The evolution of wealth in a periphery economy. Estimates for Uruguay in the long-run (1860-1940)

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The aim of this paper is to present some benchmark estimations on Uruguayan national wealth from 1860 to 1940. We found a similar pattern of wealth constriction after WWI than those found previously in the European and US economies. The developing of the Uruguayan economy led us to conclude that the transition between the agrarian based model of development, predominant in the 19th century, to the import substitution model, from the 1930s onwards, had severe costs regarding wealth and savings. The wealth structure could amplify this result since fixed assets –mainly land and agricultural assets– were a persistent patrimonial base of the accumulation since the 19th century.

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(Draft version, please do not quote without authors previous authorisation)

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1. Motivation

Differences in the level of wealth –especially in the presence of credit constraints– explains disparities in purchasing power, consumption and investment opportunities between individuals. Also, the interaction between wealth inequality and economic development is central to many theories that attempt to explain the cross-country differences between the historical evolution of countries and regions. However, one of the most salient difficulties in proving these theses lies in the lack of continuous and reliable statistical data. Recently, this issue has acquired special attention with the publication of Thomas Piketty's book "Capital in the Twenty-First Century" and what some authors have called the return of "patrimonial capitalism" (Milanovic 2013).

The model proposed by Piketty links the stock of capital (K) to the flow of income (Y). K includes all forms of explicit or implicit return-bearing assets such as housing, land, machinery, financial capital (in the form of cash, bonds and shares), intellectual property, and even human persons in the time of legalized slavery. The relative importance of different kind of assets has, of course, changed throughout history; land assets is less important today than it has been in the past. The importance of assets also varies between rich and poor countries at given points in time, and between different income groups. Piketty's primary concern here is with the ratio between the defined capital and the annual total income flow, which is named as the β ratio in his terminology.

From the growth theory and according to the Harrod-Domar-Solow formula (Piketty and Zucman 2014) we know that at the steady-state, capital-output ratio will be equal to the saving rate (s) divided by the rate of growth of the economy (g);

i.e. $\beta=s/g$. Thus, in the long-term we would be able to define the equilibrium β which would vary between countries; and both Piketty (2014) and Piketty and Zucman (2014) explain the evolution of the ratio according to the changes in s and g during the 19th, 20th, and 21st centuries.

This "general theory of capitalism" (Milanovic 2013) proposed by Piketty has brought about a renewed interest in the historical levels and the long-run evolution of the total wealth of economies and how wealth is distributed among the population.

The rise of wealth-income ratios in developed countries, from the 1970s until the present, is mostly a recovery effect to compensate for the capital losses experienced during the first decades of the 20th century (Piketty and Zucman, 2014). This argument rests on evidence corresponding to five countries: the United States (US), the United Kingdom (UK), Germany, France (Piketty and Zucman, 2014; Piketty, 2014) and Sweden (Waldenström, 2017) over the 1870–2010 period. For the three European countries belonging to the core of the world economy during 19th and 20th centuries—the UK, Germany and France—the analysis finds a similar U-shaped pattern: today's private wealth-national income ratios appear to be returning to the high values observed in 1870–1910. For the US and Sweden, the U-shaped pattern is weaker but the trajectory insinuates a similar evolution. In all cases saving flows account for the bulk of wealth accumulation: capital gains seem to wash out in the long run (Piketty and Zucman, 2014; Piketty, 2014, Waldenström, 2017).

The divergence in outcomes closely related to the wars seems quite plausible, although the effect may have primarily worked via the political channels rather than military channels. In his account of the dramatic swings in household wealth during the 20th century, Piketty (2014) suggests that wartime capital destruction

represented only a small part of both the absolute and relative wealth compression. Instead, the main mechanisms seem to have been government regulation and, in particular, increased taxation of wealth, property and high incomes that has impact until the end of the 1960s. Before WWI, capital markets ran unfettered, but a number of anti-capital policies were put into place after the WWII, which depressed asset prices through the central decades of the 20th century.

Our results show a similar pattern in terms of wealth accumulation between the Uruguayan economy and their developed pairs. The WWI divide in two our analysis period: before the war the Uruguayan economy presents high –and similar than the developed countries– levels of wealth-income ratios, while after the war the β ratio drops rapidly.

Initially, we will centre our analysis around three expected results: first, we expect a similar divergent pattern among the evolution of the per capita income and wealth gaps between the Uruguayan economy and the core world economies. As a consequence, Uruguay should present lower ratios of wealth per capita than the advanced economies but in levels relatively close to the advanced economies.

Second, due the evidence presented by some experts' perception on the 19th century (Vaillant, 1873), we should expect high levels of wealth as a percentage of total income in the international comparison.

Third, due to the Uruguayan economy structure the wealth composition should be based mainly on fixed assets –land and agricultural assets-, and this composition should show a stable pattern during the period of analysis in terms of participation in total wealth.

The data available for Uruguay allows us to accurately estimate the historical evolution of wealth and thus to use it as a case in order to discuss the importance of wealth accumulation on processes of development.

After this introduction, the paper is ordered in four sections. In Section 2, we present a brief context of the Uruguayan economy evolution during the period of analysis, and we placed our hypothesis and expected result according to this context (Section 3). In section 4 the available information is presented with a detailed and careful description of the methodological procedure done to re-estimate the original data collected by Raúl Ochoa (1948). In Section 5 to 7 we present our findings and finally, in Section 8 we conclude.

