FCEA FACULTAD DE CIENCIAS ECONÓMICAS Y DE ADMINISTRACIÓN | IECON INSTITUTO DE ECONOMÍA | UNIVERSIDAD DE LA REPÚBLICA URUGUAY

Structural change in a small natural resource intensive economy. Switching between diversification and reprimarization.
APPENDIX

Carolina Román
Henry Willebald

INSTITUTO DE ECONOMÍA
Serie Documentos de Trabajo

Diciembre,2019
DT 31/2019

ISSN: 1510-9305 (en papel)
ISSN: 1688-5090 (en línea)

We thank the participants at Seminario de Investigación, PHES, FCS, UdelaR (Sep. 2012) and IV Jornadas Académicas, FCEA, UdelaR (Aug. 2013) and, in particular, Reto Bertoni, María Camou and Andrés Rius for their comments. Previous versions of this paper involved Nicolás Bonino-Gayoso; note our appreciation for his contributions. Maximiliano Presa provided excellent research assistance for the econometric exercises. We are solely responsible for any remaining errors.

Forma de citación sugerida para este documento: Román, C. Willebald, H. (2019) "Structural change in a small natural resource intensive economy. Switching between diversification and reprimarization". Serie Documentos de Trabajo, DT 31/2019. Instituto de Economía, Facultad de Ciencias Económicas y Administración, Universidad de la República, Uruguay.

Appendix

Appendix 1. Sources and estimation

A1.1 Data sources

At current prices, for Manufacturing, Construction, Utilities, and Transport, we used the unpublished information kindly provided by Luis Bértola to cover the period 1900-1955 and Bértola (1998) to fill the period back to 1870. For Agriculture, we used Bértola (1998) between 1870 and 1936. The reason behind this decision is that using Bertola's new estimates for the 1900-1936 period produced very low levels for the primary sector, a result that is not consistent with the relevance of the agro-export model of Uruguay during the late 19th century. The agricultural series corresponding to 1870-1936 presented in Bértola (1998) has been extensively used in the national historiography (Moraes, 2001; Araujo et al., 2015) and validated by the local scholars. For Communications, we developed new estimates for the 19th century, as there was no information available to analyse this sector (see the next section, "A1.2 Own estimates" for the details).

For the case of Government, we combined several sources. First, we took the calculations of value added (total wages plus property rentals) of the public administration developed by Siniscalchi & Willebald (2019) –data provided by the authors– for 1908, 1919, 1936 and 1955. Second, to fill in missing information we interpolated –and rescaled– with estimates of the Government value added provided by Bertino & Tajam (1999) for 1900-1955 and by Bértola (1998) to go back as far as 1870.

At constant prices, the information for Agriculture, Manufacturing, Construction, Utilities and Transport corresponding to 1870-1955 is from Bértola (2016), with minor exceptions. For 1870-1874 the author does not provide figures for Transport and Utilities. Therefore, we used Bértola (1998) to complete the information for Transport, and we projected backward the levels of Utilities to fill 1870-1874 (calculating three-year moving average instead of taking the level of 1875).

For Communications, we used Bértola (2016) for 1900-1955, and provide new estimates for the previous period (see the next section for the details). Finally, for the case of Government, we used the evolution of the number of civil servants updated by Siniscalchi & Willebald (2019) based on data developed by Azar et al. (2009).[1] Then, to

[1] We are grateful to Sabrina Siniscalchi for sharing her unpublished calculations with us (related to her PhD Thesis).

complete the 19th century we rely on data provided by Millot & Bertino (1996) and data provided by Camilo Martínez[2] on civil servants and fill the gaps with linear interpolations.

A1.2. Own estimates

A1.2.1 Fishing and sea hunting

This division includes fishing on a commercial basis in the ocean, coastal or inland waters, and hunting and trapping for commercial use (exclusively sea mammals such as seals and sea lions). Information about the sector value added is available for 1936 and 1930 (Industrial Census of 1930 and 1936).[3] We calculate the evolution of this activity to obtain the change in the production in 1936-1955 and 1930-1936 –rescaling values– and 1870-1930 –with the retropolation methodology. This is how we estimate the output of the sector.

