

ARTICLES/ARTÍCULOS

A new estimate of Ecuador's GDP, 1900–50

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Abstract

Official Ecuadorian gross domestic product (GDP) data begin in 1950. Prior, only preliminary estimates were available, based on very scattered evidence and broad assumptions. In this paper, we estimate new GDP figures for Ecuador for 1900–50. These are based on the quantitative and qualitative information available for the period, using extensive primary and secondary sources. The new data series allows analysing Ecuador's economic growth and structural change and comparing them to industrialised core countries and other countries in the region. Unlike previous estimates, our series shows a sustained divergence of Ecuador from the core countries during the first half of the 20th century.

Keywords: Ecuador; GDP; economic growth; structural change; convergence; 20th century

JEL code: N16

Resumen

Las series oficiales del PIB ecuatoriano comienzan en 1950. Para periodos anteriores, hasta ahora solo se disponía de estimaciones preliminares, basadas en información muy dispersa y supuestos muy generales. En este artículo estimamos nuevas cifras del PIB de Ecuador para el período 1900–50, basadas en la información cuantitativa y cualitativa disponible y el uso de numerosas fuentes primarias y secundarias. La nueva serie permite analizar el crecimiento económico y el cambio estructural de Ecuador y compararlos con la dinámica de los países industrializados y de otros países de la región. A diferencia de las estimaciones anteriores, nuestra serie muestra una divergencia sostenida de Ecuador con respecto a los países industrializados durante la primera mitad del siglo XX.

Palabras clave: Ecuador; PIB; crecimiento económico; cambio estructural; convergencia; siglo XX

1. Introduction

Ecuador enjoyed very high rates of economic growth between 2000 and 2014, driven by the boom in oil prices. Per capita gross domestic product (GDP) increased from \$8,176 in 2000 to \$12,078 in 2014 (purchasing power parity (PPP) terms, 2017 international

U.S. dollars), as a result of an average yearly growth rate of 2.8 per cent¹. Nevertheless, the 2014 decline in oil prices put an end to this cycle. In 2019, right before the COVID-19 catastrophic shock, Ecuadorian per capita GDP was still 6 per cent lower than its 2014 maximum.

This boom-and-bust cycle, closely associated with fluctuations in primary export prices, is not a recent phenomenon, but rather a structural weakness of the Ecuadorian economy dating back to the first wave of globalisation. Recurrent economic crises and high levels of volatility, largely stemming from the country's dependence on natural resource exports, have been a defining feature of Ecuador's long-term economic trajectory. This pattern is not unique to Ecuador, but has in fact been a common characteristic of many Latin American economies, seriously hindering their long-term development prospects (Bértola and Ocampo, 2010).

In particular, for the case of Peru, Seminario (2016, pp. 50–52) has stressed the importance of economic crises in explaining the country's dismal long-term economic performance. Seminario concluded that the key problem facing the Peruvian economy in the long term has not been an absence of economic growth *per se*, but rather its fragility or, in other words, an excessive exposure to unfavourable events. Similarly, in their analysis of Bolivia, Herranz-Loncán and Peres Cajías (2016) have identified the succession of catastrophic economic episodes as the primary driver behind the country's long-term economic divergence.

The long-term evolution of the Ecuadorian economy seems to fit the same pattern, characterised by a succession of crises which, as described by Oleas (2019) for the 20th century, were essentially related to shocks originating in the international markets. The Ecuadorian economy's vulnerability to commodity price fluctuations strikes the observer for its long-term persistence and the difficulties to develop macroeconomic alternatives. As described by Salgado (1978) over four decades ago, Ecuador's reliance on commodity exports is akin to the sails of a ship, moved by the winds of the world. Without them, the ship may not sink, but will not be able to move forward.

Broadberry and Wallis (2017) have emphasised the importance of considering the rate and frequency of shrinking, rather than growth rates during booms, to explain a country's long-run economic performance. Ecuador provides an excellent example of an economy in which, despite experiencing several intense growth cycles, the persistence and depth of shrinking episodes might have prevented convergence with the industrialised core. According to the Maddison database, Ecuador's per capita GDP amounted to 16.8 per cent of the U.S. level in 1950. Even at the height of the 21st-century oil boom, this percentage had barely changed, sitting at 16.6 per cent.

This article adopts a long-term perspective to examine whether the intensity of economic shrinking in Ecuador and the inability to converge were as serious in the first half of the 20th century as afterwards. Answering this question is hindered by the lack of reliable GDP data for the early decades of the century. As in the case of other Latin American countries, Ecuadorian economic growth is only well documented since the early 1950s, thanks to the efforts of the country's Central Bank (*Banco Central del Ecuador*, BCE).

The BCE, founded in 1927, established in 1952 a 'national income' section within the economic research department, which would be in charge of elaborating national accounts. BCE's initial estimation efforts, though, were affected by the unreliability and scarcity of information sources. In 1954, upon request of the Ecuadorian government, United Nations commissioned Henri Rijken van Olst the elaboration of the country's

¹ <http://data.worldbank.org>.

national accounts for 1950–53. This study (Rijken van Olst, 1954) is the earliest complete estimation of Ecuadorian GDP.

Although further publications by BCE and the Economic Commission for Latin America and the Caribbean (ECLAC) have provided full series for 1950 onwards, the quality and detail of the data are much higher since 1965 (see Banco Central del Ecuador, 1985, 2012; CEPAL, 1978, 2005; and <https://estadisticas.cepal.org/cepalstat/Portada.html>). In addition, CEPAL (1978) also provided estimates for the Ecuadorian GDP and its sectoral components for 1939–49. These were based on a retrospective study carried out by BCE (*Contabilidad nacional del Ecuador 1950–1955*, August 1956) which unfortunately we have not been able to find either in the BCE archives or in other national and international libraries. For the period before 1939, the only previous attempt to estimate Ecuador's historical GDP figures is Hofman's (1994) series, which starts in 1900. However, this series is based on broad assumptions about potential average GDP growth rates during different stages of Ecuador's economic evolution, rather than direct empirical indicators of economic activity. These figures are reproduced in the Maddison and MOxLAD databases, including three 'guesstimates' for 1870, 1880 and 1890 in the former.

This paper offers new GDP and GDP per capita series for Ecuador covering 1900 to 1950. These are estimated from the output side and based on a large set of empirical data from diverse sources. While the quality of the early 20th-century data is not as robust as the figures from 1950 onwards, we believe these new series represent a significant step forward in quantifying the long-term evolution of the Ecuadorian economy. Moreover, they allow for better analysis of economic cycles and Ecuador's long-term convergence, or lack thereof, with industrialised countries.

The structure of the article is as follows. The next section provides a brief overview of Ecuador's economic evolution during the first half of the 20th century. Section 3 describes the methodology and sources followed to estimate the GDP series. Section 4 presents the results of the estimation and compares them to the previously available figures. Section 5 examines Ecuador's long-term growth and convergence trends from 1900 to the present and compares them to other Latin American economies. Section 6 concludes.

2. The Ecuadorian economy in the first half of the 20th century

During the late 19th and early 20th centuries, Ecuador experienced a process of growth and economic transformation driven by primary exports, similar to other countries in the region. This early expansive cycle was highly dependent on cocoa. While the start date is debated, it is generally accepted that this cycle lasted at least until 1929, bringing high growth rates, particularly in the few years before the First World War (Roberts, 1980; Benalcázar, 1989; Alexander-Rodríguez, 1992; Acosta, 2006).

However, this export-led growth did not benefit the entire country equally due to Ecuador's distinct geographical regions – the coastal lowlands (*Costa*), the Andes (*Sierra*), the Amazonian region and the Galapagos Islands. Communication among those regions, and particularly between *Costa* and *Sierra*, the most populated ones, was difficult because of challenging geography and a lack of modern inland transport infrastructure. It was not until the early 1900s that a railway finally connected the main cities of Quito (in the *Sierra*) and Guayaquil (in the *Costa*). Thus, when the cocoa growth cycle took place, domestic markets were insufficiently integrated. This explains the differential evolution of both areas. While the *Costa* specialised in export-related activities, the *Sierra's* production was largely oriented towards domestic consumption, with very limited trade with Peru and Colombia (CEPAL, 1953).

