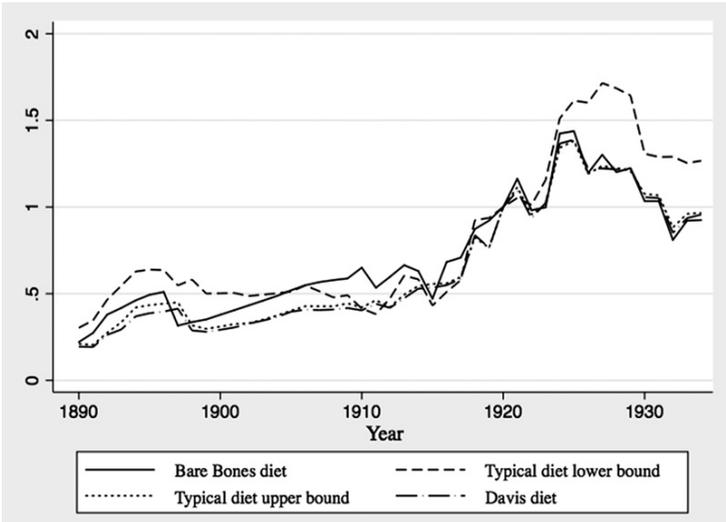


*Fig. 4.* São Paulo Price Index: 1890−1930. *Note*: Base year is 1920.

are consistent with the anecdotal evidence that speaks to increasing prices over the period. The general uniform upward trend in prices over the duration of the Old Republic would have been highly problematic for the working class. The acceleration with the onset of World War I would have been especially problematic. The periods of accelerated increases coincide with the period of the city's greatest unrest in terms of labor strikes (Wolfe, 1993). By 1925, prices had increased between 4.6 and 7.3 times their 1891 values. These price increases were accentuated by the fact that nominal wage growth did not increase accordingly.

## 3. NOMINAL WAGES

I derive wage data for the city of São Paulo from three individual firms to construct the São Paulo Old Republic (SPOR) wage series: the *Companhia Paulista de Estrados de Ferro* railway company (Paulista), the *Fiação, Tecelagem e Estamparia Ypiranga Jafet* textile factory (Jafet), and the *São Paulo Tramway, Light and Power Company* public works firm (Light). These records survived archival redistribution associated with state takeovers in the mid-twentieth century and privatization in the 1990s.[12] The series is based on short employee personnel cards known as *fichas*. Although there is some variance as to the information included, individual-level employee characteristics provide valuable data for constructing nominal wage series for the typical worker. Although other studies have used these records, none have combined and aggregated a nominal wage series or estimated real wages (Andrews, 1991; Lanna, 2002).

The wages and labor structure of these firms reflect similar companies in the city. In the case of Paulista, the company's efficiency was similar to that of Mogiana and Sorocabana, its two major contemporaries. The share of personnel costs as a percentage of total costs for both Sorocabana and Paulista averaged around 60% through 1925 (Saes, 1981, pp. 137–139). Jafet was just one of many textile factories throughout the city, and although it was a bit larger than the average textile company, the wage structure and labor force were similar to other factories (São Paulo *BDIC*, 1912, pp. 124–125; 1919, p. 120). Responses to questionnaires the Centro de Industriais de Fiação e Tecelagem de São Paulo (CIFTSP) sent to factory owners seeking average warper and carder wages in 1922 shows the average Jafet wages for these positions well with the range reported to the CIFTSP (CIFTSP, 1922, Circulars 92, 93). Jafet also reflected the labor shares of other textile firms in the city and state as reported in the 1911 and 1920 (Ribeiro, 1988, p. 133). That Light became a monopoly in both transportation and energy over the period is a potential cause for concern; however, evidence on the *fichas* demonstrates significant worker movement between different independent mechanics and other major mechanics departments, such as General Motors and Ford. Furthermore, the

average wages Light construction workers received were consistent with the few wage observations we have for the city in 1912 (Ball, 2013, pp. 65–66). Thus, it is from these three firms that I construct a nominal wage series for the city of São Paulo during the Old Republic.

### 3.1. Paulista

Brazilians from Campinas, an interior coffee center roughly 55 miles from the city of São Paulo, established Paulista in 1872. While originally founded for coffee transportation, the railway also became the most important passenger train service in the state (Saes, 1981, p. 143). By 1928 the company employed over 12,406 individuals. To develop the Paulista portion of the series, I use evidence compiled from employee entry cards, *fichas*, for Anna Lúcia Duarte Lanna's livre-docência (2002) and available on compact disk (Lanna, 2000). Fortunately her careful research survives, because the records she used were lost in the privatization process of the 1990s. In order to utilize these data, I combined the series on worker demographics with the series on workers' employment histories, resulting in a database that provided information on worker entry and exit dates, wages, subsequent raises, nationality, civil status, schooling level, residence type, occupation, promotions, resident city, and race. Although the data can be rich, only 38% of employees had information for schooling level and only 68% for race.