We start with fishing. Information about fish harvest is available for 1935-1942 and from 1950 onwards (Marin, 2016, and data provided by the author) and for the rest of the period we assume a constant rate of per capita consumption in the cities (2 kg over 1943-1949 and 2.8 kg prior to 1935)[4] (population from Nathan, 2014; Pellegrino, n/d, and percentage of urban population from Klein Goldewijk & Van Drecht, 2006). With this information and the output, we calculate the unit value for 1955, 1936 and 1930. We obtain retail prices (per kg.; we consider sea bass and hake) for 1955, 1931-1940 (Dirección General de Estadística, 1940), 1920 (Nahum, 1993, p. 205), 1915, 1913 (Boletín de la Oficina de Trabajo, 1915, 1913) and 1910 (Bouyat, 1911). Intermediate years are interpolated and re-scaled using changes in a Food Price Index (1914-1955) (Nahum, 2007; Instituto de Economía, 1969, p. 93) and reptropolated with a Consumption Price Index (Bértola et al., 1999). The constant price series are developed using the evolution of the fish catch.

Next, we consider commercial hunting and trapping of seals and sea lions. Information about the value of production (skins and oil) is available from 1910 to 1943 (SOYP, 1943). Completing the rest of the period requires the use of information about prices and the number of animals captured.

[2] We are grateful to Camilo Martínez by sharing his unpublished calculations with us (related to his Master's Thesis).
[3] Data corresponding to 1930 is presented in the Industrial Census of 1936.
[4] Bertullo (1959).

The number of seals captured is available, yearly, from 1873 to 1900 and 1910-1941, is aggregate for 1943-1947 and yearly from 1950 onwards (Ponce de Leon, 2000). For 1901-1909, the production was marginal and we assume it equal to zero. For 1943-1947, we propose an exercise to distribute the data among years respecting the trend of the series and the total data of the period. Information about the accumulated value of production and total seal harvest in 1873-1888 is used to establish an average price for the period. The rest of the years are interpolated and re-scaled according to the evolution of fish prices. The constant price series are developed using the evolution of the total number of seals captured.

The sum of the two activities is the entire sector (in current and constant prices).

A1.2.2 Mining

Historically, mining and quarrying was a marginal economic activity in Uruguay. It has included the extraction of minerals occurring naturally as solids, like iron, peat, mining of non-ferrous metal ores (copper, lead, zinc), precious metals (gold, silver), stone, sand and clay, granite and marble. However, it was not until 1983 when the National Account System disaggregated the value added of the activity as a particular sector; previously all statistics included the activity in other sectors considered as of similar nature. As the majority of the mineral products of Uruguay are materials for construction, it has been assumed that the production units are to an extent, or in some manner, vertically integrated and so mining has been classified under manufacturing; this is typically manufactured of non-metallic mineral products or materials for the construction industry. We took advantage of this decision to work backward from the level of 1983, but including some adjustments using other sources.

The value added of mining and manufacturing of 1936 is available (data from Industrial Census) and the total wages of both sectors of 1908 (Siniscalchi, 2019). We used the corresponding ratios to estimate the levels of mining value added according to our previous estimates of manufacturing GDP.[5] Therefore, we have levels for the value added of mining for 1983, 1936 and 1908 and we linked them with the trajectory of the value added of materials of construction (1970-1982; BCU, 1989, p. 6), non-metallic minerals (1955-1969; BCU, 1973, p. 11), non-metallic minerals (excluding glass) (1900-1954; Bertino & Tajam, 1999; applied re-scaling using figures from 1908 and 1936) and

[5] We assume that the relation between total wages is a good proxy of the relation between values-added.

materials for construction (1872-1899; Bértola, 1998; 1870-1871: we used the same level as 1872).

In the last decades of the 19th century, there were significant local expectations about gold extraction (see, e.g., Anuario Estadístico, 1890, p. 612) and the activity received the attention of several international investors (Macmillan, 1930) and official authorities (El Libro del Centenario, 1925). The extraction was significant until WWI, and this justifies including this production in our calculations. Stastitical Yearbook (1915) presents information about the production (in kg) and sales (in pesos) of gold from the main mines of Uruguay from 1885 to 1913. As we know the total wages paid by the gold mines in 1908 and that, in general, these businesses never resulted in large gains for the investors (Acevedo, 1934, p. 472), we can estimate the total value added by increasing total wages by a replacement rate of 10%. Based on this assumption, we calculated each year's value added as 47% of the total sales of gold and used this relation from 1885 to 1908 (after this period, the extraction of gold declined severely).