Foreign trade during the cocoa cycle underpinned not just economic growth, but also government finances. Tariffs represented at some point two-thirds of total government revenues. Export growth allowed the government to issue sovereign debt and fund public

works (Crespo Ordoñez, 1933; Alexander-Rodríguez, 1992; Clark, 2004). The benefits of foreign trade extended to other areas of the economy, such as the financial sector (Chiriboga, 1982) and impacted national politics. As described by Chiriboga (1982) and Velasco (1972), among others, the country's dependence on international markets increased the economic and political influence of the local elites of Guayaquil and its surrounding region (see also Fisher, 1983; Reyna Pérez, 2023). As a consequence, the opportunity opened by the export boom did not translate into efforts to improve domestic market integration, since this might have allowed the industrial production of the *Sierra* to reach the Guayaquil markets (Maiguashca, 2014).

When international markets changed due to the Great War and Great Depression, a severe economic crisis unfolded in the country. The presence of diverse cocoa plagues made the situation worse leading to the catastrophic end of the cocoa cycle. Thorp (1998) considered this crisis a typical example of the challenges faced by a mono-export economy with limited domestic integration.

The end of the cocoa cycle triggered significant political realignments. The dominant *Costa* elites began to disintegrate as the *Sierra* elites gained power and influence, leading a modernisation attempt in their region. This was reflected in growing industrial investment that co-existed with the persistence of some traditional features like labour market servitude (Ospina Peralta, 2020). The crisis also encouraged the introduction of some political reforms and the establishment of new institutions like the Central Bank, which was partly inspired by the Kemmerer mission.

Unlike other countries in the region, the early 20th-century crisis of export-led growth did not bring about a change in Ecuador's growth model or a prioritisation of state-led import substituting industrialisation (ISI) strategies. As CEPAL (1953, p. 125) indicated, Ecuador had no alternative but to pursue sustained export growth to advance its economic development. The recovery from the Great Depression was thus associated with increased exports of products like coffee, Panama hats, minerals and rice. However, despite the limits of state-led industrialisation, this new export cycle was associated with some developments in the manufacturing sector. In 1948, the industrial production index was twice as high as it had been 10 years earlier. The main industrial development took place in textiles, which made some progress towards import substitution. Domestic cement also increased its market share at the expense of imports, covering 80 per cent of domestic demand by the late 1940s (CEPAL, 1953).

A new cycle of intense growth and economic transformation started in the mid-20th century, closely tied to banana exports and the re-emergence of the *Costa* region as the country's economic engine (Ospina Peralta, 2020). As Larrea Maldonado (1987) noted, this cycle established the real foundations of Ecuador's capitalist system, evidenced by advances in some long-delayed transformations like changes to the structure of agrarian property and rural employment, urbanisation and increased public investment. Moreover, the expansion of the road system (Caspa, 2022) finally allowed the integration of the domestic market, stimulating internal migration and reducing demographic pressure in the *Sierra* region. Meanwhile, coerced labour relationships reduced its presence and the power of the *Sierra* elites, already affected by the new economic and political prominence of the *Costa*, was substantially weakened. The mid-20th century thus ushered in a new stage of the country's development, though it remained highly dependent on primary product exports.

3. Estimation methodology

Our GDP series for 1900–50 is estimated from the output side. The starting point of the estimation is the value added of each economic sector in 1950, as estimated by Rijken van Olst (1954), because it was based on the closest price structure to our period of

Table 1. Composition of GDP at factor costs, Ecuador, 1950

Sector	Million sucres	%
Agriculture, forestry, hunting and fishing	2,565	38.62
Mining and quarrying	150	2.26
Manufacturing industries	1,055	15.89
Construction	180	2.71
Electricity, gas, water and sanitation	34	0.51
Transport, storage and communications	343	5.16
Trade	678	10.21
Banking, insurance and real estate	94	1.42
Housing property	534	8.04
Public administration and defence	387	5.83
Other services	621	9.35
Total	6,611	100.00

Source: Rijken van Olst (1954), cuadro II.

interest. Further BCE estimates of the Ecuadorian GDP sectoral structure in 1950 use much later base years (1975, 1993, 2007). In addition, the absence of information on the estimation methods used to produce the figures for 1939–49 (CEPAL, 1978), together with some inconsistencies in those series that are described below, prevented us to use the output structure implicit in those estimates. Table 1 shows the 1950 sectoral structure of the Ecuadorian economy that we use as the basis for our estimation.

We have estimated a series of real gross output for each sector from 1900 to 1950, based on available indicators of each sector's activity. We then used those series to project each sector's 1950 value-added figure backwards, assuming that gross output and value added evolved at the same pace within each sector. Finally, we summed the resulting sectoral value-added series to estimate the yearly Ecuadorian GDP.

The quality of our results is affected by the absence of data or difficulty obtaining information for certain components of the estimation, particularly in the areas of trade, housing property, other services and the evolution of domestic prices before 1913. This data limitation may have introduced biases of unknown direction in the level, fluctuations and composition of the series. Additionally, our estimation suffers from a lack of information on the differential evolution of prices and productivity across sectors, forcing us to largely depend on the 1950 price structure for the entire period under study. However, the significance of this issue is mitigated by the low technological dynamism of a substantial portion of the Ecuadorian economy during the first half of the 20th century. Nevertheless, due to the gradual reduction in the quantity and quality of available empirical information as the series extend further back in time, as well as the increasing distance from 1950, it is necessary to allow for relatively larger error margins in the observations for the earliest years.

In the next subsections, we summarise the estimation methods used for each sector. The Appendix provides a more detailed list of the sources used to estimate the series of the agriculture, mining, manufacturing, construction, transport and communication, banking and public administration sectors, as well as the population, price and foreign trade data sources.

3.1 Agriculture, forestry, hunting and fishing

This was the largest sector of the Ecuadorian economy in 1950, and its importance was even higher in earlier years. Our output series in this sector starts with CEPAL's (1953) estimate of the production composition in 1950, which distinguishes between the two main agricultural regions: *Costa* (Coast) and *Sierra* (Andean region) (see Table 2). We have excluded the contribution of the Amazonian region and the Galapagos Islands, as their role in the Ecuadorian economy was marginal by 1950 (CEPAL, 1953, Vol. 1, p. 43). We have also assumed that the evolution of hunting and fishing was similar to the rest of the sector.

Based on this structure, we have estimated four output indices: (i) *Costa* agriculture; (ii) *Sierra* agriculture; (iii) livestock production and (iv) forestry, wood and timber. We have aggregated them according to their 1950 weights.

The *Costa* agriculture was the most important part of the agrarian sector and the Ecuadorian economy, encompassing the country's main export products during the period. According to CEPAL (1953), the main agricultural products of the *Costa* in the mid-20th century were maize, rice, cotton, sugarcane, coffee, tobacco, bananas, cocoa, oranges, pineapples, castor oil plant (*higuerilla*), *achiote*, beans, peanuts and yucca. We have estimated output indices for most of those products for 1900–50², relying on the evolution of exports as representative of production for the main export goods when information was limited. Gaps in the series were filled using changes in railway transport volumes or, in the absence of these data, by assuming similar trends to the products with available information. The different output indices are then aggregated based on the 1950 price structure. We have used the resulting aggregate volume series as representative of the evolution of the value added of the *Costa* agriculture, assuming, as in the rest of this estimation exercise, a constant ratio between value added and gross production.

The agricultural output of the *Sierra* region differed significantly from that of the *Costa* region, primarily comprising products oriented towards domestic consumption, for which information is less abundant. CEPAL (1953) provides production figures for some of the main products of the *Sierra* agriculture (maize, barley, wheat, rye, potatoes, lentils and beans) for 1938–50, which we aggregated using the available 1942 price structure. We estimate the evolution of production in the remaining years based on the evolution of the *Sierra* population, under the assumption that agricultural production was largely intended for consumption within the region.

To construct an index of livestock output, we have used data on the production of beef, pork and sheep meat, and milk, butter and cheese around 1949, from CEPAL (1953), as well as 1920–26 figures from Paviolo (1927). We have interpolated the values between those two dates and projected the series back to 1900 based on population trends. We have aggregated those series using 1950 prices. Finally, to approximate the evolution of forestry products we have used the series of exports of wood, rubber and *tagua*, which we have also aggregated using 1950 export prices.