2. Background: The Uruguayan economy between 1860-1940

Uruguay integrated the "club" of the new settlement economies during the expansion of the Atlantic economy since the mid-19th century until the first decades of the 20th century. These "temperate economies" (Lewis 1983:209) constituted "the group of non-European countries which at the twentieth century can be classified as developed" (Foreman-Peck 1995:105). Settler economies benefited from the consequences of the Second Industrial Revolution (railways, refrigeration, decreasing maritime and overland shipping costs) as their temperate climate and fertile soils were especially suitable for the production of wool, meat, wheat and corn. Their natural resource endowments enabled them to adopt a fast expansion trajectory and, in the eve of the WWI, they reached levels of income per capita on a par with the richest economies (Willebald 2017). Nonetheless by 1880, the agrarian frontier was exhausted, and along with the enclosure process, labour become

abundant and concentrated in urban areas. By 1910 the export-led paradigm started to show their weakness. At the beginning in the 1920s, the primary sector showed a very poor performance, due mostly to the lack of innovation away from natural pastures. During the following decades, its performance deteriorated even more due to the international trade conditions, while the general level of the economy fluctuated strongly as consequence of internal and external factors.[1]

The state played a key role on the Uruguayan long run development. Particularly, in the second decade of the 20th century, some measures tend to create a *social welfare state* –promoting universal social and public coverage programs– which come along with a broader process of nation state building and modernization knowing as *the Batllismo*.[2] The social bases of this political movement was founded on the urban middle class – mainly concentrated on the capital– and faced the opposition of the National Party as the political representative of the popular conservative forces (Barran 1986) associated with the land-owner elite (Filgueira 1995).

After the 1930 crisis, with a multiple exchange rate system as a main economic policy, Uruguay starts an inward period of development leading by a state protected industry, which grew fast and reach certain degree of diversification. The domestic demand also grew rapidly due to the expansion of the public sector, the improvement in the real wages and the advance of a corporate welfare state. The central decades of the century were characterized by massive incorporation to the welfare system –woman suffrage extension, institutionalized salary negotiation, pension system universalization. This *"benefit was supported by a middle class and*

1 The high volatility of investment (Román and Vázquez, 2013) and fluctuations of terms of trade (Bértola and Lorenzo, 2011) explain the cyclical evolutions of the Uruguayan economy in the long run.

2 The name become from his founder José Batlle y Ordoñez, who was president of Uruguay during 1903-1907 and 1911-1915.

egalitarian political culture that legitimized the demand 'for privilege for all'…" (Filgueira 1995:22)

3. Hypotheses and expected results

According to the previous antecedents we deal with the following expected results from our empirical approach (referred to 1860-1940) in terms of level, evolution and composition of wealth and β.

First, we expected that (i) in the long run, the gap between Uruguay and the "world leaders" countries in terms of wealth per capita shows a similar trajectory than income pc gap and, in consequence, (ii) it should show a lag compared to the industrialized economies –levels of wealth pc lower than the average of advanced economies– as the GDP per head shows in the long run.

During the 19th century, Uruguay has a comparative rich economy in terms of GDP per capita based on livestock production and, according to contemporaneous experts, "there is no country in the world that can be compared to the Uruguay on this matter" (Vaillant 1873, p.144, our own translation). In these terms, we should expect two results. On the one hand, (iii) the level of β should be relatively high in the international comparison and comparable with the core of the world economy. However, the despair levels of development between Uruguay and industrialized economies (iv) would be due to differences in terms of wealth composition being the main component of Uruguayan wealth the land and agriculture assets, opposed to the financial and housing assets of the developed countries.

Those factors that explain the evolution of the β coefficient in developed countries (v) should not have effect in the case of Uruguay. The WWI did not cause damage

to the level of capital in Uruguay and, in spite of certain attempts at land taxation (directed at large estates; Bertino et al. 2005), the public policy did not constitute a political anti-capital mechanism, so we expect that other factors will be explaining the evolution of β.

4. Methodological description and results for Uruguay

Our main source of information is the data presented by Raúl Ochoa (1948), who collects estimations of national wealth by categories surveyed in diverse works of national historiography. Among them, the earliest work of national wealth estimation was written by Adophe Vaillant (1873), which combines the current value of land for housing and farming, working capital and the money supply from banks. As the sources used by Vaillant (1873) were statements made by taxpayers to the *Contribución Directa*,[3] the author argued that these figures are underestimated and tripled the declared values "to get them closer to reality" (Bertino and Tajam 1998, p.53).

From 1893 onwards, the database includes agricultural capital investment, private railways and coins; and from 1925 onwards, the category "other assets" includes the legal banking reserve and the value of products, machinery and agricultural assets. The original sources outlined in Ochoa (1948) are showed in Table 1, in which the value of national wealth in current pesos and its composition is also presented. All sources were checked in this research.

3 Direct taxation over rural real state property.

Table 1. Total Wealth in Uruguay: Composition and Sources. (In current Uruguayan pesos and percentages)

	Total Wealth	Agricultural Land	Agricultural Assets	Housing	Other Assets	Sources
1866	**311**	32%	36%	22%	9%	Acevedo, E. (1933) "Anales" y "Manual de Historia del Uruguay" y DGE (1860)
1876	**324**	28%	18%	32%	23%	Acevedo, E. (1933), "Anales"
1880	**557**	39%	16%	39%	5%	Acevedo, E. (1933), "Anales"
1893	**630**	24%	16%	18%	42%	Acevedo, E. (1935), "Manual de Historia del Uruguay"
1900	**1013**	29%	16%	19%	35%	Acevedo, E. (1903), Notas y Apuntes
1910	**1790**	34%	12%	22%	32%	Maeso, C. M. (1910), "El Uruguay a través de un siglo"
1925	**2083**	44%	14%	28%	13%	BROU, Dpto de investigaciones Económicas
1928	**2253**	41%	13%	29%	18%	BROU, Dpto de investigaciones Económicas
1931	**2776**	33%	11%	27%	29%	BROU, Dpto de investigaciones Económicas
1934	**2205**	30%	11%	33%	26%	Ruíz Díaz, M. (1936) "Los barómetros Económicos del Uruguay"
1936	**2275**	29%	15%	34%	22%	Comisión Honoraria de Estudio del Censo Industrial de 1936
1940	**2448**	36%	10%	30%	24%	Bellan, O. (1940) Diario La Mañana 23/9/1940

SOURCE: own elaboration based on Ochoa (1948, p.802).