Then, we count with two indicators: the production of non-metallic minerals (or similar to them) (1870-1983) and the extraction of gold (1883-1908). From 1909 onwards, changes in the magnitude of mining are measured by variations in the first one and, previously, we use the evolution of both indicators (with weights of 70% and 30% respectively).[6]

The calculation in constant prices uses the same series, sources and criteria. For the non-metallic output, we used the evolution of the same industrial sectors in constant prices and, for the production of gold, we considered the volume of output of the activity (kg of gold).

A1.2.3 Communications

This division includes postal activities and telecommunications. We constructed an indicator for 1870-1899 consistent with that presented by Bertino & Tajam (1999) for 1900-1955. We considered measures of volume and price of the output of three services: postal, telephone and telegraph communications.

In the case of the postal service, we used an indicator of the evolution of the total value of services for posted letters (Arocena & Graciani, 1992). Information is available for

[6] With these weights we are sure that: (i) the gold production never exceeded the production of other minerals and (ii) the share of the value added of mining never exceeded 1% of the GDP. Both decisions are consistent with the history of the sector (Bauman, 2018).

1870-1873 and 1878-1900, and we filled in the data for 1874-1877 by linear interpolation. We used these series to calculate backward from the figure of 1900 (Bertino & Tajam, 1998) and obtain a series at constant prices. Sources for prices are scarce. The initial reference is the unit price of $0.039 per letter for 1900. We calculated this price as the ratio between the total production value of the postal service (Bertino & Tajam, 1998) and the letters sent. From secondary sources, we obtained unit prices for other three years (revenues of the postal service divided by the letters sent): $ 0.033 in 1890 (Mulhall & Mulhall, 1892, p. 598); $ 0.054 in 1895 (Mulhall & Mulhall, 1892, p. 598) and $ 0.1169 in 1872 (Mulhall & Mulhall, 1875, p. 330). To fill in the gaps, we calculated linear interpolation except for 1870-1871, where we maintained the level of 1872. We estimated the evolution of the gross value added (GVA) for the entire period using the number of letters sent by postal service and the prices.

In the case of the telegraph services, to calculate the evolution of output, we used the number of telegraph messages from 1882 to 1900 (Arocena & Graciani, 1992). We used the population growth (Nathan, 2014; Pellegrino, n/d) to complete the information, which is equivalent to assuming that the messages per capita were constant between 1870 and 1882. With this series, we projected backwards from the figure of 1900 and obtained the series at constant prices. From secondary sources, we obtained unit prices for several years. Prices are not available for Uruguay and we used the average price charged for telegrams among the Argentine provinces, which should represent a good proxy for the Uruguayan tariff (1873, 1877, 1878, 1883, 1886, 1899: Berthold, 1921, p. 15; 1875: Mulhall & Mulhall, 1875, p. 418).[7] To fill in the gaps, we calculated linear interpolations except for 1870-1874, where we maintain the level of 1875.

In the case of the telephone services, we used the information on the telephone subscribers of two telephone companies –Compañia Telefónica de Montevideo and Sociedad Cooperativa Telefónica Nacional– (Arocena & Graciani, 1992) available between 1886 and 1900. In the previous period, the activity was marginal.[8] We used the physical volume to project backward from the level of 1900 and obtained the series at constant prices. From secondary sources, we obtained an estimation of the revenues of the telephone service assuming that there was a uniform charge of $4 monthly per subscriber in 1892 (Mulhall & Mulhall, 1892, p. 598). We assume one subscriber per house, annualize the monthly cost and obtain a tariff of $ 0.048 (which is consistent with

[7] The original figure is expressed in gold pesos and is converted to Uruguayan pesos using the exchange rate presented in Bonino et al. (2015).
[8] Compañía Telefónica de Montevideo was founded in 1882 (Barachini, 1981, pp. 106-107).

the unit prices corresponding to 1900: 0.041 Uruguayan pesos).[9] We calculated, by linear interpolation, the prices corresponding to 1893-1899 and, for the previous period, we maintain the same price as for 1892.