3.2 Mining and quarrying

The extractive industries were not very significant in Ecuador during the first half of the 20th century. By 1950, they just represented 2.3 per cent of GDP. Gold was the main mineral produced and exported in the country. Petroleum extraction, which would later become one of Ecuador's main exports, began in the late 1910s but was still relatively small by 1950 compared to other exports. Our index of extractive industries output is

² We do not include beans, peanuts and yucca in the estimation due to insufficient information.

Table 2. Composition of the output value of the agrarian sector in 1950 (%)

	Costa	Sierra	Total
Agriculture	49.4	23.0	72.4
Livestock	8.3	11.7	20.0
Forest products	2.6	0.0	2.6
Wood and limber	2.0	3.0	5.0
Total	62.2	37.8	100

Source: CEPAL (1953, Vol. 3, p. 62).

primarily based on the aggregation of gold production (for the whole period) and raw petroleum (for 1916–50), valued at 1950 prices. We have also added to the series the small amounts of silver produced during the period (approaching the evolution of silver with exports or, when these were not available, through changes in gold production; see CEPAL, 1953, Vol. 1, p. 98), as well as copper and lead exports from 1938 onwards, all valued at 1950 prices. Extraction of the last two products before 1938, as well as production of other minerals, was negligible according to CEPAL (1953, Vol. 1, p. 98).

3.3 Manufacturing industries

CEPAL (1953, Vol. 1, p. 112) presents an index of industrial production for 1938–50, which we use as the starting point for our estimation. CEPAL (1953, Vol. 3, p. 80) also provides the structure of the sector in 1938 (at 1948 prices). To project this index back to 1900, we developed a series for each subsector from 1900 to 1938, based on available data on the evolution of several industry branches; specifically the cement and oil refining industries and some components of the following sectors: textile (*toquilla* hats, which were a significant export item), leather and shoemaking (leather and sole) and food and beverages (sugar, alcohol and beer). Most of these were traditional industry products, which is consistent with the rather marginal presence of modern sectors in the country before the late 1930s and with the low importance of capital goods within total imports prior to the mid-1930s.

3.4 Construction

The value added of the Ecuadorian construction sector in 1950 has been projected backwards using the geometric average of two variables: apparent consumption of cement and imports of construction materials. Cement consumption was estimated from 1923 to 1950 by adding domestic production (see above) and imports. Before 1923, we only have considered imports, as there was virtually no domestic cement production according to Tafunell (2006). Imports of construction materials have been taken from CEPAL (1953, Vol. 3, pp. 95–96) for 1928–50 and from the official foreign trade statistics before 1928³.

³ We have tested the sensitivity of the series to the weights given to its two components – the apparent consumption of cement and imports of construction materials. In our baseline estimates, we assign similar weights to these two components. If we assign twice the weight to imports of construction materials compared to cement consumption, the average annual deviation between the original and the alternative GDP series is just 0.6%. Furthermore, this change does not affect the long-term trend or the fluctuations of the series.

3.5 Electricity, gas, water and sanitation

There is no information available on gas, water or sanitation output, and no registered companies in those sectors during the first half of the 20th century. Therefore, we limit our index to the evolution of electricity production. Electricity output data are scarce, with only some observations on electricity consumption in Guayaquil in 1930, 1935, 1940, 1945 and 1950 (CEPAL, 1953, Vol. 1, p. 132). For 1900–30, we assume electricity production and power capacity grew in line with imports of electric materials, available in Tafunell (2011). Between 1930 and 1950 we use the Guayaquil electricity consumption data, interpolated based on the evolution of industrial output. Industry was, according to CEPAL (1953, Vol. 1, p. 80), the largest consumer before the Second World War, absorbing around 80 per cent of the electricity produced.

3.6 Transport, storage and communication

The index for this sector's output is based on the aggregation of the following five series:

- *Communication*: We estimate the evolution of the value added of this subsector using the sum of the revenues of the post and telegraph services, deflated with the general consumption price index. This information is available from 1900 to 1945 and we have projected it forward to 1950, based on the relationship between this series and population data for the period 1935–44.
- *Railway transport*: The evolution of output between 1937 and 1950 is based on railway ton-kilometres and passenger-kilometres, weighted according to their respective unit transport prices in 1950 (estimated from total freight and passenger revenues). For data prior to 1937, we use the total revenues of the railway system, deflated with the general consumption price index. For years where railway revenues were unavailable, we have made interpolations based on the evolution of the sum of the country's exports and imports, expressed in constant terms.
- *Road transport*: For 1938–50, we have estimated the evolution of output through changes in gasoline apparent consumption, available in CEPAL (1953, Vol. 1, p. 131). The increase in gasoline consumption over those years is almost equivalent to the growth in the number of motor vehicles in the country, as documented by Caspa (2022, p. 16). Prior to 1938, in the absence of systematic data on gasoline usage, we have used the sum of deflated imports and exports as a proxy to estimate the value added of road transport. This approach is warranted given the relatively low level of motorisation during that earlier period – the number of automobiles and trucks amounted to only 600 in 1925 and 2,400 in 1930, compared to 12,100 by 1951. Moreover, the length of roads adapted for motor vehicle traffic was very limited before the late 1930s (Caspa, 2022), suggesting that road transport remained heavily dependent on animal power prior to 1938.
- *Sea transport*: For 1900–37, we approach the evolution of output using the returns from the 1 per cent tax on sea freight that was levied at the time. We have then projected this data series forward to 1950 and filled any earlier gaps, using the evolution of the sum of real exports and imports. We have incorporated a series for river transport, which played an essential role in domestic trade and the transportation of commodities, such as cocoa, to the ports. Information on this subsector is quite limited, but we have used an estimate of the value of river transport services in 1900 (Dillon, 1901), and projected that forward based on the evolution of real exports and imports.
- *Air transport*: Commercial passenger air transport in Ecuador started in 1928. By 1950, according to Rijken van Olst (1954), it represented an amount equivalent to 75 per

cent of the families' expenses in railway services. We assume freight air transport to be marginal. Therefore, we estimate an air transport passenger series that increases from 0 per cent in 1927 to 75 per cent of railway passenger transport services in 1950, and that fluctuates over time as the rest of the transportation sector.⁴

All these indices, except for road transport, are expressed in 1950 sucres. In order to express the road transport index in the same terms, we again use the data provided by Rijken van Olst (1954). These data indicate that families' expenditures on road transport services at the time were 2.5 times greater than their expenditures on railway transport. While this ratio does not include the entire road and railway transport services, but rather only reflects families' expenditures in those sectors, we have used it as representative of the relative sizes of the total (freight and passenger) road and railway sectors. This choice seems justified given the relatively small scale of Ecuador's railway network. Employing a different ratio does not alter the final results.

3.7 Trade

For the trade services sector, as has been done for other countries (see e.g. Prados de la Escosura, 2003; Herranz-Loncán and Peres-Cajías, 2016), we assumed that value added grew in line with the evolution of traded products. This is estimated as the sum of: (i) a percentage of agrarian output equivalent to the relative importance of urban population on total population; (ii) the overall production of the extractive and manufacturing industries and (iii) total imports in real terms. We estimate the evolution of urban population based on the guesstimate for 1920 by Hamerly (2015, p. 142), and the data for 1950 taken from Almeida Guzmán and Almeida Arroba (1988). Prior to 1920, we assume that urban population grew in line with industrial production. We use 2-year moving averages to account for stocks.

3.8 Banking, insurance and real estate

The estimated value added of the financial sector services in 1950 has been projected backwards on the basis of a series of bank deposits, deflated with the consumption price index.

3.9 Public administration and defence

The value added of this subsector has been assumed to grow in line with government expenditure, expressed in real terms based on the general price consumption index.

3.10 Housing property and other services

Information on the evolution of these two subsectors is virtually non-existent. Therefore, we have assumed that housing rents and other services evolved in line with urban population, allowing, in the case of housing rents, for a 0.5 per cent annual increase in quality (see e.g. Prados de la Escosura, 2003, Herranz-Loncán and Peres-Cajías, 2016).