Due to certain discrepancies present in the series reported by Ochoa (1948, p.802) as well as missing data, some corrections on the original series were made. First, the data missing regarding of the distribution of land and farms for the years 1876, 1893, 1900 and 1910 were estimated by linear interpolation. Second, given the discrepancies in the internal value distribution presented in some years, the approach taken was to consider as valid the total wealth value in each year and reassign values by category based on the percentage distribution presented by Ochoa (1948, p.802). Third, items corresponding to public wealth was subtracted in order to obtain the private wealth, and the total wealth was re-estimated considering these differences. Finally, the categories used in Ochoa (1948) were regrouped as shown in Table 2 to fit the analytical categories of Piketty and Zucman (2014), which allows us to compare the composition of wealth.

Table 2. Category Grouping According to Wealth Classification Sources

Original classification Ochoa (1948)	**Classification to match Piketty's criteria**
Tierras	Land
Fincas	Housing
Riqueza ganadera	Agricultural assets
Capitales de giro	Other assets
Comercio de importación	Other assets
Capital industrial y metálico	Other assets
Capital agrícola	Agricultural assets
Ferrocarriles particulares	Other assets
Mobiliario y alimentos	Other assets
Encaje de bancos	Other assets
Ahorro nacional	Other assets

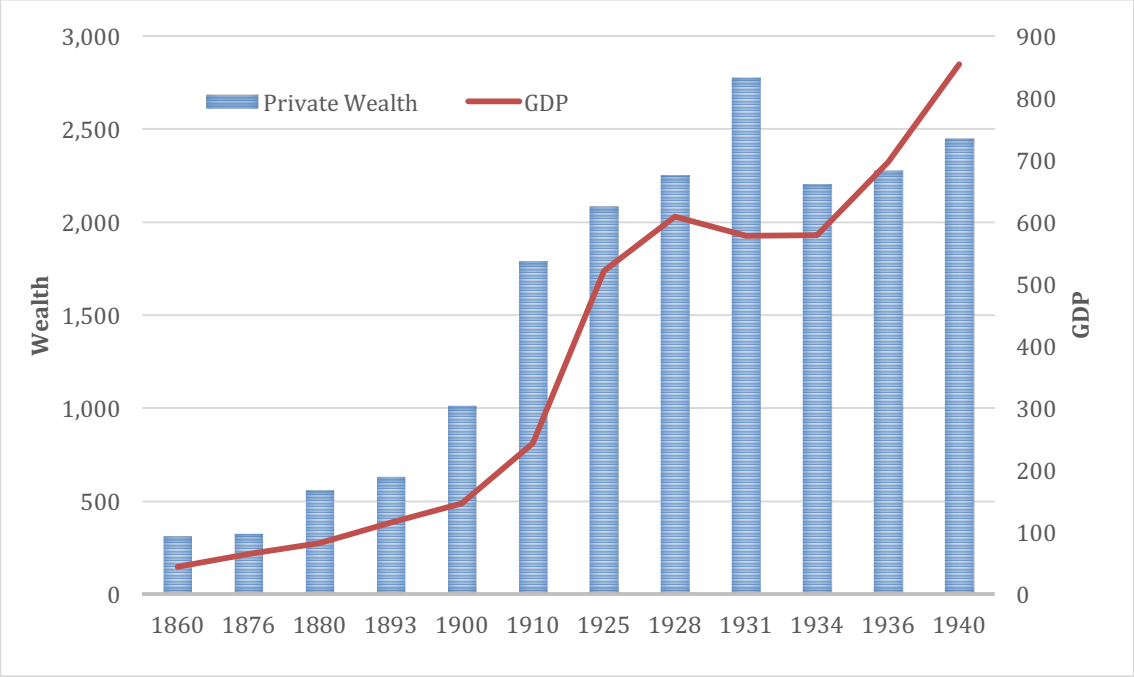
Original classification Ochoa (1948)	Classification to match Piketty's criteria
Moneda metálica	Other assets
Capital industrial y commercial	Other assets
Capital commercial	Other assets
Capital industrial	Other assets
Stock comercial e instalaciones	Other assets
Instalaciones industrials	Other assets
Productos Agrícolas	Agricultural assets
Maquinarias e implementos agrícolas	Agricultural assets
Metálico Plata y Vellón	Other assets
Otros Bienes	Other assets

SOURCE: own elaboration based on Ochoa (1948) and Piketty and Zucman (2014)

In fact, information refers to gross wealth. Net wealth was obtained subtracting liabilities from gross wealth. Following Piketty and Zucman (2014) and Waldenström (2017), we estimate and deduct from land and housing wealth the mortgage debts. Information about total liabilities is scarce and we make our calculations on a rough estimation corresponding to 1892. Barrán and Nahum (1971, p.493) declares that in 1892, at least a 20 per cent of total real estate was mortgaged and we take this value as our initial reference. Statistical Yearbooks (1909-1910, 1928, 1936 and 1940) inform about mortgages annual constitution and cancellation for 1887-1940 and 1900-1940, respectively. According to Barrán and Nahum (1971) the mortgage debts entailed a liability that can be considered close to commercial credits, so we use the evolution of these transactions (Bonino, Román, et al. 2012) to estimate the total series of constituted mortgages for the missing period (1870-1886). We use the –relative high– linear correlation between

constituted and cancelled mortgages in 1900-1930[4] to estimate the cancellations for 1870-1899.

Figure 1 - Uruguayan Total Private Wealth and National Income (in current million Uruguayan pesos)



SOURCE: own estimation based on Ochoa (1948) and Bonino, Román et al. (2012).