Another feature of the Paulista data is that it includes individuals working in 71 different cities throughout the state of São Paulo. Because the wage series studies the city of São Paulo I only include those individuals working within a commutable distance from São Paulo, namely, Campinas, Valinhos, and Jundiaí. The largest share of workers lived in Jundiaí, less than 40 miles from São Paulo with a direct train route to the majority of the city's factories. As a result, the Paulistano portion of the SPOR wage series is based on 3,400 wage observations of 1,809 individuals between the years of 1891 and 1930.

### 3.2. Light

Light was a subsidiary of Canada's Light and Power Company and arrived in São Paulo in 1898 to provide urban transportation. It quickly became the city's sole urban transport provider and by 1911 had successfully branched into the emerging energy market (Greenfield, 1975). By the end of the Old Republic, Light employed over 6,400 individuals in the city (São Paulo Tramway, Light and Power Company, 1930). The Light portion of the SPOR wage series is based on *fichas* of individuals hired during the Old Republic in the car-house and mechanics departments. To systematically sample the entry cards, which

were organized alphabetically by the workers' first names, I recorded every fifth entry card, creating a sample of 1,893 entry wage observations. This is a valid sampling method because there did not appear to be any other criteria beyond alphabetical order organizing the *fichas*. There were two different types of entry cards. The first was used through the early 1920s and included employee names, position, wages, entry and exit dates, the number of raises, address, and reason for leaving. Most individuals hired in the 1920s used the second type of *ficha*, which was more informative and often included a worker's nationality, age, civil status, and prior employer. All available information was recorded and included in the SPOR wage series.[13]

### 3.3. Jafet

While Paulista and Light provided important services to the city and were key employers, textile factories were by far the largest presence in the city during the Old Republic. Employing men, women, and children, the textile industry employed over 40% of the states' 1920 industrial workforce (Brazil, 1922, 5.2, pp. 386–417). Jafet was a medium-sized textile factory founded in the early-twentieth century by Syrian immigrant brothers. It was one of the most important employers in the city's Ipiranga neighborhood. Similar to the Light evidence, data for Jafet was also recorded on a variety of *fichas* and many of the cards for Old Republic employees survive on a set of four microfilm rolls.[14] Entry cards were sorted first alphabetically (by the worker's first name) and then chronologically by hiring date, so I recorded data from every fifth card with detailed information for a systematic sample. All cards contained an employee's name, age, nationality, civil status, entry and exit date, position, whether the worker was a piece-rate employee, wage, prior employer, and raises.[15] Some contained information on literacy, race, number of machines worked, and parentage. I inferred whether a worker was female from worker's names. This process prioritizes *fichas* with more complete information over those that only included an individual's name, age, wage, and entry and exit date. At times the company rehired individuals under different employee numbers in different years, but I found little overlap in the data collection process. Therefore, I treat each record as a unique hire. The Jafet sample yields 727 entry wage observations. The sample includes 1,349 individuals; however, 622 piece-rate employees and their earnings are not included in the wage series because there is no data on worker output. While the majority of the observations are from after 1918, the first wage observation appears in 1910.

The wage records only give hourly wages, thus bonuses awarded, fines charged, and advancements cannot be tracked. These would have been important considerations for workers at the time, but supporting evidence is simply unavailable. Nevertheless, the series provides the best estimate we have of the

changing value in an employee's work hour over the period and will serve as a valuable benchmark for future research.

### 3.4. Estimating Nominal Wages

To assign an appropriate skill level to each worker's entry-level position, I explored three competing skill-level classifications. The first used the 1920 Brazilian Census, but this classification proved unviable because it contained no wage observations for many of the service-sector jobs appearing on the employee entry cards. The second derived skill levels based on quartiles from the Preston and Haines (P−H) series that combined occupational codes from the 1910 US Census with wages from a 1901 US cost-of-living report (1991). Each quartile was associated with increasing skill levels. The third option used the Historical International Social Class Scheme (HISCLASS) to define skill levels (Van Leeuwen & Maas, 2011). This was by far the best classification because it proved more accurate for the Brazilian case.

The HISCLASS is a hierarchical scheme dividing jobs into 12 social categories defined using the Historical International Standard Classification of Occupations (HISCO) (Van Leeuwen, Maas, & Miles, 2002). Each of the 12 classes is correlated with a skill level − high (higher managers and higher professionals); medium (lower managers, lower professionals, clerical and sales personnel, foreman, medium-skilled workers, and farmers and fishermen); low (lower clerical and sales personnel, lower-skilled workers, and lower-skilled farm workers); and unskilled (unskilled workers and unskilled farm workers). Thus, as opposed to the P−H classification for skill, HISCLASS provides a clear distinction between managers, foremen, and workers. I used the Portuguese feature of the HISCO database, which reports mainland-Portuguese terms for occupations to code workers' entry-level positions. Most of the reported jobs could be coded directly; however, I could not strictly adhere to HISCO determinations because of the differences between Brazilian and mainland-Portuguese and because of idiosyncratic firm terminology at Paulista, Light, and Jafet. Once I coded a worker with a HISCO number, he or she could then be classified by the HISCLASS into one of the four skill levels. Less than 1% of the observations were for highly skilled jobs. The remaining observations were divided into the following shares: medium skill (39.65%), low skill (33.01%), and unskilled (27.29%). The Appendix reports further information on the sample's temporal and company distribution and on the average worker characteristics by skill level.