⁴ To account for the possibility that Rijken van Olst (1954) may have overestimated the value of air transport services in 1950, we have conducted a sensitivity analysis. This analysis assumes the 1950 air transport value was 50% lower than Rijken van Olst's estimation. With this assumption, the average yearly deviation between the original and the alternative GDP series is just 0.03%, and neither the long-term trend nor the fluctuations are affected by the change.



Figure 1. Ecuadorian GDP, 1900–50: new estimate (1950 = 100).

Source: Own elaboration, see text.

4. Estimation results and comparison with previous estimates

Figure 1 shows our GDP series for 1900–50⁵. In Figure 2 we compare, for each production sector, our estimates with the sectoral indices available in CEPAL (1978) for 1939–49. Figure 3 compares our series with Hofman's (1994) estimates for 1900–38.

As shown in Figure 2, there are significant differences between our estimates and the series available in CEPAL (1978) for 1939–49. Graph 2.7 shows that our GDP series grows at much lower rates than CEPAL's during those years, resulting in Ecuadorian GDP being much higher in 1939 according to our series. Specifically, our figures would indicate that the GDP of Ecuador in 1939 was 65 per cent of its 1950 level, compared to 50 per cent in CEPAL's figures. Unfortunately, the sources and estimation methods behind CEPAL's series are unavailable, preventing us from identifying the reasons for these differences.

However, Figure 2 allows us to compare the evolution of each sector's GDP between the two estimates. This reveals that the difference can be almost entirely explained by the evolution of the agrarian sector. In contrast, the differences for other sectors are small or temporary.

In the case of the agrarian sector, the difference between both series is very large. Our estimate indicates the size of the sector in 1939 was 79 per cent of its 1950 size, while CEPAL (1978) estimates it was just 43 per cent. Our series shows the sector's value added growing at 2.2 per cent, compared to 8.1 per cent in CEPAL's data.

Although we do not know the empirical bases and assumptions behind CEPAL's estimates, the available evidence suggests that such high growth was unlikely. CEPAL (1953, Vol. 3, pp. 63–33) provides figures of output or exports from 1939 to 1950 for the following Ecuadorian agricultural products: barley, wheat, rye, potatoes, rice, sugarcane, coffee, bananas, cocoa, *achiote*, oranges and pineapples. Except for bananas, the growth rate of the production or exports of these products was lower than 8.1 per

⁵ The new yearly estimates of GDP and GDP per capita between 1900 and 1950 are presented in the Appendix.

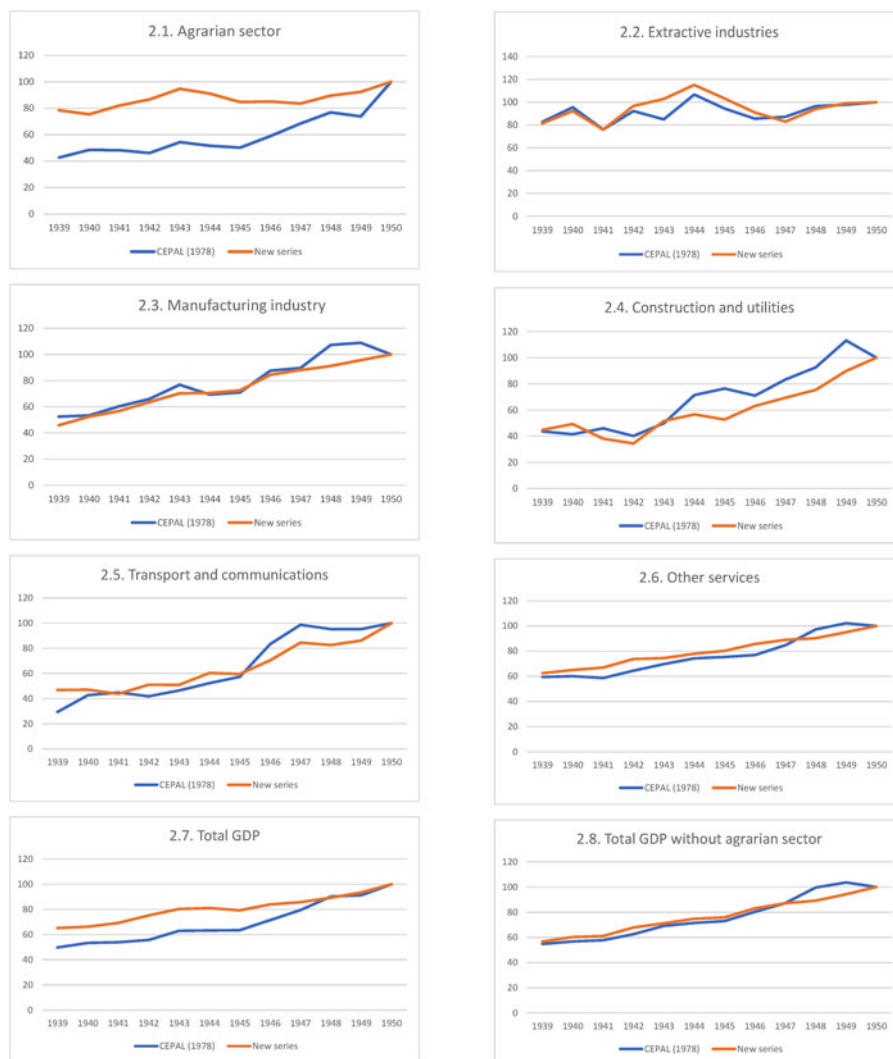


Figure 2. Ecuador's GDP in 1939–50: alternative estimates.

Source: Own elaboration and CEPAL (1978), see text.

cent, averaging 2.5 per cent across all products. Additionally, Ecuadorian exports, dominated by agricultural goods, grew at a yearly rate of 4.5 per cent during those years.

As shown above, in 1950 agriculture accounted for 72 per cent of the agrarian sector. CEPAL (1953) divides agriculture between *Costa* and *Sierra* production, and estimates that *Costa* output grew at a yearly rate of 4.7 per cent between 1939 and 1950 (see Vol. 3, p. 68) while *Sierra* production was virtually stagnant prior to 1950 (Vol. 1, p. 57). This aligns with our own estimates, of 5.3 and 1.5 per cent yearly growth for the *Costa* and *Sierra*, respectively, during that period. Based on this evidence, we suggest that CEPAL's (1978) estimate of agrarian production growth between 1939 and 1950 was upwardly biased, perhaps due to the excessive weight given to certain export products like bananas or sugar.

Figure 3 covers the 1900–39 period. As described above, Hofman's (1994) estimates for this period were not based on the direct use of production indicators, but on assumptions

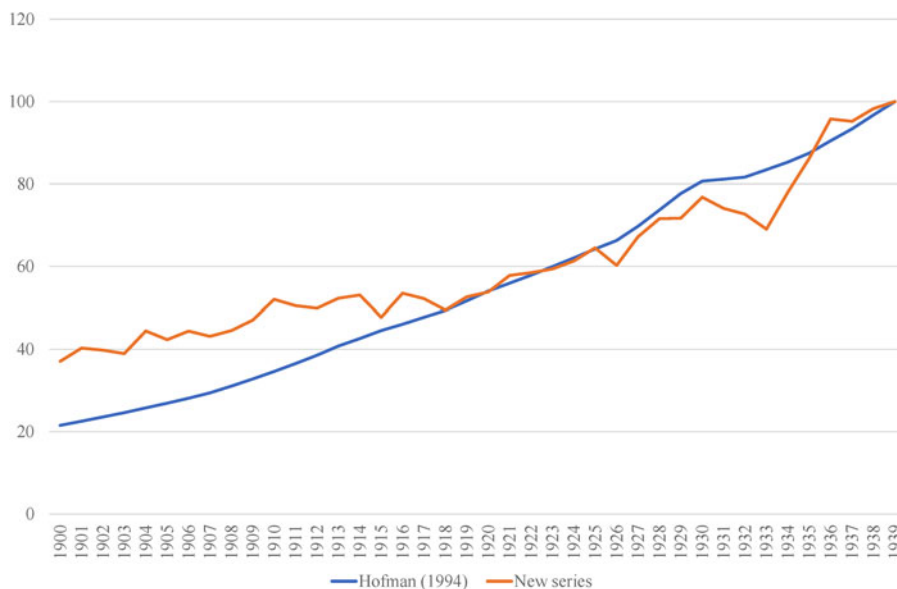


Figure 3. Ecuadorian GDP, 1900–39, alternative estimates (1939 = 100).