In Figure 1 we represent the evolution of the total private wealth and National Income in current prices between 1860 and 1940. We correct the GDP estimation of Bonino, Román et al. (2012) with recent estimations of net foreign factors in order to work with National Income estimations.[5] The relation between both variables is high[6] although the increasing in the GDP is significant higher than wealth (from 1860 to 1940 the wealth multiply by 7 and GDP by 19). Despite its

4 The lineal coefficient between both types of transaction is 0.83 previously to the Great Depression and it reduces to 0.72 in 1900-1940.

5 Thanks to PhD (candidate) Gaston Diaz for sharing generously his data with us.

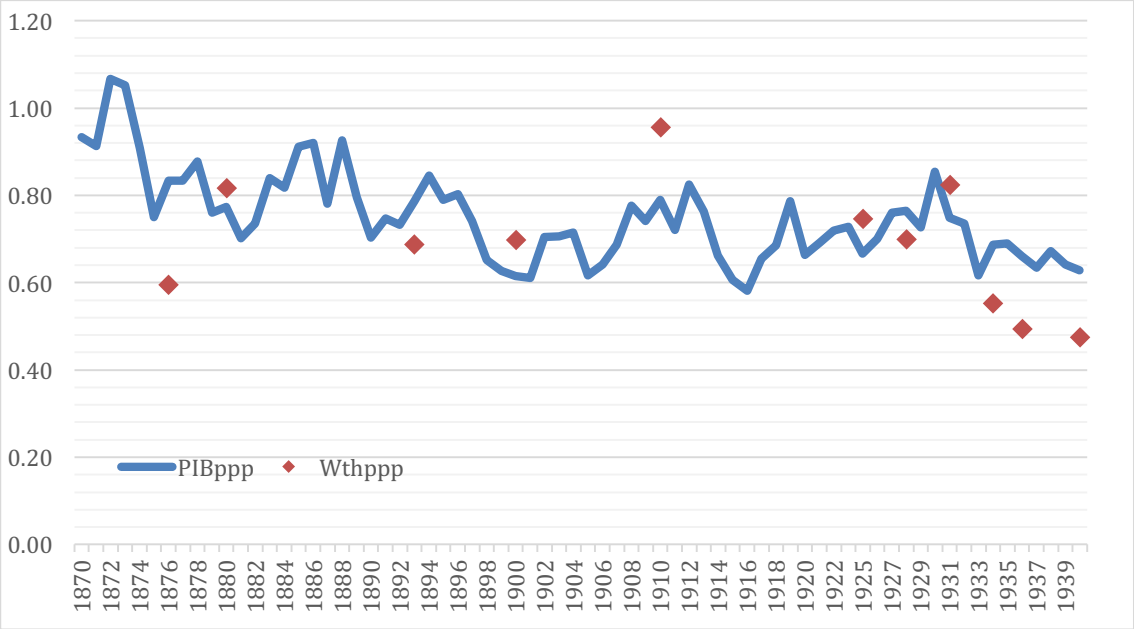
6 Lineal correlation: 0.92

variability, wealth accumulation –in current terms– was persistent throughout the period. Total wealth shows an increasing performance over the period until the crisis of the 1930s (Figure 1), and contrary to the central economies, the WWI seem to have not stopped the accumulation process, but only slowed it down.

5. Some comparisons and stylized facts

In comparative terms, and as we expected, the evolution of the wealth per capita exhibits a similar trajectory to that shown by the relative income per capita (Figure 2).

Figure 2 - Wealth Per Capita Gap and Income Per Capita Gap. Uruguay vs the Core. PPP 1990 International Dollars



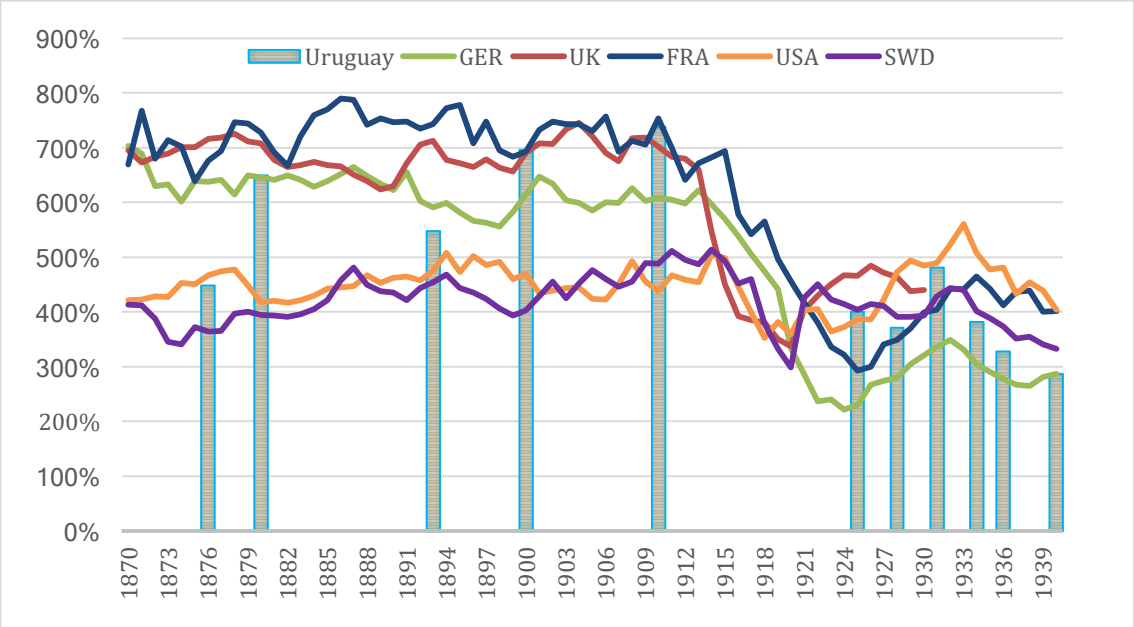
SOURCE: own estimation based on Piketty and Zucman (2014), Ochoa (1948), Maddison Proyect (2013) and Bonino, Román et al (2012).