I use the occupational structures reported in the 1920 Brazilian Census to weight the relative importance of each wage observation. This benchmark neither allows for shifts in shares over time nor distinguishes jobs within the industrial sector, but still improves the series' ability to reflect the urban labor

***Table 3.*** Distribution of Jobs in São Paulo City and State by Sector, 1920.

| Sector | State Number (Share %) | City Number (Share %) | Sample (*N*) | Weight (3)/(4) |
|---|---|---|---|---|
| Agriculture | 865,876 (62.64) | 12,520 (6.04) | 0 | – |
| Mining | 16,582 (12.1) | 1,980 (0.95) | 0 | – |
| Industry | 229,280 (16.59) | 100,388 (48.39) | 4,500 | 22 |
| Transportation | 51,594 (3.73) | 13,914 (6.71) | 938 | 15 |
| Commerce | 87,675 (6.34) | 30,582 (14.74) | 580 | 53 |
| Law enforcement | 11,558 (0.84) | 5,783 (2.79) | 128 | 45 |
| Public administration | 14,072 (1.02) | 4,974 (2.4) | 0 | – |
| Private administration | 10,156 (0.73) | 4,011 (1.93) | 16 | 251 |
| Liberal professions | 38,229 (2.77) | 13,980 (6.74) | 0 | – |
| Wealth (*de renda*) | 11,637 (0.84) | 3,847 (1.85) | 0 | – |
| Domestic service | 45,477 (3.29) | 15,476 (7.46) | 57 | 272 |
| Total | | 207,455 (100) | | |

*Source*: Brazil, 1922, 4.5, part 1, pp. XVI–XVII, XXIII–XXIX.

market. I link each HISCO job appearing in the wage series to the 11 sectors listed in Table 3, resulting in the following frequency weights. The wage series cannot speak to all Paulistano working individuals, but it does represent the vast majority of the formal working class. The table also demonstrates that the industrial sector labor market was almost three times in the city than it was in the state.[16]

Using the variables and weights described above, I estimate hedonic regressions for nominal wages of unskilled, low-skilled, and medium-skilled workers in São Paulo's formal labor market. The dependent variables are the log of the nominal hourly wages for unskilled, low-skilled, and medium-skilled workers.[17] The best estimation, column 1 in Table 4, takes into account the following independent variables: *female, cia, apprentice, skill level, age,* and *age*$^2$. The variables for *experience* and *experience*$^2$, although seemingly important in columns 2 and 3, are misleading because tenures were very short at Light and Jafet and rarely include salary increases.[18] The *age* variables therefore are preferable to *experience* and *experience*$^2$. Columns 4–6 indicate regressions that also include independent dummy variables accounting for *nationality, literacy,* and *race.* Including these variables, however, excludes important wage observations in the sample. There are no *nationality* observations for Light employees prior to 1920. In the case of *literacy,* few literacy observations exist for the pre-1920 period. In addition, São Paulo's skilled workers were often skilled tradesmen where experience was more valuable than literacy. In terms of the potential problems in excluding race from the analysis, evidence on racial discrimination

*Table 4.* Predicted Nominal Wage.