Source: Own elaboration and Hofman (1994), see text.

about potential GDP average growth rates at different stages. This is reflected in the lack of short-term fluctuations in Hofman's series. Excluding cyclical movements, his figures align closely with the new series from 1918 to 1939. However, Hofman's series grow much faster than ours from 1900 to 1918, largely due to the stagnation affecting our series during the 1910s. This stagnation is consistent with the evolution of foreign trade, as the real value of annual exports remained virtually unchanged between the periods of 1910–14 and 1915–19.

As a result of these differences with previous estimates, the new series presents a quite different picture of the evolution of the Ecuadorian economy between 1900 and 1950 from the previous one, with lower long-term growth. While Hofman (1994) estimated a 4 per cent yearly growth rate over 1900–50, our estimates indicate a 2.7 per cent growth rate. Consequently, our series suggests the Ecuadorian economy's size in 1900 was more than twice as large as Hofman (1994) assumed. This has substantial implications for growth and convergence, which are addressed in the next sections.

5. The Ecuadorian economy in the long term: growth and divergence since 1900

Figure 4 and Table 3 summarise the evolution of the Ecuadorian economy throughout the 20th and early 21st centuries. Figure 4 presents the long-term evolution of per capita GDP, while Table 3 provides information on the structure of GDP.

Figure 4 and Table 3 reflect the long-term process of growth and structural transformation of the Ecuadorian economy since the early 20th century. By 2019, the country's GDP per capita was more than 6 times as high as in 1900. Over the century, the structure of the economy changed radically. The agrarian sector, which accounted for 56 per cent of GDP in the early 20th century, experienced a continuous decline in relative terms throughout the period. Initially, this decrease was associated with the growth in manufacturing industries, whose weight doubled in the two decades before 1950. However, while the importance of agriculture has continued decreasing until the present, the relative weight of

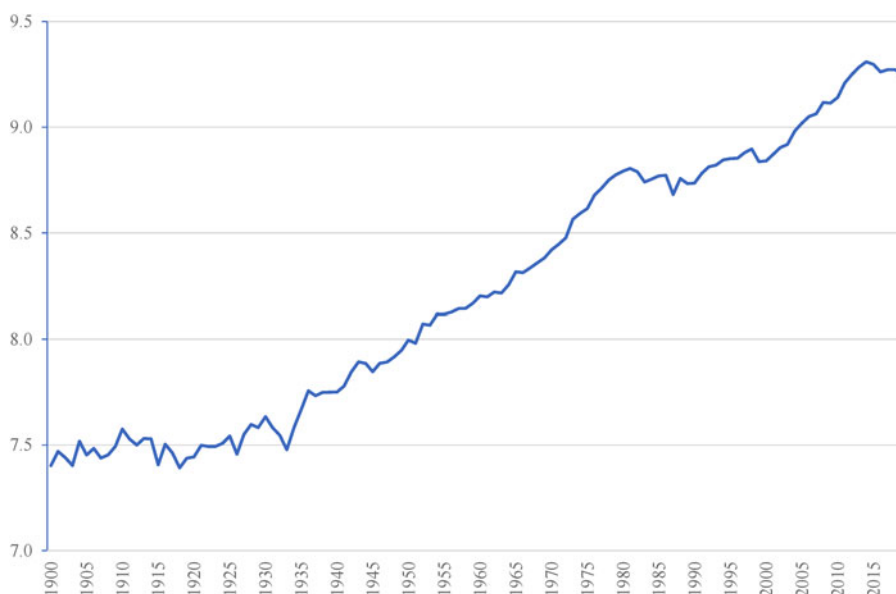


Figure 4. Ecuadorian GDP per capita (constant \$, logs), 1900–2019.

Source: For 1900–50, our own estimates; for 1950–2019, Maddison Project database (2020 version), projected forward to 2019 based on CEPALSTAT (<https://estadisticas.cepal.org/cepalstat/Portada.html>).

Table 3. Sectoral composition of the Ecuadorian GDP, 1900–2019

	Agrarian sector	Mining and petroleum industries	Manufactures	Utilities and construction	Services
1900–09	56.00	0.74	7.35	1.57	34.34
1910–19	53.91	0.57	7.32	1.77	36.44
1920–29	53.94	1.04	7.01	3.25	34.76
1930–39	47.81	2.80	9.69	2.32	37.38
1940–49	41.82	2.70	14.61	2.29	38.58
1950–59	36.16	2.12	14.99	4.30	42.43
1960–69	30.29	1.96	16.67	6.25	44.83
1970–79	19.62	13.53	14.27	6.78	45.80
1980–89	13.27	14.78	14.48	6.83	50.65
1990–99	12.89	12.63	15.30	6.41	52.77
2000–09	10.44	12.25	14.98	9.00	53.34
2010–19	9.37	9.98	13.34	11.92	55.40

Sources: For 1900–49, own estimations (see text). For 1950–2000, CEPALSTAT (<https://estadisticas.cepal.org/cepalstat/Portada.html>).

Notes: Some rows do not add up to 100 due to rounding. For the extractive industries, the figures from 1955–71 were negative or inconsistent in CEPALSTAT. We have corrected those figures based on CEPAL (1978) and, for 1971, based on CEPALSTAT's series with base year 2007. We have linked the three different sectoral series (our own estimates; CEPALSTAT's series with base year 1975, available until 2001; and CEPALSTAT's series with base year 2007, available since 1960) through weighted averages of each pair of series, in which the relative weight of each series depends on the distance to the base year of that series.

industry has stagnated since the late 1940s at around 15 per cent of GDP. Further reductions in the importance of agriculture have been linked to the expansion of services and the extractive industries, which boomed in the early 1970s due to the growth in the petroleum sector.

Figure 4 allows observing the effect of the cyclical pattern of growth and shrinking in the Ecuadorian economy throughout the 20th century. In the first decade of the century, the economy experienced significant but unstable growth, with GDP and GDP per capita increasing annually by 2.6 and 0.9 per cent, respectively. However, this process came to an end by 1910, when the economy first stagnated and then collapsed during the First World War, largely due to the dramatic reduction in cocoa exports since 1917.

Growth would only resume at the end of the war, with GDP growing at a yearly rate of 3.2 per cent between 1919 and 1930. Yet, due to the intensity of the previous collapse, the 1910 level of per capita GDP would not be reached again until 1928. Just 2 years after the recovery of the pre-war peak, the Great Depression triggered a new period of economic contraction, with GDP decreasing 10 percentage points between 1930 and 1933. As a consequence of these two crises, it would only be in 1934 that the levels of per capita GDP observed in 1910 would be definitively surpassed. Taken together, the yearly growth rate of GDP per capita in Ecuador during the 1900–33 period was just 0.3 per cent, close to stagnation.

Ecuadorian economic growth underwent a dramatic acceleration after 1933. The period between the recovery from the Great Depression and the debt crisis of the early 1980s was the golden age of Ecuadorian economic growth, with yearly growth rates of 5.2 per cent for GDP and 2.4 per cent for per capita GDP⁶. As a result, GDP per capita in 1981 was 3.4 times higher than that in 1934. This remarkable record was largely driven by the renewed dynamism of exports. Initially, the growth of exports of certain agrarian commodities, such as coffee, rice and specially bananas, replaced the declining cocoa trade. Later on, in the 1970s, the oil export boom more than doubled the size of GDP and increased GDP per capita by 45 per cent in just a decade.

However, once more, the growth of those decades was suddenly interrupted by the start of the so-called 'lost decade', leading to a prolonged period of stagnation. The previous 1981 peak in per capita GDP was only surpassed in 1992, although the economy suffered a new downturn in the late 1990s. Economic growth would resume in 2000, again fuelled by high oil export revenues, and continue until 2015, when a new period of decline began.