Time comparisons of the monetary values between countries require expressing the variables in terms of purchasing power parity (PPP). These adjustments are available for GDP (Maddison, 2009; Bolt and Van Zanden, 2013), which is how our income are measured, but the adjustments are not available for wealth. Then we propose a shortcut, which is not exempt from problems, but allows for carrying out several exercises which give robustness to our estimates. We assume that the PPP and volume corrections used to GDP pc are applicable to wealth.

Wealth and income per capita gaps in respect to the core of the world economy – the average of the US, UK, Germany and France–, evolve similarly from the 1870s to WWII with some discrepancies that reveal some evidence of overreaction. In 1910 the ratio almost achieves the unity, and it coincides with an episode of significant improvement in the income gap —1912 is relative maximum in the evolution of this series— which demonstrates that they are some correlated process. The comparison between levels is another interesting stylized fact. As we mention previously, in the beginning of the 20th century, Uruguay integrated the "club" of non-European countries which can be classified as developed, and our evidence would confirm this insight. In terms of income, the average disparity between Uruguay and the world core is 0.25 and the comparison, in terms of wealth pc, broaden the gap to 0.31.

Figure 3 presents the evolution of the Uruguayan wealth-income ratio. The available years' data are presented for Uruguay and we also include the series for the US, UK, Germany, France and Sweden in order to compare levels and trajectories.

Figure 3 - Wealth-Income ratios in Uruguay and Other Countries. 1876-1940. Selected Years



SOURCE: own estimation based on Piketty and Zucman (2014), Waldenström (2017), Ochoa (1948); Bonino et al. (2012).

The Uruguayan ratio shows a trajectory consistent with the historical evolution of its economy during the First Globalization period (1870-1913). The increasing trend is the result of a society with a growing "capitalization" of the economy, functioning to exploit idle resources and to increasingly participation in the international commodity markets.[7] The trend shows the characteristic evolution of a growing economy dealing with the forces of globalization, which implies a positive stimulus but also negative shocks. An evidence of the last factor was the financial crisis of 1890 which had special adverse consequences in the River Plate (Flores, 2011). The Baring crisis of 1890 is one of the world's most famous financial crises of the last 200 years. The crisis is well known because the Bank of England put together a rescue fund to save the House of Baring. The investment banking

7 In the sense of the "staple theory" (Innis, 1930, 1940).

firm was in financial trouble as it was the primary debt issuer in Argentina, which was experiencing an economic and financial downturn (Weidenmier 2009). The adverse consequences arrive immediately to Uruguay, a country with similar economic conditions than Argentina, and the most severe expression was the bankruptcy of the Banco Nacional in 1891 (Millot and Bertino 1996). Therefore, it is highly probable that the fall in the ratio during the 1890s was associated with real capital losses in the course of that period.

The β levels of Uruguay are comparable with those of the European countries, which support our initial hypothesis, and it is mainly based on agricultural wealth. Uruguay presented a livestock wealth between the highest in the world. According to the Yearbook of 1907-1908, Uruguay was in the ninth and sixth positions in world rankings in terms of cattle and sheep production respectively, and leading both rankings if we consider it in per capita terms.

The 1920s represent a true breakdown in the long-run evolution of the ratio, similar to the European countries of the core, and that aligns the evolution of the indicator with that of US and Sweden's ratio. The years after WWI in Uruguay were characterized by a rough confrontation between those political forces that promoted structural changes in the economy (*Batllismo*) and the conservative forces that defended the status quo, especially agrarian groups related to livestock production (Barrán and Nahum 1987; Caetano 1991, 1992).

The *Batllismo* meant a foundational inflection point in the Uruguayan history in terms of social reforms, however the results in terms of economic reforms were absolutely different. On the one hand, the successful nationalization and state owner policy constituted the most notable legacy of the *Batllismo*. On the other hand, the productive diversification was only a partial (and marginal) process,

and livestock continued to be the main activity of the economy in terms of production and exports (Bertino, Bertoni, et al. 2005). In other terms, the society would have created a social system that the economy could not support (as it is insinuated in Azar, Bertino, et al. 2009, Bértola 2000 and Filguiera 1995). We will come back on this argument in the next section. [8]

In spite of the similar levels of β of Uruguay respect to core countries, the differences in terms of development levels are clearer when we consider the evolution of wealth in terms of composition (Figure 4). If we analyze the evolution of wealth by its components we can see that Uruguay has some distinctive elements in respect to those found by Piketty and Zucman (2014) for the central economies.

First, land has a greater weight in the total asset composition than in other economies, and did not lose primacy as the main source of wealth during the period as Piketty (2014) found as occurring in the core economies. In the Uruguayan case, we show separately the land component and the agricultural assets. Both components together represent almost 50% of the country's wealth, except in 1931 reaching its lowest peak at 41%. This finding creates a breeding ground for our hypothesis (iv).

8 Also, in accordance with this argument, Bertino et al (2005, p.417) express: "... the viability of the strategy depended on its ability to generate a genuine basis of supporting and reproduction. Despite the transformations in the Uruguayan economy in the first three decades of the 20th century, the accumulation regime of the end of the 19th century was maintained. Even without considering the political and social restrictions, it can be assert that if the system reproduction was still based on the performance of the primary export sector, the viability of the strategy was questioned." (own translation)

Figure 4. The Changing Nature of National Wealth, US, UK, Germany, France, Sweden and Uruguay 1860-1940

SOURCE: own estimation based on Piketty and Zucman (2014), Waldenström (2017), Ochoa (1948), Bonino et al (2012).