| | (1) lnwage b/se | (2) lnwage b/se | (3) lnwage b/se | (4) lnwage b/se | (5) lnwage b/se | (6) lnwage b/se |
|---|---|---|---|---|---|---|
| Age | 0.092*** | | 0.065*** | 0.094*** | 0.105*** | 0.101*** |
| | (0.01) | | (0.01) | (0.01) | (0.01) | (0.01) |
| $Age^2$ | −0.001*** | | −0.001*** | −0.001*** | −0.002*** | −0.001*** |
| | (0.00) | | (0.00) | (0.00) | (0.00) | (0.00) |
| Experience | | 0.000*** | 0.000*** | | | |
| | | (0.00) | (0.00) | | | |
| $Experience^2$ | | −0.000*** | −0.000*** | | | |
| | | (0.00) | (0.00) | | | |
| Female | −0.005 | 0.000 | 0.000 | −0.037 | −0.174*** | 0.113 |
| | (0.05) | (.) | (.) | (0.05) | (0.04) | (0.14) |
| Apprentice | −0.400*** | −0.510*** | −0.456*** | −0.412*** | −0.129** | −0.505*** |
| | (0.04) | (0.07) | (0.06) | (0.04) | (0.04) | (0.06) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Year | Y | Y | Y | Y | Y | Y |
| Skill level | Y | Y | Y | Y | Y | Y |
| Cia | Y | Y | Y | Y | Y | Y |
| Nationality | | | | Y | | |
| Literate | | | | | 0.015 | |
| | | | | | (0.03) | |
| White | | | | | | −0.041 |
| | | | | | | (0.03) |
| _cons | 6.458*** | 7.832*** | 6.764*** | 6.375*** | 5.242*** | 6.279*** |
| | (0.12) | (0.03) | (0.15) | (0.11) | (0.15) | (0.16) |
| Obs[a] | 116,280 | 94,297 | 94,297 | 114,670 | 8304 | 94,957 |
| RSq | 0.54 | 0.56 | 0.59 | 0.55 | 0.86 | 0.52 |
| AIC | 162,271.7 | 133,871.2 | 126,110.7 | 155,579.7 | 347.3 | 141,629.8 |
| BIC | 162,358.7 | 133,927.9 | 126,186.3 | 155,743.7 | 410.5 | 141,714.9 |

*Source*: SPOR wage series. Does not include highly skilled workers.

*Notes*: [a]The actual number of wage observations are as reported in the text. These shares reflect the estimated numbers using frequency weights as reported in Table 3.

*p < 0.05; **p < 0.01; ***p < 0.001.

RSq, R-squared; AIC, Akaike information criterion; BIC, Bayesian information criterion.

reveals it was most acute at the hiring level and not with wages awarded (Andrews, 1991; Ball, 2013; Melo, Araújo, & Marquez, 2003).

The nominal wage indexes in the Appendix use the regression coefficients for each year to estimate nominal hourly wages for a 26-year-old non-apprenticed male worker in each of the three skill levels: unskilled, low skilled, and medium skilled.[19] Unskilled wages, for the most part, increased very gradually through 1923. There was then a short increase in hourly unskilled wages in the mid-1920s. The general trend for low- and medium-skilled workers deviated. Hourly wages decreased after the Encilhamento and then rose in the last few years of the nineteenth century, before decreasing again. Wages then generally increased from 1908 through the middle of the 1920s. The wage trends indicate increasing nominal wages for each group of workers during World War I and up through the mid-1920s. In the last five years of the Old Republic, workers made nominally just around two times more than they had at the beginning of the period. In terms of differences between groups, as Fig. 5 shows, two periods of time stand out in terms of changes in skill premiums between unskilled and medium-skilled workers.[20] A spike in the skill premium occurring in the late-nineteenth century coincides with a period of new construction and industrialization in the city. The gap between medium-skilled workers and those below them then decreased and remained relatively constant through World War I and in the years immediately after the war. The gap then contracted in the early 1920s. By the mid-1920s,
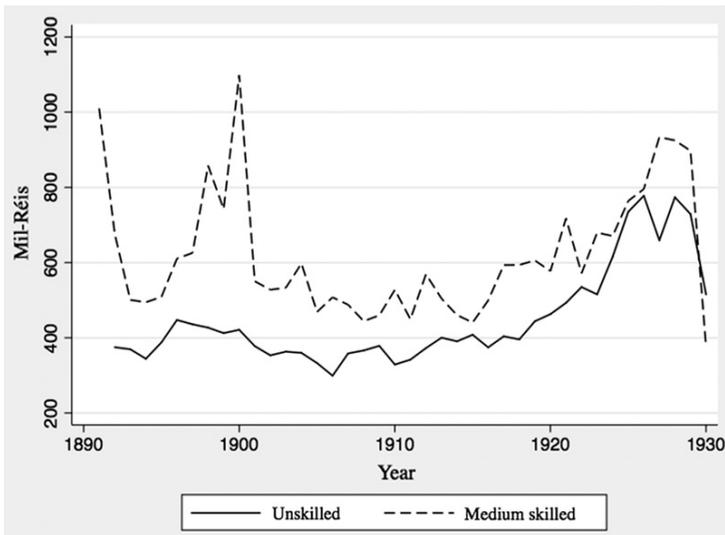


*Fig. 5.*   Nominal Hourly Paulistano Wages: 1891−1930. *Note*: Entry wages for a 26-year-old male non-apprentice.

however, the gap once again widened, and only the downturn of the late 1920s brought about dramatic change. As a whole, though, hourly wages did not keep pace with the city's increasing cost of living, which, as reported above increased between 4.6 and 7.3 times their 1891 values by the mid-1920s. Deflating the wages to reflect real worker wages for the period is essential to understanding the challenges facing typical Paulistano households and residents.