Summing up, Ecuador's economic growth during the 20th century was significantly impacted by two extended periods of stagnation – from 1910 to 1933, and again from 1981 to 2000. To provide further context, Figures 5 and Table 4 compare the long-term evolution of Ecuador's GDP per capita against the average of four industrialised nations, as well as a sample of other Latin American economies dating back to 1900.

The long-term evolution of the Ecuadorian economy has been characterised by a lack of convergence with the industrial core, as shown in Figure 5. In the early years of the century, until 1929, divergence was slow but sustained, GDP per capita decreasing from 26 to 22 per cent of the core countries' level. Interestingly, the effect of the Great Depression was less intense in Ecuador than in the core, marking the beginning of a period of convergence which accelerated during the Second World War. Consequently, relative GDP per capita reached 30 per cent of the core level by 1947. However, divergence then resumed, only being temporarily interrupted in the 1970s. The temporary convergence that took place in this decade was due to the economic crisis in the core countries and intense economic growth in Ecuador associated with the oil boom. But the long Latin

⁶ This turning point in the process of Ecuador economic development has been also highlighted, for the case of road construction, by Caspa (2022).

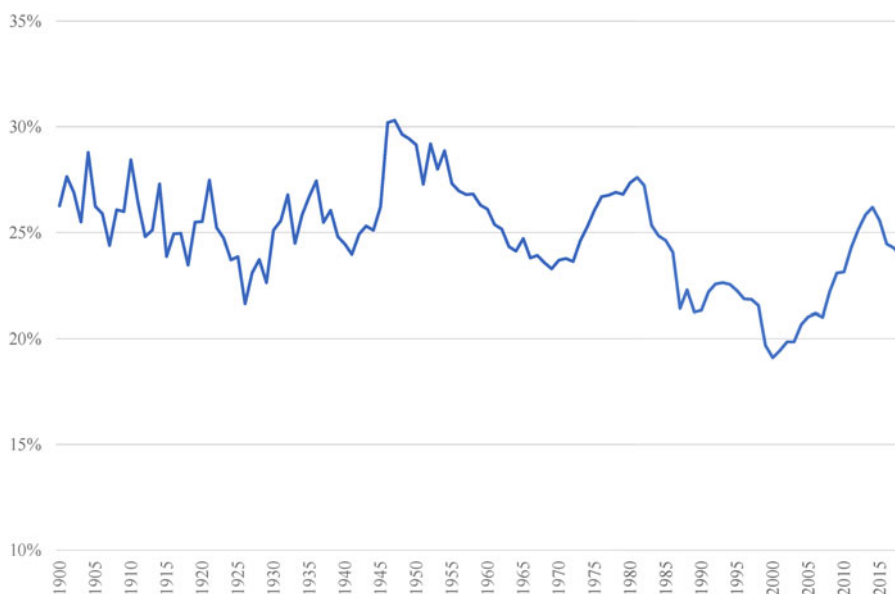


Figure 5. Ecuador's per capita GDP as a percentage of the (unweighted) average of France, Germany, United Kingdom and United States (1900–2018) (%).

Sources: Maddison Project database (2020 version) and our own figures.

American depression of the late 20th century ultimately brought the Ecuadorian relative GDP per capita to its absolute minimum in 2000, at a level of 19 per cent.

This period was followed by quick convergence from 2000 to 2014, which brought the economy back, in relative terms, to the starting point of the series (26 per cent). However, this convergence was interrupted by the sudden halt of economic growth in 2014. In summary, while there have been periods of substantial economic growth, especially from 1933 to 1981 and 2000 to 2014, the growth has not been high enough to compensate for the long periods of stagnation and divergence.

Compared to Latin America, Ecuador appears to have belonged to a group of middle-income countries around 1900, with included Bolivia, Mexico and Venezuela (Table 4). Moreover, and although there is a high level of uncertainty due to the poor quality of the available data, Ecuador in 1900 seems to have been relatively richer than Brazil, Peru or Colombia, but much poorer than Argentina, Uruguay and Chile.

Over time, Ecuador's disadvantage compared to the Southern Cone countries remained. While there was some convergence with Uruguay (since the 1960s) or Argentina (since the 1970s), by 2018 Ecuador's GDP per capita was still just 53 per cent of those economies, compared to 44 per cent in 1900. Ecuador also lost ground relative to Brazil, Colombia and Mexico. By 1900, it seems to have been richer than Brazil and Colombia and only 10 per cent poorer than Mexico (although all these countries' estimates must be allowed a large error margin). By the 1920s, however, Colombia had surpassed Ecuador, and by the 1970s, Brazil had as well. Divergence with Mexico and Brazil was especially pronounced during the ISI period. In 2018 Ecuador's GDP per capita was just 73 per cent of the average for those three countries.

By contrast, Ecuador has performed better than Bolivia and Cuba, which had a similar GDP per capita level to Ecuador ca. 1900. Both Bolivia and Cuba suffered substantial economic problems in the second half of the 20th century (and Cuba also during the Great Depression) and, as a result, both countries now have GDP per capita well below Ecuador's.

Table 4. Ecuador per capita GDP as a percentage of other Latin American economies (%) (1900–2018)

	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2018
Argentina	36	32	31	32	35	37	41	39	50	61	48	49	57
Bolivia	112	114	88	91	87	99	143	131	161	178	166	181	159
Brazil	188	197	138	153	144	133	107	98	80	79	70	66	76
Chile	48	43	40	42	45	51	54	55	73	61	45	49	48
Colombia	151	157	100	88	77	87	92	92	97	81	81	83	79
Cuba		94	72	87	112	113	122	152	160	132	172	142	128
Mexico	90	87	67	93	91	85	77	66	66	64	55	63	65
Peru	151	125	87	78	76	81	77	74	97	130	114	98	86
Uruguay	48	43	48	35	47	42	48	56	62	60	53	57	53
Venezuela	89	116	90	71	49	35	30	30	40	47	49	55	99

Sources: Maddison Project database (2020 version) and our own figures.

Finally, the relative position of Ecuador has changed significantly over time compared to Peru and Venezuela. Peru was clearly richer than Ecuador from the late 1910s until the 1970s. Since then, the two countries have fluctuated at similar economic levels. Ecuador's comparison to Venezuela reflects the complex economic history of the latter. While Venezuela and Ecuador had similar levels of GDP per capita by 1900, Venezuela gradually left Ecuador behind and remained much richer for most of the 20th century, until the recent collapse of its economy brought its GDP per capita down to levels more similar to Ecuador's.

In summary, Ecuador remained in an intermediate position in the region. It has not been able to converge with the richer Southern Cone countries, nor keep pace with some emerging economies like Brazil, Colombia or Mexico. However, Ecuador has performed much better than Bolivia, Cuba or, more recently, Venezuela.

6. Conclusions

Official figures of Ecuadorian GDP start in 1950. Prior to 1950, only preliminary GDP figures were available for Ecuador, often relying on scattered evidence and broad assumptions. In this paper, we have presented new GDP figures for the Ecuadorian economy covering the first half of the 20th century. We have estimated GDP from the output side, taking the structure of GDP in 1950 as the starting point and extending backwards each sectoral output figure on the basis of product volume indicators. These new estimates are based on a wide range of primary and secondary sources. These revised data offer a rather different picture of Ecuador's economic evolution compared to previous figures. Specifically, the new series indicates that economic growth was much slower than previously assumed, both between 1900–18 and 1939–49. As a consequence, Ecuador's GDP and GDP per capita levels would have been significantly higher in 1900 than the earlier estimates suggested.

The revised GDP estimates provide detailed information on the structural transformation of Ecuador's economy over time. As could be expected, the data show a declining presence of agriculture within GDP. The shrinking of the agrarian sector was only partially offset by the growth of the manufacturing industry, revealing the limitations of Ecuador's industrialisation experience. The GDP share of industrial sector remained relatively low, hovering around the 15 per cent level reached in the 1940s. Instead, the two sectors that gained more prominence at the expense of agriculture were the extractive industries, thanks to the oil production boom since the 1970s, and, especially, the services sector.