Secondly, the country's wealth, like other macro magnitudes (Román and Vázquez, 2013) seems to have a higher volatility than either the core countries or other countries in the European periphery such as Sweden. This is one of the structural features of the economy that, probably, had caused most harmful effects on the economic performance (Bértola and Bittencourt 2005).

6. Decomposition of wealth accumulation

Following Piketty and Zucman (2014), we decompose the evolution of the wealth-income ratio into two multiplicative components (volume and relative price effects) using the following accounting equation:

$$\beta_{nt+1} = \frac{(1+g_{wst})(1+q_t)}{(1+g_t)}\beta_{nt} \quad (1)$$

Where:

$(1 + g_{wst}) = 1 + \frac{s_t}{\beta_{nt}}$: saving-induced wealth growth rate. (2)

$(1 + q_t)$: capital-gains-induced wealth growth rate (3)

$(1 + g_t) = \frac{Y_{t+1}}{Y_t}$: growth rate of national income. (4)

From (1), we can deduce an expression for the growth rate of wealth:

$$\frac{\beta_{nt+1}}{\beta_{nt}} = \frac{(1+g_{wst})(1+q_t)}{(1+g_t)} \quad (5)$$

$$\frac{\frac{K_{t+1}}{Y_{t+1}}}{\frac{K_t}{Y_t}} = \frac{(1+g_{wst})(1+q_t)}{(1+g_t)} \quad (6)$$

$$(1 + g_k) = (1 + g_{wst})(1 + q_t) \quad (7)$$

And, considering the equation (2),[9] we can re-write equation (7) as follows:

$$(1 + g_k) = \left(1 + \frac{s_t}{\beta_{nt}}\right)(1 + q_t) \qquad (8)$$

With this equation we can calculate the different incidence of volume (*s-effect*) and price effect (*q-effect*) on total real wealth and, according to the historical accuracy of the evolutions, we can give robustness to our data. We require several new estimates to advance in this direction. The real growth rate of private wealth derives from the wealth series expressed in constant prices. We consider the four economic aggregates used as reference in the analysis of the evolution of the composition of wealth (Figure 4). Index numbers with a similar nature of the kind of the assets were used to deflate current values. In this sense, we use a Land Price Index (Bértola, Camou, et al. 1999) for agricultural land and the implicit deflators of Agriculture, Construction and total GDP (Bonino, Román, et al. 2012) for agricultural assets, housing and other assets, respectively.

We also need an estimation of private saving rates. We follow the proposal of Piketty and Zucman (2014) who consider the net-of-depreciation national saving rates and define it as the ratio between savings and national income (both corresponding to private agents). For saving calculation, we take advantage of a recent estimation of historical national accounts calculated according to the expenditure method (Román 2017), who offers consumption and depreciation estimates (based on Román and Willebald 2015). The evolutions of rates and our results are presented in Figure 5 and Table 3.

9 As is well known, the $\beta = s/g$ formula was initially derived by Harrod (1939) and Domar (1947) using fixed coefficient production functions. In this model, β is completely given by technology, hence the knife-edge conclusions about growth. The derivation of the formula with a flexible production function Y=F(K,L), that includes capital-labor substitution and then β results endogenous and a balanced growth is possible, is due to Solow (1956).

Table 3. Accumulation of Private Wealth in Uruguay, 1876-1940

	Market-value private wealth- income ratios (%)		Real growth rate of national wealth (%)	Savings-induced wealth growth rate (%)	Capital gains–induced wealth growth rate (%)
	β_t	β_{t+n}	g_w	$g_{ws} = s/\beta$	Q
1876-1880	449	649	16,7	2,1	14,2
1880-1893	649	548	-4,9	2,5	-7,2
1893-1900	548	696	7,2	0,3	6,9
1900-1910	696	739	0,8	-0,2	1,0
1910-1925	739	401	-2,3	1,6	-3,9
1925-1928	401	371	6,3	0,5	5,8
1928-1931	371	482	2,6	1,1	1,5
1931-1934	482	382	-3,1	-1,1	-2,1
1934-1936	382	327	4,3	-0,1	4,4
1936-1940	327	287	-2,9	1,5	-4,4
1876-1910	449	739	1,6	1,3	0,3
1910-1940	739	287	-0,7	0,3	-1,0
1876-1940	449	287	0,5	0,8	-0,3

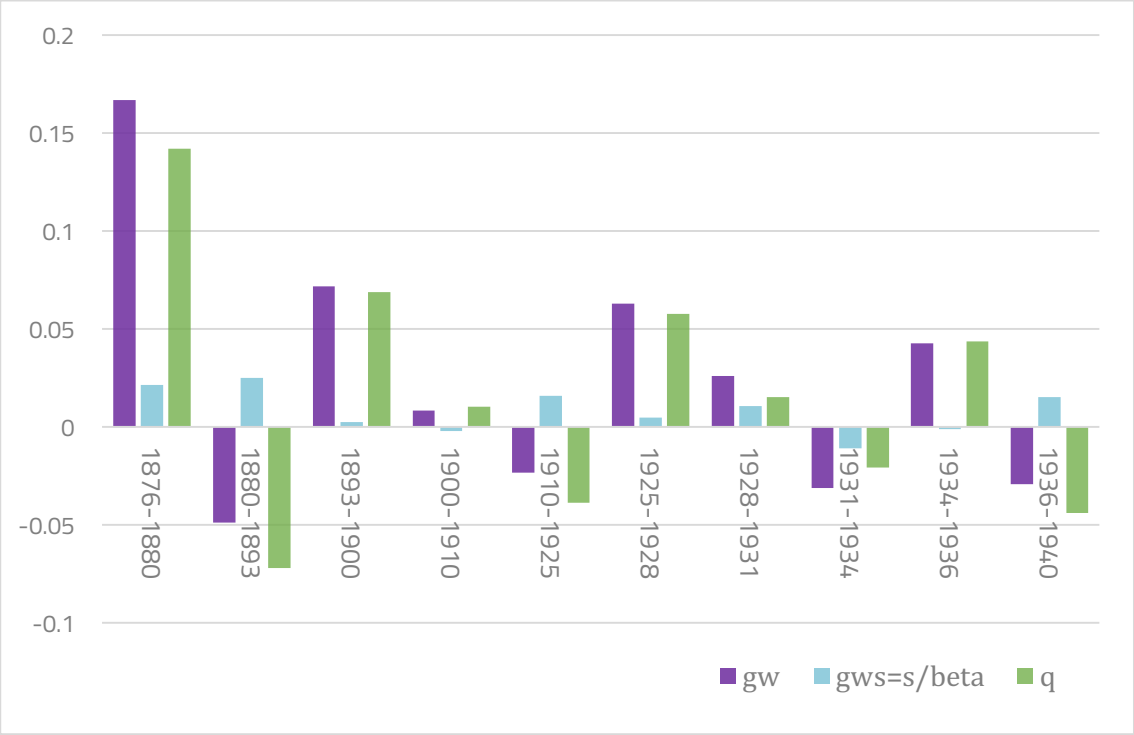
SOURCE: own estimation.