## 4. PAULISTANO REAL WAGES

I deflate the new nominal wage series to estimate real wages for Paulistanos over the duration of the Old Republic.[21] The real hourly entry wages indexed to 1920 for a 26-year-old non-apprentice male worker at each skill level are reported in Table 5. (The Appendix reports the hourly real entry wage estimates for each year by skill level.) Fig. 6 demonstrates how real Paulistano unskilled, low-skilled, and medium-skilled wages declined over the Old Republic period. As previously noted, the period in the late-nineteenth century where low- and medium-skilled wages spiked corresponded with a period of rapid construction, industrialization, and an influx of unskilled immigrants to the city. The relative spike in wages for more skilled workers, thus, likely stems from a shortage of skilled laborers during the period. The premium that more skilled workers received, however, declined as the Old Republic progressed. This contraction corresponds to both an increase in the number of skilled immigrants arriving in the city as the period progressed, especially during the 1920s (Ball, 2013, pp. 58−60), and a relative increase in labor organization effectiveness (Wolfe, 1993).

Although Paulistano real wages declined for the majority of the Old Republic, the 1920s did represent a slowdown in lost purchasing power for many workers. Some years even show some recovery. The general strikes of 1917 and 1919, thus, can be understood as workers' and the working class's reaction to the cumulative decline in purchasing power up through this period in the Old Republic. The subsequent decade of relatively stable real wages and of the contracting gap between unskilled workers and their counterparts points to a modest victory for the city's relatively weak labor organization. Still, while real wages suggest some gains were made in stalling the rapidly declining real wages, Paulistano workers did not enjoy prewar real incomes for the remainder of the Old Republic period. These wages only continued to drop with the onset of the Depression, the Revolution of 1930, and the first two years of Getúlio Vargas's provisional Presidency.

In the period after the Old Republic and the political upheaval associated with the political transition, there are indications that the typical Paulistano day laborer did enjoy gains to living standards under Vargas and through the 1970s. Real wage gains between the mid-1930s and 1975 were minimal, but

***Table 5.***   Paulistano Real Wages: 1891−1930.

| Year | Unskilled | Low Skilled | Medium Skilled |
| --- | --- | --- | --- |
| 1891 | | | 908 |
| 1892 | 308 | 706 | 446 |
| 1893 | 272 | 342 | 295 |
| 1894 | 202 | 351 | 232 |
| 1895 | 216 | 260 | 227 |
| 1896 | 244 | 269 | 267 |
| 1897 | 228 | 325 | 262 |
| 1898 | 320 | 358 | 516 |
| 1899 | 318 | 582 | 458 |
| 1900 | 312 | 584 | 651 |
| 1901 | 267 | 355 | 312 |
| 1902 | 233 | 421 | 279 |
| 1903 | 227 | 396 | 268 |
| 1904 | 213 | 414 | 283 |
| 1905 | 182 | 253 | 205 |
| 1906 | 158 | 278 | 216 |
| 1907 | 191 | 224 | 208 |
| 1908 | 194 | 242 | 188 |
| 1909 | 196 | 207 | 191 |
| 1910 | 176 | 236 | 226 |
| 1911 | 167 | 236 | 176 |
| 1912 | 192 | 316 | 235 |
| 1913 | 182 | 339 | 184 |
| 1914 | 160 | 228 | 151 |
| 1915 | 165 | 134 | 143 |
| 1916 | 147 | 215 | 157 |
| 1917 | 149 | 188 | 176 |
| 1918 | 102 | 171 | 123 |
| 1919 | 125 | 174 | 137 |
| 1920 | 100 | 100 | 100 |
| 1921 | 97 | 147 | 114 |
| 1922 | 123 | 166 | 106 |
| 1923 | 109 | 143 | 115 |
| 1924 | 97 | 96 | 85 |
| 1925 | 114 | 147 | 95 |
| 1926 | 137 | 136 | 113 |
| 1927 | 117 | 111 | 132 |
| 1928 | 137 | 114 | 132 |
| 1929 | 129 | 73 | 127 |
| 1930 | 105 | 46 | 62 |

*Sources*: As elaborated in the text.
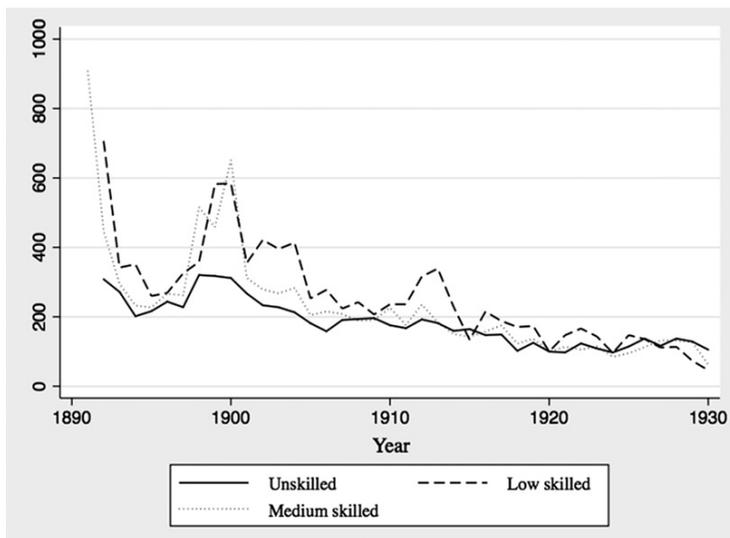*Note*: Wages indexed to 1920.