We added these three gross value products (GVP) –respectively, in current and constant prices– and obtain the total value added of the ratio considering the same technical coefficient used by Bertino & Tajam (1999) (VA/GVP = 0.80 for current and constant prices).

A1.2.4 Financial intermediation

This division includes activities related to obtaining and redistributing funds, namely deposits, financial leasing and other granting of credit. Commercial banks and other financial intermediaries earn explicit commissions from the services they offer, but the majority of their incomes were derived from credit operations. Banks pay lenders a lower interest rate than they charge borrowers. The difference between interest rates (active minus passive rates) is the profit they obtain.

Therefore, we construct an indicator of the performance according to the evolution of the following relationship: $Output=C.i_a-D.i_p$

Where,

C: the total amount of loans.

D: the total amount of deposits.

i_a: the loan interest rate.

i_p: the deposit interest rate.

We retropolate the figure of the sector's value added of 1955 using the movement of this indicator to obtain annual data (we assume the relation VA/GVP maintained constant).

We used the deposits series presented in Díaz & Moreira (2017) which include short- and long-term transactions of private banks and Banco de la República Oriental del

[9] Current prices expressed in monetary values of 2005; remember that Uruguayan peso suffered several changes and, in facts, the Uruguayan pesos previous to the 1970s must be divided by 1 million for being comparable with the monetary values of the end of century. In this sense we talk about series in current prices expressed in *"pesos actuales"*.

Uruguay (BROU; a state bank) between 1929 and 1955. This series is linked with the deposits presented in Román (2012) –and data provided by the author– for 1870-1928 with a deposits series that also includes both types of deposits but considers fewer types of items (for instance, total deposits in 1929 was $176 million for Díaz & Moreira, 2017, and $146 million for Román, 2012). However, the evolution of the two series is very similar).

The information on loans is from Díaz & Moreira (2017) which considers loans from private banks and BROU to private and public agents from 1929 to 1966. This series is linked with the loans presented in Román (2012) for 1912-1928 that also includes both types of credit but only considers loans to private agents and not all the modalities (for instance, total loans in 1929 was $219 million for Díaz & Moreira, 2017, and $210 million for Román, 2012; however, again, evolutions are very similar). For 1900-1911, loans from BROU are available and Acevedo (1934), p. 330, provides loans of the financial system for 1903-1905. Then, we take the difference between total loans to private agents and total loans from BROU as being total loans by private banks for 1903-1905. We link the levels corresponding to private banks in 1905 and 1912 with the movement of BROU's credits, and arrived at both levels. From 1904 backward until 1900, we assume a constant rate of change of loans from BROU. Data for the 19th century is scarce and incomplete. We use information from measures of total loans (*deudores*) and deposits (*acreedores*) for 1871-1874 (Acevedo, 1933, p. 596, 731), 1883-1891 (Acevedo, 1934, p. 201) and calculate the ratio between them to obtain a coefficient to estimate total credits using the information on deposits. Coefficients for intermediate years –1875-1882, 1892-1899– are the result of linear interpolations.

Information about interest rates is incomplete and very heterogeneous because there are changes in terms and types of transactions. We propose the following approaches to fill this gap.

Initially, we combined information on the annual loan interest rates from BCU[10] (1999-2015), BCU Bulletins (1976-2001), Banda & Múgica (1976) (1955-1975) and Román (2012) (1898-1954). For the preceding period, we have two levels of interest rates –1882 (Acevedo, 1934, p. 321) and 1867 (Acevedo, 1923, p. 719)– and estimate annual rates from changes in interest rate yields on public debt provided by Gastón Díaz (1884-

[10] Series Estadísticas – Tasas de Interés: http://www.bcu.gub.uy/Servicios-Financieros-SSF/Paginas/Series-Estadisticas-Tasas.aspx (Retrieved April, 2016).

1897)[11] and Obstfeld & Taylor (1872-1883) (we maintain the level of 1872 to fill in the 1867-1871 period).

We adopted an approach similar to the previous one to calculate deposit interest rates. We combine information of three series from BCU (1998-2015), BCU Bulletins (1976-1997), Banda & Múgica (1976) (1952-1975) and Román (2009) (1921-1951). For the preceding period, we find three levels of interest rates –for 1905 and 1882 (Acevedo, 1934, p. 332, both adjusted by an interpolated spread between 1867 and 1921) and 1867 (Acevedo, 1923, p. 719)– and estimate annual rates using changes in interest rate yields on public debt provided by Gastón Díaz (1884-1914) and Obstfeld & Taylor (1872-1883, 1915-1920).