Periods with different extensions were considered and the variations were expressed as percentages in annual terms. Several comments derive from this analysis.

First, the periods when wealth decreased (1880-1893, 1910-1925, 1931-1934 and 1936-1940) coincide with important q-effects which denotes the adjustments of prices. Considering the first period, all explanations of the 1890 crisis (Ciganda 1891, Nahum 2011) insist on the strong speculative process that preceded the crash of the Banco Nacional. The price correction that represents the severe decline in the q- effect reflects the adjustment of the assets values after a period characterized by a financial –and especially real estate– bubble. The adverse evolution in the period 1910-1925 opens several conjectures. According to these results, Uruguay evidenced the destruction of wealth from 1910 –previous to the WWI– to mid-1920s as consequence of losses caused for an adverse evolution of

the relative prices. The 1920s are a transition period between an economic model based on agrarian exports (Bértola 2008) to another pattern founded on import substitution industrialization (ISI) process (Arnabal, Bertino, et al. 2013) and an active participation of the state in the economy.[10] The 1920s meant, in facts, an undefined period in terms of productive specialization that combined the weakening of the agro-export model prevailing previous to the WWI and the incipient ISI process.[11]

Figure 5 - Accumulation of Private Wealth in Uruguay, 1876-1940 (annual percentage rates)



SOURCE: own estimation.

10 Bértola and Ocampo (2010) name these decades as a state-led industrialization period.
11 The impact of the WWI in the Uruguayan economy is an open discussion topic. "How rich we were when we were rich?" (Bértola 2000) debates about the positive or negative effects of the conflict on the economy. Our evidence would confirm the negative consequences of WWI on wealth accumulation and we will deal with this question on the next steps of our research.

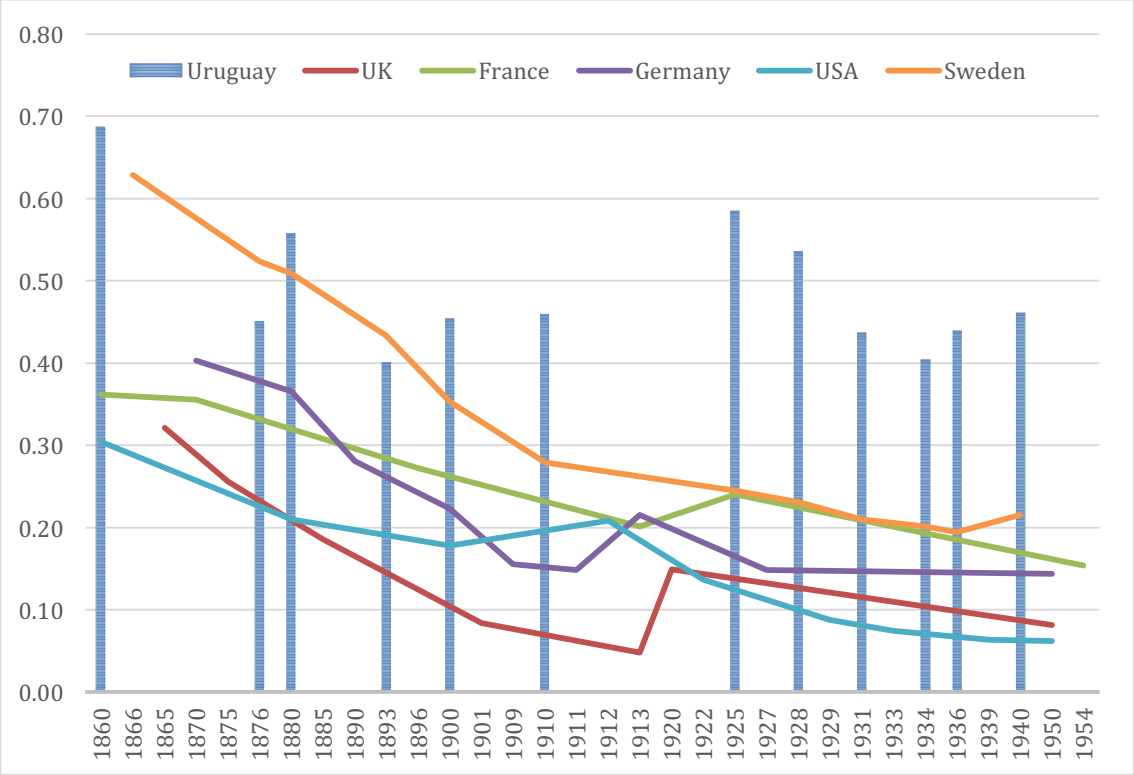
Second, considering the fall of wealth related to volume effect (s-effect), it was during the Great Depression when this evolution was more notorious (the other cases corresponded to marginal declines). The negative rate reflected consequences of external and internal character. On the one hand, clearly the depression of the period meant wealth damage with deep consequences in business and personal patrimonies (Jacob 1981). On the other hand, the five previous years corresponded to a period with important asset liquidation in the livestock activities (Bertino, Bertoni, et al. 2005) (especially in the beef production), which meant real capital damage (see Figure 4). However, our arguments are not exempt from criticism.