*Fig. 6.* Real Paulistano Wages: 1891−1930. *Notes*: Entry wages for a 26-year-old male non-apprentice. Prices indexed to 1920.

there was increased discretionary spending, improved household diets and an accumulation of household durables (Wells, 1983). As wages and prices are only one component of living standards, investigating how additional indicators shifted during the Old Republic is an important next step for understanding São Paulo's Old Republic period.

# 5. CONCLUSION

In the absence of reliable official statistics, economic historians must seek alternative archival sources to create historical series. In this respect, São Paulo, Brazil is not unique; however, the city's importance to the country's history and growth, particularly during the period of the Old Republic, makes it surprising that it is only now that a new series is being introduced. By 1920, São Paulo was growing many times faster than Rio de Janeiro and was already the most important industrial center and Brazil's largest destination for a sizeable immigrant population. Yet prior to 1913, scholars must rely on wage and price estimates for a city with a very different labor market and design to speak to São Paulo and the region as a whole.

Evaluating how the vast majority of São Paulo's population navigated the city's daily life amid population growth, changing labor market dynamics, and constraints is imperative to understanding the city's history. These series

provide the necessary price and wage data to aid researchers and social scientists in addressing those questions. Analyzing changes in skill premiums and gendered wage differentials can speak to and help quantify important measures of inequality and discrimination. Looking at lifetime wage expectations by position helps address the importance training and experience played in wage determination and the level of capital investment and development in São Paulo. Expanding the series through 1945 will allow for an analysis of how Getúlio Vargas's initiatives, which were arguably proto-populist in nature, impacted real worker wages and quality of life. Aligning the cost-of-living measures with strike activity and labor unrest may help indicate if there is a particular threshold or drop in wages that encourage labor organization. Incorporating the available official statistics on vitality and work accidents and injuries alongside these price and wage series will provide a more well-rounded understanding of changing living standards during the Old Republic.

On a comparative level, this new series challenges our geographic understanding of the southern cone labor market. Indexing these Paulistano real wage estimates to 1913 and comparing those calculations to wages reported in other southern cone urban centers suggests São Paulo's labor market prior to World War I was likely more integrated with Buenos Aires's market than with Rio de Janeiro's (Bértola, Calicchio, Camou, & Porcile, 1999). More research is needed to investigate to what extent and how long this was the case. Extending the southern cone comparison past 1913 requires researchers to grapple with the following question. If the hourly wage in São Paulo had such little purchasing power, why did immigrants continue to arrive in the city in the 1920s (Bértola & Ocampo, 2012)?

Social networks alone cannot account for such a blatant disregard for cost-of-living expenditures. More likely was that families largely looked to other endeavors or jobs to supplement their income, thereby lessening the impact of increasing prices, and growing and strengthening the city's informal markets. Considering the importance of the informal market in today's Latin American economy, it seems like the early-twentieth century may be the best starting place for understanding how the mechanisms and informal institutions governing those markets developed. These suggestions are just a selection of many possible directions for future research.

## NOTES

1. *Revista de Commercio e Industria, 1919*, p. 278.
2. Notable social histories of urban workers during the era include, but are not limited to, Andrews (1991), French (1992), Hahner (1986), Moura (1988), Pinheiro and Hall (1979), Veccia (1995), Wolfe (1993), and Weinstein (1996).
3. Using the same month to report prices minimizes seasonal price differences.

4. Not all prices were reported in price per kilogram. Volumetric measures, as reported in arrobas, liters, English pecks (*alguiere*), or sacks were converted to kilograms based on the following cooking conversions: 0.89 K rice/liter, 0.5 pounds/cup dry beans, 150 g/cup manioc flour.

5. The prices as reported below are available in the following: *Província de São Paulo* June 15, 1889. *Estado de São Paulo* June 6, 1890, p. 3; June 5, 1891, p. 2; May 6, 1892, p. 2; May 25, 1893, p. 2; June 16, 1895, p/6; June 21, 1896, p. 4; June 20, 1897, p. 4; June 18, 1898, p. 5; April 10, 1908, p. 5; July 2, 1909, p. 5; April 8, 1910, p. 6; July 12, 1911, p. 8; May 25, 1912, p. 9. *Relatório da Secretaria de Agricultura* 1902, p. 180; 1903, p. 70; 1904, pp. 125−126; 1905, p. 175; 1908, p. 121; 1909, p. 128. *Boletim do Departamento Estadual de Trabalho* a1.3; 2.7, pp. 340−341; 2.8−2.9, p. 567; 3.10, p. 244; 3.12−3.13; 4.15, p. 431; 5.21, pp. 623−681; 6.23, p. 337; 9.34−9.35, pp. 15−16; 9.37, p. 466 (Cardim, 1936, pp. 20−23).