For the construction of the constant price series, we used the series of credits and deposits –which represent the volume of money that banks and financial intermediaries commercialize– and considered the corresponding interest rates –the "price of the money"– using 1913 as the base year. All credits and deposits were valued at these "prices" to obtain the values at constant prices.

A1.2.5 Wholesale and retail trade

In BROU (1965), this sector includes the intermediation for merchandise of industrial, agricultural and imported origin, corresponding to both wholesale and retail trade. Their output is measured by the value of the corresponding inputs and intermediation margins.

We use the same structure in current prices of the commercial value added –corresponding to 1955– to calculate the historical figures considering backward projections based on the same sectoral structure corresponding to Agriculture (26 percent) and Manufacturing (40 percent) as well as available estimates of total imports (29 percent; Román, 2017).

Analogously, we used the structure at constant prices of the commercial value added –corresponding to 1955– to calculate the historical figures consistently with the previous estimates of Agriculture (25 percent) and Manufacturing (49 percent) as well as available estimates of total imports (25 percent; Román, 2017).

[11] Data kindly provided by Gastón Díaz which will be presented as part of his forthcoming PhD thesis (Universidad de la República, Uruguay - University of Geneva, Switzerland).

A1.2.6 Real estate activities

This sector includes real estate activities with self-owned or leased property (buying, selling, renting and operating self-owned or leased real estate and the provision of homes and furnished or unfurnished flats or apartments for more permanent use, typically on a monthly or annual basis), and on a fee or contract basis (agents and brokers of intermediation, management and appraisal services for real estate).

The value added corresponds to the value of the housing services –self-provided or provided by other agents– minus the intermediate consumption. We estimated the value of housing services by applying average rent to the occupied dwellings. The intermediate consumption should be estimated according to the value of maintenance and repair expenditures in housing, insurances and rental administrative expenses, calculated assuming this component to be a constant share of the 1955 figures.

To obtain the values back to 1889, we use information on the rent of a one-room house for 1889 (Acevedo, 1933), 1908 (Housing's Census), 1914, 1937 and 1962 (Ministerio de Industrias, 1927; Ministerio de Industrias y Trabajo, 1946; Dirección General de Estadística y Censos, 1970). To fill the gaps, we used the evolution of the consumer price index (Bértola et al., 1999) and the housing price index (Nahum, 2007; Instituto de Economía, 1969) for 1889-1913 and 1914-1955, respectively, and re-scaling according to those levels. Information about occupied dwellings is from two sources: 1908 (Population Census); and 1910, 1920, 1930, 1940, 1950 (CIDE, 1967). To complete the series, we used changes in the population (Nathan, 2014; Pellegrino, n/d,). Finally, to obtain figures going back to 1870, we considered the household size (Population Census, 1908 and 1889, and linear interpolations to fill the gaps between the two) and population growth (for the rest of the period).

Calculations of the value added of the sector in constant prices consider the changes in aggregate occupied dwellings, and we assumed constant proportions relative to population size to project backward from 1955 with this indicator.

Education, health, social work, and other community, social and personal service activities

This heterogeneous sector includes private education, human health, veterinary activities, social work activities, sewage and refuse disposal, sanitation and similar activities, recreational, cultural and sporting activities and other services. Several of

these activities correspond to services provided collectively but which are consumed by individuals while benefitting society as a whole.

BROU (1965) includes five sub-sectors: (i) services consumed by households (private education, private medical and sanitary services and other services); (ii) services provided to business activities (legal advice and other technical advisory services, other commercial and professional services); (iii) recreational services (production, distribution and exhibition of films, theatres and other services); (iv) personal services (household domestic staff such as maids, cooks, waiters, valets, butlers, laundresses, hairdressing, photographic activities); (v) other services.

First, we used proxies for each type of service and we assumed constant proportions in the sector to project backward from 1955 to 1899. As several of these activities correspond to goods which are provided collectively and demanded by a large share of the population, we correct the indicators with the evolution of the urban population (Nathan, 2014; Pellegrino, n/d, and Klein Goldewijk & Van Drecht, 2006) and the evolution of wages (Bértola et al., 1999).