Our revision of the levels of Ecuadorian GDP per capita has implications for the country's relative position in the international context. Unlike previous estimates, our new series shows an intense divergence of Ecuador from the average of a sample of core countries during the early 20th century. While there were several episodes of convergence starting in the 1930s, they were too short to allow for a sustained improvement in the relative position of Ecuador. As a result, by the early 21st century, in terms of relative GDP per capita Ecuador was in a similar position as in the early 20th century. Similarly, from a Latin American perspective, Ecuador was unable to converge with the economies of the Southern Cone over the long term, and clearly underperformed compared with some of the region's emerging economies, such as Mexico, Colombia or Brazil.

To sum up, Ecuador in 1900 was substantially richer than assumed in previous research. However, the country then experienced much slower growth in the following decades than previously believed, preventing it from converging with the core industrialised economies. The long-term economic divergence of Ecuador appears to have been driven more by the extended periods of stagnation (such as 1910–33 or 1982–2000), rather than the weakness of its growth cycles, aligning with the findings of Broadberry and Wallis (2017).

We hope that the new series can be used in the future for deeper analysis of the specific characteristics of Ecuador's economic growth and divergence over the 20th century. In particular, the new estimates might be used as one of the necessary ingredients to estimate the evolution of inequality across regions, which is crucial given the stark geographical divide between the *Costa* and the *Sierra* as well as the marginal economic role of the Amazonian region and the Galapagos Islands. A key priority for future research would be to determine whether Ecuador's sustained international divergence was accompanied by regional convergence or divergence within the country.

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Appendix A. Sources and estimation methods

Population

Ecuador's population figures have been taken from Yáñez *et al.* (2014). Regional population figures come from Alexander-Rodríguez (1992).

Consumption price index

The index of consumption prices is the result of linking the price series available in Alexander-Rodríguez (1992) for 1913–39 and the index estimated by JUNAPLA⁷ and reproduced in CEPAL (1968, Table 22) for 1939–50. The resulting series has been brought backwards to 1900 based on the evolution of the exchange rate between the Ecuadorian sucre and the dollar, taken from MOxLAD, and the U.S. price consumption index, taken from Officer and Williamson (2021a).

Foreign trade

- (a) *Exports and imports.* For 1926–50, exports and imports figures are taken from the *Boletín del Banco Central del Ecuador* (multiple years), the foreign trade report included in Banco Central del Ecuador (1951), and from Dirección Nacional de Estadística (1944). Exports data for specific products are sourced from CEPAL (1953, Vol. 3). For 1916–25, export and imports figures come from Ministerio de Previsión Social y Trabajo (1927); for 1909–1915 from Ministerio de Hacienda del Ecuador (1910, 1911, 1914), and, for 1900–08, from Cámara de Comercio de Guayaquil (1907), Compañía 'Guía del Ecuador' (1909), and Dillon (1901).
- (b) *Export and import prices.* Export prices for 1911–50 and import prices for 1928–50 have been taken from CEPAL (1953, Vol. 3). For previous years, we have used the same estimation method as CEPAL (1953, Vol. 3, p. 6), comparing trade data in value and volume. Export and import volume data come from Compañía 'Guía del Ecuador' (1909), Dillon (1901), Ministerio de Hacienda del Ecuador (1910, 1914, 1917), and Ministerio de Previsión Social y Trabajo (1927).

Costa agriculture

Output

Achiote: We assume output to follow the evolution of exports. Export data come, for 1925–50, from CEPAL (1953, Vol. 3, p. 66), for 1909–20 from Ministerio de Previsión Social y Trabajo (1927) and Ministerio de Hacienda del Ecuador (1917) and for 1900–08 from Compañía 'Guía del Ecuador' (1909).

Bananas: Output in 1934–47 is sourced from González (1960) and in 1948–50, from Almeida Guzmán and Almeida Arroba (1988, p. 85). These figures have been projected backwards to 1900 based on the evolution of exports, taken from CEPAL (1953, Vol. 3, p. 66) for 1925–33, from Ministerio de Previsión Social y Trabajo (1927) for 1910–20 and from Compañía 'Guía del Ecuador' (1909) for 1900–08. Gaps have been filled using information on changes in railway transport of bananas from Coverdale and Colpitts (1928).

Cocoa: For the period 1900–50, we assume output to follow the evolution of exports, taken from Boletín del Banco Central del Ecuador (1957), Ministerio de Hacienda del Ecuador (1910, 1911, 1914, 1917), Ministerio de Previsión Social y Trabajo (1927) and Compañía 'Guía del Ecuador' (1909).

Coffee: Output in 1925–50 is sourced from CEPAL (1953, Vol. 3, p. 64) and projected backwards to 1900 based on the evolution of exports, taken from Compañía 'Guía del Ecuador' (1909) and Ministerio de Previsión Social y Trabajo (1927).

Cotton: Output in 1920–26 is sourced from Paviolo (1927) and figures for 1935, 1939 and 1945–50 from CEPAL (1953, Vol. 3, p. 64). For previous years, we estimate the evolution of output through export data sourced from Compañía 'Guía del Ecuador' (1909), Dillon (1901), Ministerio de Hacienda del Ecuador (1917) and Ministerio de Previsión Social y Trabajo (1927).

Higuerilla: Export figures for 1925–50 taken from CEPAL (1953, Vol. 3, p. 66).

Maize: Output for 1946–50 is sourced from CEPAL (1953, Vol. 3, p. 64).

Oranges: Export figures in 1925–50 are taken from CEPAL (1953, Vol. 3, p. 66).

Pineapples: Export figures in 1925–50 are taken from CEPAL (1953, Vol. 3, p. 66).

⁷ Junta Nacional de Coordinación y Planificación Económica.

Rice: For the period 1931–50 data are sourced from CEPAL (1953, Vol. 3, p. 64) and projected backwards until 1910 based on the evolution of rice railway transport taken from Coverdale and Colpitts (1928).

Sugarcane: Output in 1930–50 is from CEPAL (1953, Vol. 3, p. 64).

Tobacco: Output in 1936–49 is from CEPAL (1953, Vol. 3, p. 64).

Prices

For most products we use 1950 prices. Banana and coffee prices are taken from González (1960). For cocoa and rice we use *Boletín del Banco Central del Ecuador* (nov–dec 1957, p. 159). Sugarcane prices are sourced from CEPAL (1953). For maize and oranges prices are from Almeida Guzmán and Almeida Arroba (1988). For the rest of the products, we use official export prices taken from the foreign trade statistics (see above).

Sierra agriculture

Output data for maize, barley, wheat, rye, potatoes, lentils and beans for 1938–50 are sourced from CEPAL (1953, Vol. 3, p. 63). We use 3-year moving averages to correct for the instability in the reported figures.

The price structure for 1942 is taken from Dirección Nacional de Estadística (1944).

Livestock

Output: Output data for beef, pork and sheep meat production in 1949 are assumed to be equal to consumption, taken from CEPAL (1953, Vol. 1, p. 89). Data for 1920–26 are taken from Paviolo (1927).

Milk production in 1947–50 is estimated based on per capita consumption in Quito (CEPAL, 1953) while national production in 1949 comes from CEPAL (1953, Vol. 1, p. 91). We assume a 19 per cent growth between 1946 and 1949 based on the evolution of consumption in Quito. Similarly, production in 1939–42 is estimated based on milk consumption in Quito (Dirección Nacional de Estadística, 1944). Production in 1920–26 is taken from Paviolo (1927).

Cheese and butter production is assumed to follow the same trends as milk production, according to ratios taken from Paviolo (1927).

Prices in 1950 are taken from Almeida Guzmán and Almeida Arroba (1988), except for cheese, for which we use the 1942 price from Dirección Nacional de Estadística (1944), deflated to 1950 on the basis of the consumer price index (see above).

Forestry

Output: We use exports as a proxy for output of rubber, tagua and wood. For wood we use the evolution of *balsa* exports for 1940–50, taken from the *Boletín del Banco Central del Ecuador* (1957), and wood exports in 1904–25 taken from Dillon (1901), Compañía ‘Guía del Ecuador’ (1909), Ministerio de Hacienda del Ecuador (1910) and Ministerio de Previsión Social y Trabajo (1927). For rubber and tagua, export data for 1934–50 come from González (1960). Before 1934, the evolution of exports is estimated based on Compañía ‘Guía del Ecuador’ (1909), Dillon (1901), Ministerio de Hacienda del Ecuador (1910, 1911, 1914, 1917) and Ministerio de Previsión Social y Trabajo (1927).