6. Should rents become available, they will be included in the series and will offer a marked improvement.

7. Conversion derived from Wolf (2011). While Allen et al. (2011) use the United States Department of Agriculture (USDA) for caloric values, manioc flour is not included in these calculations.

8. Davis (1935) reports expenditures per fammain, a measure in expenditures on food that accounted for variance in household composition. Just five of 75 families reported fewer than 2,000 calorie consumed per day, the median was 3,083 calories. See Friedman (1952).

9. The composition of the household is not described, thus to calculate daily consumption, I assume a two-parent household with three children (one adult male and two younger children). I use Davis's (1935) fammain estimates − adult male at 1, adult female at 0.86 and a 9-year-old boy at 0.53 (pp. 137−155) − dividing the annual estimates by 3.92 to convert annual family consumption to annual adult male consumption.

10. See note 8.

11. Fats include consumption of animal fats, vegetable oil, and butter reported by Wells (1983).

12. The *Fundação de Energia e Saneamento do Estado de São Paulo* house the Light records. Jafet records are on microfilm at the *Centro de Documentação e Informação Científica* (CEDIC) at the *Pontífica Universidade Católica de São Paulo* (PUC-SP). Paulista records come from the database Lanna (2000) created.

13. When using Light data for regression analysis, just 857 wage observations for 809 individuals hired between 1924 and 1929 included age observations.

14. Entry cards for employees whose first name begins with the letters A, C, D, E, R, G, Q, U, and X are not available. Tabulating first name distributions for Light and Paulista reveals no great oversampling problems in terms of nationalities.

15. Most raises at Jafet were either a function of collective bargaining under the threat of strikes or imposed by the CIFTSP.

16. Further occupational distribution provided by the 1920 Brazilian Census is limited to the industrial sector at the state level and provides little distinction between jobs. Outside of the textile sector, roughly 68% of industrial workers reported their industrial jobs as "undefined" or "other professions" rather than specifying specific jobs (4.5, part 2, pp. 613−810).

17. See Margo and Villaflor (1987) for similar methodology in nominal wage estimations.

18. Including the *experience* variables overly constrains the data. When including experience variables in regressions without weights to predict nominal wages, the number of observations used for the predictions was nearly halved because of variables omitted due to collinearity.

19. Twenty-six is the median age for all workers in the sample.

20. Low-skilled worker wages alternated between aligning more closely with unskilled and medium-skilled wages. The real difference in terms of unskilled and low-skilled

workers was in terms of future opportunities. Many women and children (especially girls) were restricted to unskilled positions with minimal opportunity to advance into management or higher-skilled positions.

　　21. The Davis index is reported here. This index was chosen because it is neither the upper- or lower-bound estimate and able to draw comparisons to Wells (1983).

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# APPENDIX

***Table A1.*** Sample Wage Data Company Distributions by Skill Level.

| | Number | Avg./Share |
|---|---|---|
| Unskilled | | |
| Age | 1,429 | 30.73 |
| Apprentice | 1,563 | 10.4% |
| White | 1,154 | 58.8% |
| Literacy | 184 | 71.7% |
| Female | 1,641 | 5.5% |
| 1891−1913 | 545 | 33.2% |
| 1914−1918 | 196 | 11.9% |
| 1919−1930 | 902 | 54.9% |
| Paulista | 1,098 | 65.2% |
| Light | 402 | 23.9% |
| Jafet | 143 | 8.7% |
| Low skilled | | |
| Age | 1,517 | 25.52 |
| Apprentice | 1,579 | 33.3% |
| White | 943 | 68.0% |
| Literacy | 402 | 49.5% |
| Female | 1,983 | 15.3% |
| 1891−1913 | 455 | 22.9% |
| 1914−1918 | 169 | 8.5% |
| 1919−1930 | 1,363 | 68.6% |
| Paulista | 693 | 34.9% |
| Light | 733 | 36.9% |
| Jafet | 561 | 28.2% |
| Medium skilled | | |
| Age | 2,028 | 30.79 |
| Apprentice | 2,372 | 14.4% |
| White | 1,615 | 64.3% |
| Literacy | 111 | 95.5% |
| Female | 2,387 | 0.0% |
| 1891−1913 | 554 | 33.2% |
| 1914−1918 | 260 | 11.9% |
| 1919−1930 | 1,573 | 54.9% |
| Paulista | 1,607 | 67.0% |
| Light | 757 | 31.6% |
| Jafet | 23 | 1.0% |

*Sources*: As elaborated in the text.