(i) Household spending in this category was approximated by services provided to households in private education (Labat et al., 2018). These figures were the result of considering the total number of students in private education and the average spending per public school student.

(ii) Services provided to business activities were approximated by the evolution of real estate transactions, assuming that related activities processed by public notaries can measure the changes in this sector. There is no information about the notary fees, but we assumed the fee was calculated as a percentage of the transaction and was relatively stable over time. Historically, notaries authenticated contracts and legal agreements of very varied type but real estate transactions were a very common activity, and we used them as a point of reference. The statistical yearbooks provide the number of registrations, properties, area (hectares) and value (in *pesos*) of sales and partitions (1915-1955), sales (1910-1914), and sales of buildings (1899-1914).

(iii) Recreational services were measured by the local taxes on public entertainment (theatres, cinemas, racecourses) in Montevideo (Consejo Departamental de Montevideo, Bulletin).

(iv) The evolution of personal services was approximated by laundresses and photographic activities. We have the output of these activities for 1955 and data of total

wages for 1955, 1936, 1919 and 1908. We used the 1955 share to weight the estimates for the earlier years. Then, we calculated annual data by interpolation and re-scaling between the figures. For this purpose, we calculated an indicator that combines the evolution of urban population and retail prices. We considered the urban population because it is reasonable to think that personal services depend on urban population growth; we used retail prices to measure changes in prices per unit.

Finally, we calculated other services as an increasing share of the sum of the previous estimations. In 1955, this item represented 13.3% and, in 1963, it represented 15.8%, which meant a yearly growth rate of 2.1%. We used this growth rate to estimate shares in earlier years and calculated the item as the remainder after considering other segments of the sector.

Second, to fill in the 1884-1899 period, we used information about the business license tax. Presa (2019) presents information about the number of business licenses (*patentes de giro*) and the corresponding taxes classified by economic activity and province for 1884-1890 and 1893-1899 (we obtained 1891 and 1892 by interpolation). We only considered those activities included in the sector and retropolated the previous estimate with this indicator.

Finally, we estimate the 1870-1884 series according to the urban population growth and the evolutions of wages, which represent the potential demand for these services.

We estimated the series at constant prices deflating the series at current prices by the Consumption Price Index (Bértola et al., 1999; Instituto Nacional de Estadística, webpage).

Appendix A2. Data.

A2.1 Total Value Added (Uruguayan pesos) and sectoral shares (in percentage), 1870-2017