Prices in 1950 are the ratio between value and quantity of exports of each product, taken from the country’s foreign trade figures (see above).

Mining and quarrying

Gold output for 1923–37 is sourced from *Boletín del Banco Central del Ecuador* (mar–apr 1956). Before 1923, output is assumed to evolve as exports, taken from Arosemena’s export figures for the period 1900–21 (1992).

Silver, copper and lead output for 1938–1950 is sourced from *Boletín del Banco Central del Ecuador* (mar–apr 1956). Before 1938, we assume silver output to follow the same trend as gold output, and copper and lead production to be negligible.

Crude oil output for 1925–50 comes from the *Boletín del Banco Central del Ecuador* (1956, p. 126). Output for 1925 is assumed to be equivalent to exports, taken from Ministerio de Previsión Social y Trabajo (1927). Before 1925, we assume a decreasing linear evolution of production that becomes 0 in 1900.

Prices in 1950 have been taken from n.a. (1951), except for gold, taken from Officer and Williamson (2021b).

Manufacturing industry

For 1938–50 the evolution of the sector is taken from CEPAL (1953; Vol. 1, p. 112). Before 1938 we use the structure of the sector in 1938 provided by CEPAL (1953, Vol. 3, p. 80) and project the evolution of each sector backwards based on the following indicators (gaps have been filled with interpolation).

Food and beverages: Sugar production in 1900 and 1908 is taken from Dillon (1901) and Compañía ‘Guía del Ecuador’ (1909), for 1930–37 data are from the figures of apparent consumption in CEPAL (1953, Vol. 1, p. 194); alcohol for 1900–06 – estimated from the alcohol tax – comes from Compañía ‘Guía del Ecuador’ (1909), and for 1933–37 from *Boletín del Banco Central del Ecuador* (jul–aug 1957); beer for 1934–37 is from *Boletín del Banco Central del Ecuador* (jul–aug 1957). The three series are aggregated using 1948–50 prices from Almeida Guzmán and Almeida Arroba (1988) and CEPAL (1953, Vol. 3, p. 79).

Textiles: Production of ‘toquilla’ hats for 1900–05 and 1911–28 is taken from Trujillo León (1986).

Cement: Production figures for 1934–37 come from CEPAL (1953, Vol. 3, p. 89) and for 1925–29 from Tafunell (2006). We assume production to be zero in 1923 when the first factory was established in Guayaquil (Tafunell, 2006, p. 44).

Leather and shoemaking: Leather output is estimated using the evolution of exports, which are available for 1900–12, 1916–25 and 1932 in Compañía ‘Guía del Ecuador’ (1909), Ministerio de Hacienda del Ecuador (1932) and Ministerio de Previsión Social y Trabajo (1927). We also assume the evolution of sole production to follow exports, which are only available for 1900–09 in Compañía ‘Guía del Ecuador’ (1909). The two series are aggregated using export unit values in 1938, taken from Dirección Nacional de Estadística (1944).

Oil industry: Output of oil refining and derivatives in 1930–37 is taken from *Boletín del Banco Central del Ecuador* (mar–apr 1956).

Construction

Cement apparent consumption combines figures of production (see above) and imports, taken from Dillon (1901), Cámara de Comercio de Guayaquil (1907) and official foreign trade statistics. Imports of construction materials are taken from Dillon (1901), Compañía ‘Guía del Ecuador’ (1909), Ministerio de Hacienda del Ecuador (1910, 1911, 1914, 1917), Ministerio de Previsión Social y Trabajo (1927) and CEPAL (1953, Vol. 3 p. 89). Imports of construction materials come from the same sources and have been deflated for 1928–50 using the price of capital goods imports in CEPAL (1953, Vol. 3, p. 99) and using the general consumption price index for data prior to 1928.

Transport, storage and communication

Communication services: Post and telegraph services revenues are taken from Compañía ‘Guía del Ecuador’ (1909) and Ministerio de Hacienda del Ecuador (1945).

Railway transport: For 1937–50, output is estimated based on railway ton-kilometres and passenger-kilometres, available at www.docutren.com. These metrics are weighted according to freight and revenue unit transport prices in 1950 (estimated from *Boletín del Banco Central del Ecuador*, nov–dec 1951). Before 1937, total revenues come from Coverdale and Colpitts (1928) and Maldonado Obregón (1977). Figures are deflated based on the consumption price index (see above). When revenues were not available, we interpolate them based on the sum of exports and imports in real terms.

Sea transport: We assume the evolution of output in this subsector to go hand-in-hand with the returns of the 1 per cent tax on freight, which are available (with some gaps) for 1900–37 in Compañía ‘Guía del Ecuador’ (1909), official foreign trade statistics and the official reports that the Ministry of Finance sent to the National Congress. We deflate it based on the evolution of the freight cost index in Isserlis (1938) and the exchange rate between the sucre and the pound, calculated from MOxLAD and Officer (2021). For 1937, we assume the same freight cost as in 1936. From 1937–50, we assume sea transport output follows the same trend as the sum of real exports and imports.

Banking, insurance and real estate

The estimated value added of financial sector services in 1950 has been projected backwards on the basis of a series of bank deposits, deflated with the consumption price index. Data on deposits come from Compañía ‘Guía del Ecuador’ (1909) for 1900–09, from Boada (1922) for 1915–1926 and from the *Boletín del Banco Central del Ecuador* (1956–57) for 1927–50.

Public administration and defence

The value added of this subsector has been assumed to follow the same growth trend as government expenditure, which has been expressed in real terms using the general price consumption index. Public expenditure data for 1900–26 and 1930–34 have been obtained from the official reports that the Ministry of Finance sent to the National Congress. Data for 1927–29 and 1935–50 are taken from Banco Central del Ecuador (1997).

Appendix B. Ecuadorian GDP and GDP per capita, 1900–50

Table B I. GDP and GDP per capita of Ecuador, 1900–50, dollar of 2011

Year	GDP (million dollars)	GDP per capita (\$)
1900	2,428.20	1,639.57
1901	2,638.39	1,753.08
1902	2,607.67	1,704.36
1903	2,552.94	1,640.71
1904	2,911.50	1,840.39
1905	2,772.84	1,724.40
1906	2,907.96	1,778.57
1907	2,824.79	1,699.63
1908	2,916.97	1,726.02
1909	3,083.69	1,794.93
1910	3,405.03	1,949.07
1911	3,304.80	1,860.81
1912	3,264.57	1,807.62
1913	3,423.19	1,864.48
1914	3,473.77	1,860.61
1915	3,126.08	1,647.04
1916	3,501.65	1,815.27
1917	3,414.80	1,740.47
1918	3,236.15	1,622.94
1919	3,444.70	1,698.57
1920	3,520.81	1,708.30
1921	3,783.15	1,804.94
1922	3,826.11	1,795.45
1923	3,887.51	1,794.79
1924	4,013.11	1,821.66
1925	4,222.18	1,885.74
1926	3,944.18	1,732.18
1927	4,398.21	1,899.88

(Continued)

Table B1. (Continued.)

Year	GDP (million dollars)	GDP per capita (\$)
1928	4,685.29	1,991.20
1929	4,696.51	1,962.60
1930	5,028.29	2,066.71
1931	4,850.70	1,961.46
1932	4,757.21	1,892.29
1933	4,520.03	1,768.40
1934	5,106.89	1,964.94
1935	5,646.00	2,137.02
1936	6,272.97	2,335.43
1937	6,233.24	2,282.40
1938	6,437.61	2,318.19
1939	6,549.01	2,319.88
1940	6,664.46	2,322.11
1941	6,967.70	2,387.83
1942	7,570.76	2,551.65
1943	8,079.52	2,678.89
1944	8,155.08	2,658.98
1945	7,974.24	2,557.48
1946	8,435.62	2,661.08
1947	8,625.76	2,676.31
1948	8,987.90	2,742.72
1949	9,413.47	2,826.02
1950	10,059.39	2,970.00

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