Theoretically, we use instruments adequate for the long-run analysis but our discussion is focused on a short period. Considering the whole period (1876-1940), the real total private wealth has maintained a low growth rate –it increased an annual 0.5 per cent– and this was induced exclusively for the saving rate –almost 1 per cent– because the relative price effect was negative (-0.3 per cent). In the Uruguayan historiography the WWI constitutes a watershed in terms of economic development and our estimates would confirm the same pattern. As the real wealth increased previously to the WWI –from 1876 to 1910 it rose an annual rate of 1.6 per cent–, after the war the real wealth decreased (-0.7 per cent annually). This change was explained by a strong slowing-down of the saving-induced wealth growth rate (with a reduction of one percent point from 1.3 to 0.3) and negative price effect of 1 per cent.

These changes, with clear consequences in the fall of the β coefficient after the WWI, were associated with the difficulties of the economy to promote economic structural changes. The transition from a development model based on the agrarian production to another model –which was still not consolidated and

should involve a changing in the wealth creation from land to other asset modalities– evidenced severe costs to the economy in terms of wealth and saving. In Figure 6 we confirm this restriction represented by the delay in the change of wealth composition compared with the core economies.

Figure 6 – Evolution of the Agricultural Land Assets as a percentage of the Private Wealth. Selected Countries (1860-1940).



SOURCE: own estimation based on Piketty and Zucman (2014), Waldenström (2017), Ochoa (1948).

As core economies reduced, almost continuously, the share of agricultural land assets on private wealth Uruguay maintained high ratios during the whole period. In other words, in spite of evidencing high restrictions and the existence of multiples expressions from experts and policy makers about the necessity to

change the growth strategy, even in the 1930s, the main wealth factor was the land and agricultural assets.

7. Wealth accumulation and capital shares

Following Piketty and Zucman (2014), in this section we attempt a brief look at the implications of our new data on capital for understanding the evolution of factor

shares and the shape of the production function. The results should be taken with caution, because measuring factor shares are preliminary estimations.

We can define the capital share as,

$$\alpha_t = \frac{B_t}{Y_t} = r_t . \frac{K_t}{Y_t} = r_t \beta_t$$

Where B_t represents the non-wage incomes (benefits include profits, land rents, interests) and r_t is the rate of return to capital.

At the moment, only four estimates of capital shares for the whole economy are available (Siniscalchi and Willebald 2017) corresponding to 1908, 1919, 1936 and 1945 (Table 4).

Table 4. Capital Shares and Capital Returns Rate. Uruguay 1910-1940.

	Ratio (non-wage income) / (national income) **α**=Bt/Yt	r=**β/α**
1910	68.19	7.01
1925	67.31	13.27
1928	66.47	14.17
1931	65.65	11.39
1934	64.83	13.90
1936	64.29	16.10
1940	63.74	18.94

SOURCE: own estimation.

The capital shares maintained stable during the first decades of the 20th century and as the capital-output decreased the results is an increasing of the capital return rate from 7 per cent in 1910 to 19 per cent in 1940. Under conditions of a low elasticity of substitution between capital and labour[12], the decrease in β_t represents a capital relative scarcity which, in consequence, increase revenues. This process is represented by the increasing movements in the rate of return to capital[13]. The coherence of our results considering data from diverse sources reinforce our estimates of total wealth.

8. Conclusion

We present a wealth estimation for selected years available from 1860s to 1940 for Uruguay. We obtain levels of β coefficients which evolve in a similar trajectory to those evidenced by the core European countries. In terms of relative development, our findings replicate the results derived from considering the

12 As happend in standard two-factor CES production function F(K, L) with an elasticity of substitution σ <1

13 The return of land and agricultural assets it is probably leading this process.

evolution of GDP pc. That is, the per capita wealth gap between Uruguay and the world core countries evolved and presented similar levels than those showed by the income-gap (Figure 2 and 3). In spite of presenting high levels of wealth as a percentage of GDP in the international comparison, the composition of this wealth rested, in the case of Uruguay, mainly in fixed assets –land and agricultural assets- and this composition showed a stable pattern during the period of analysis (Figure 4).

Our findings of similar cycles, compared to the European economies, of the wealth-income ratio variations after the WWI in a peripheral economy like Uruguay would indicate that prices are a powerful transmission channel in the de-cumulation of wealth, even in those economies whose wealth composition is based mainly on fixed assets such as land (Figure 4 and 5).

The main result of this research can be summarized as follows: we found a similar pattern of wealth constriction after WWI than those found in the European and US economies by Piketty and Zucman (2014) and Walderstorm (2017). The developing of the Uruguayan economy during the period led us to conclude that the transition between the agrarian based model of development, predominant in the 19th century, to the import substitution model, from the 1930s onward, had severe costs regarding wealth and savings. The wealth structure could amplify this result since fixed assets –mainly land and agricultural assets– were the patrimonial base of the accumulation since the 19th century.

Those findings open an interesting agenda of investigation to reconsider the role of the state intervention during the first half of the 20th century in Uruguay and the extent of the Batllista's reforms, which implies to review the connections between wealth and income distribution in the period.

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