	Current prices (uruguayan pesos)	Percentage of total value added												
	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1870	30	32.9	0.0	0.3	16.8	2.3	4.8	20.0	3.0	0.2	5.6	1.6	12.1	0.2
1871	33	36.1	0.0	0.3	15.3	2.2	3.7	20.1	3.1	0.2	5.0	1.0	12.9	0.3
1872	40	35.6	0.0	0.2	15.3	1.8	4.1	19.3	4.5	0.2	4.2	0.8	13.9	0.2
1873	44	37.6	0.1	0.2	12.3	1.6	3.7	18.4	4.8	0.2	3.4	1.8	15.6	0.2
1874	40	37.2	0.1	0.2	12.9	1.8	3.1	18.7	4.2	0.2	4.1	2.3	15.0	0.2
1875	37	32.8	0.1	0.2	14.3	1.9	3.9	18.3	4.7	0.2	7.0	2.6	13.7	0.2
1876	41	32.9	0.1	0.1	14.3	1.2	3.1	18.0	3.9	0.2	7.1	3.6	15.2	0.2
1877	43	33.3	0.1	0.1	15.8	1.1	2.6	18.5	3.7	0.2	7.0	3.1	14.3	0.2
1878	46	35.2	0.2	0.1	16.3	1.0	2.4	19.1	3.6	0.1	5.0	3.0	13.8	0.2
1879	44	35.4	0.2	0.1	16.2	1.1	2.8	19.5	3.6	0.1	3.7	3.3	13.8	0.2
1880	47	37.7	0.2	0.1	17.4	1.0	3.0	20.6	3.3	0.1	2.3	3.1	10.8	0.2
1881	45	37.2	0.2	0.2	17.1	1.1	3.3	20.7	3.8	0.1	2.3	3.3	10.6	0.2
1882	49	38.3	0.1	0.1	16.4	1.1	2.8	20.7	3.9	0.1	1.7	3.4	11.1	0.2
1883	58	37.7	0.1	0.2	16.3	1.0	3.8	20.6	4.4	0.1	0.9	3.6	11.1	0.2
1884	60	33.8	0.1	0.2	15.2	1.0	5.0	21.7	4.8	0.2	1.1	4.5	12.1	0.2
1885	65	29.5	0.1	0.8	16.0	1.0	10.4	22.2	4.3	0.2	1.2	4.0	9.8	0.4
1886	64	26.9	0.1	0.8	14.4	1.2	9.8	21.6	3.9	0.3	2.0	5.2	13.4	0.4
1887	58	24.1	0.1	0.6	15.4	1.5	8.1	22.5	5.2	0.4	3.0	6.0	12.6	0.4
1888	71	24.2	0.1	0.5	15.5	1.2	10.1	21.0	6.1	0.4	5.3	4.4	10.7	0.4
1889	77	23.0	0.1	0.4	17.3	1.2	8.7	21.3	4.9	0.3	5.3	4.5	12.5	0.5
1890	72	26.1	0.1	0.7	14.3	1.3	8.0	19.9	5.4	0.4	5.6	4.1	13.4	0.5
1891	70	28.5	0.1	0.5	16.3	1.5	4.8	19.6	5.0	0.4	6.4	3.9	12.4	0.5
1892	60	28.9	0.1	0.4	16.0	1.4	4.4	18.6	6.0	0.4	4.3	4.3	14.5	0.6
1893	65	32.5	0.1	0.3	15.5	1.5	3.4	18.2	6.2	0.4	4.5	3.5	13.4	0.5
1894	68	34.5	0.1	0.2	15.1	1.4	2.8	18.5	6.4	0.4	4.4	3.6	12.2	0.5
1895	68	32.3	0.1	0.2	16.3	1.3	4.0	18.6	6.4	0.5	3.7	4.0	12.1	0.5
1896	71	31.8	0.2	0.3	17.0	1.4	3.9	18.8	5.8	0.5	4.2	4.1	11.5	0.5
1897	76	34.2	0.1	0.3	15.3	1.9	3.2	18.6	5.4	0.5	5.5	3.8	10.9	0.3
1898	74	28.6	0.2	0.3	17.5	2.0	3.8	18.2	5.8	0.5	7.0	4.6	11.1	0.4
1899	82	33.0	0.1	0.3	15.1	1.9	3.9	17.4	5.5	0.5	6.0	4.0	11.9	0.4
1900	83	29.1	0.2	0.3	17.7	1.9	3.5	18.5	5.6	0.6	6.3	4.6	11.4	0.5
1901	83	28.6	0.1	0.3	17.3	1.9	4.1	18.5	5.6	0.6	5.5	5.1	11.9	0.5
1902	85	32.2	0.1	0.5	15.4	1.8	2.8	18.5	5.8	0.5	6.0	4.3	11.7	0.5
1903	91	30.2	0.1	0.5	17.3	1.7	4.6	17.8	5.9	0.5	5.4	4.7	10.9	0.5
1904	94	33.1	0.1	0.4	15.6	1.7	2.2	19.3	5.4	0.5	6.1	4.4	11.0	0.4
1905	97	29.6	0.1	0.4	17.0	1.7	2.6	19.4	6.2	0.5	6.0	5.1	10.7	0.6
1906	113	32.6	0.1	0.4	16.3	1.6	2.4	21.3	5.6	0.5	4.5	4.9	9.2	0.6
1907	125	31.7	0.1	0.5	16.8	1.6	2.8	22.2	5.8	0.5	3.3	4.5	9.7	0.5
1908	133	30.7	0.0	0.4	16.7	1.6	2.8	22.8	5.5	0.5	2.8	4.2	11.3	0.6
1909	140	32.3	0.0	0.2	15.7	1.4	2.9	22.5	5.9	0.4	2.4	4.4	11.2	0.6
1910	150	31.3	0.1	0.3	16.7	1.5	3.7	22.2	5.9	0.5	2.4	4.1	10.5	0.7