***Table A2.***   Predicted São Paulo Nominal Hourly Wages, 1891−1930.

| Year | Unskilled | Low Skilled | Medium Skilled |
|------|-----------|-------------|----------------|
| 1891 |           |             | 1,010          |
| 1892 | 375       | 815         | 677            |
| 1893 | 370       | 442         | 501            |
| 1894 | 344       | 569         | 495            |
| 1895 | 388       | 443         | 508            |
| 1896 | 447       | 469         | 611            |
| 1897 | 436       | 592         | 626            |
| 1898 | 427       | 453         | 858            |
| 1899 | 412       | 718         | 743            |
| 1900 | 421       | 750         | 1,099          |
| 1901 | 378       | 477         | 550            |
| 1902 | 353       | 606         | 528            |
| 1903 | 363       | 600         | 533            |
| 1904 | 360       | 664         | 598            |
| 1905 | 333       | 440         | 469            |
| 1906 | 299       | 498         | 508            |
| 1907 | 358       | 399         | 488            |
| 1908 | 366       | 435         | 444            |
| 1909 | 379       | 379         | 460            |
| 1910 | 329       | 419         | 528            |
| 1911 | 342       | 458         | 449            |
| 1912 | 373       | 581         | 569            |
| 1913 | 400       | 707         | 504            |
| 1914 | 391       | 530         | 460            |
| 1915 | 408       | 315         | 441            |
| 1916 | 374       | 519         | 499            |
| 1917 | 404       | 483         | 593            |
| 1918 | 396       | 629         | 594            |
| 1919 | 444       | 584         | 606            |
| 1920 | 463       | 439         | 577            |
| 1921 | 493       | 707         | 718            |
| 1922 | 535       | 684         | 571            |
| 1923 | 515       | 645         | 680            |
| 1924 | 616       | 577         | 671            |
| 1925 | 735       | 898         | 764            |
| 1926 | 778       | 731         | 796            |
| 1927 | 659       | 598         | 934            |

**Table A2.**   (*Continued*)

| Year | Unskilled | Low Skilled | Medium Skilled |
|------|-----------|-------------|----------------|
| 1928 | 774 | 608 | 925 |
| 1929 | 729 | 394 | 897 |
| 1930 | 515 | 214 | 377 |

*Sources*: See Table 3 and as elaborated in the text.

**Table A3.**   Paulistano Real Hourly Wages by Skill Level: 1891−1930.

| Year | Unskilled | Low Skilled | Medium Skilled |
|------|-----------|-------------|----------------|
| 1891 |  |  | 5,243 |
| 1892 | 1,427 | 3,103 | 2,576 |
| 1893 | 1,257 | 1,503 | 1,704 |
| 1894 | 933 | 1,543 | 1,341 |
| 1895 | 1,000 | 1,142 | 1,313 |
| 1896 | 1,127 | 1,182 | 1,539 |
| 1897 | 1,054 | 1,430 | 1,513 |
| 1898 | 1,483 | 1,574 | 2,978 |
| 1899 | 1,470 | 2,559 | 2,647 |
| 1900 | 1,443 | 2,567 | 3,761 |
| 1901 | 1,236 | 1,561 | 1,800 |
| 1902 | 1,080 | 1,851 | 1,612 |
| 1903 | 1,053 | 1,738 | 1,545 |
| 1904 | 985 | 1,817 | 1,636 |
| 1905 | 841 | 1,111 | 1,184 |
| 1906 | 734 | 1,220 | 1,245 |
| 1907 | 884 | 983 | 1,203 |
| 1908 | 897 | 1,064 | 1,088 |
| 1909 | 907 | 908 | 1,101 |
| 1910 | 814 | 1,038 | 1,306 |
| 1911 | 774 | 1,037 | 1,018 |
| 1912 | 890 | 1,388 | 1,359 |
| 1913 | 843 | 1,489 | 1,062 |
| 1914 | 738 | 1,002 | 870 |
| 1915 | 762 | 589 | 823 |
| 1916 | 682 | 945 | 908 |
| 1917 | 690 | 825 | 1,014 |
| 1918 | 472 | 751 | 709 |

***Table A3.*** (*Continued*)

| Year | Unskilled | Low Skilled | Medium Skilled |
|------|-----------|-------------|----------------|
| 1919 | 580 | 763 | 791 |
| 1920 | 463 | 439 | 577 |
| 1921 | 451 | 646 | 657 |
| 1922 | 571 | 731 | 610 |
| 1923 | 504 | 630 | 664 |
| 1924 | 451 | 422 | 491 |
| 1925 | 530 | 647 | 551 |
| 1926 | 636 | 597 | 650 |
| 1927 | 539 | 490 | 764 |
| 1928 | 636 | 499 | 760 |
| 1929 | 596 | 322 | 734 |
| 1930 | 487 | 203 | 356 |

*Sources*: As elaborated in the text.