	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1911	149	31.0	0.1	0.3	15.9	1.7	4.3	21.3	6.6	0.5	2.5	4.3	10.7	0.8
1912	178	34.4	0.1	0.2	15.1	1.7	3.6	20.6	6.2	0.5	2.2	3.8	10.9	0.7
1913	199	33.8	0.0	0.1	14.3	1.7	5.2	18.3	5.9	0.5	2.5	3.8	13.0	0.6
1914	186	32.8	0.1	0.1	16.3	2.0	2.7	17.5	5.7	0.6	3.1	4.4	14.0	0.6
1915	198	37.4	0.0	0.1	15.0	1.9	1.6	17.2	4.7	0.6	3.1	4.4	13.4	0.6
1916	200	37.3	0.1	0.1	15.6	2.1	1.7	17.4	5.2	0.6	3.9	4.6	11.0	0.6
1917	254	40.9	0.0	0.0	15.0	1.8	1.2	18.3	4.5	0.6	3.3	3.8	10.1	0.5
1918	280	39.8	0.1	0.0	15.8	1.9	1.6	18.9	4.9	0.6	2.9	3.6	9.4	0.5
1919	325	42.8	0.1	0.1	12.9	1.8	1.7	19.2	5.0	0.6	3.3	3.2	8.7	0.6
1920	317	34.3	0.1	0.2	13.9	2.1	3.4	18.2	5.4	0.6	4.3	5.7	10.7	1.1
1921	290	28.1	0.1	0.1	15.5	2.5	3.4	18.2	5.9	0.8	4.6	6.6	13.0	1.3
1922	275	25.9	0.1	0.1	16.0	2.8	4.5	18.4	6.2	0.8	3.4	7.3	13.1	1.3
1923	301	27.0	0.1	0.2	15.7	2.6	4.6	18.5	6.3	0.8	3.8	7.1	12.1	1.2
1924	351	30.5	0.1	0.1	15.0	2.6	4.6	18.8	6.1	0.8	2.9	6.4	11.1	1.1
1925	350	28.6	0.1	0.1	15.5	2.8	4.9	18.7	6.6	0.8	3.1	6.8	10.7	1.2
1926	356	26.9	0.1	0.2	15.3	2.9	4.1	18.8	7.5	0.9	3.4	7.1	11.7	1.2
1927	392	25.0	0.1	0.2	16.7	2.8	5.3	18.8	7.6	0.8	2.7	6.7	12.0	1.2
1928	424	25.4	0.1	0.3	16.4	2.8	5.2	19.3	7.8	0.8	2.4	6.6	11.9	1.2
1929	426	23.6	0.1	0.2	16.5	3.0	5.5	19.0	8.6	0.9	2.3	6.8	12.1	1.4
1930	466	26.4	0.0	0.2	16.0	3.0	4.6	19.0	8.6	0.9	2.1	6.6	11.0	1.4
1931	405	20.8	0.1	0.2	16.7	3.9	4.7	18.0	10.2	1.2	1.6	8.0	13.0	1.7
1932	388	21.1	0.1	0.2	16.6	4.0	3.8	17.4	10.2	1.2	3.0	8.0	13.1	1.4
1933	354	20.8	0.1	0.1	15.6	4.3	3.8	16.3	10.4	1.3	3.5	8.2	14.1	1.6
1934	398	21.3	0.1	0.1	18.1	4.0	3.0	16.5	8.7	1.2	3.3	7.7	14.5	1.5
1935	430	22.7	0.1	0.1	16.5	3.9	3.6	16.3	8.5	1.2	3.1	7.5	15.1	1.6
1936	479	24.4	0.1	0.1	16.0	3.6	3.6	17.0	9.2	1.1	2.8	7.0	13.6	1.5
1937	541	22.9	0.0	0.1	16.6	3.4	4.3	17.2	8.8	1.3	2.9	7.4	13.5	1.7
1938	571	20.5	0.1	0.1	18.4	3.5	5.4	17.8	9.0	1.1	3.0	7.8	11.7	1.7
1939	601	20.8	0.0	0.1	17.5	3.6	5.7	17.4	8.7	1.1	2.9	9.2	11.0	1.9
1940	632	21.7	0.0	0.1	16.6	3.7	4.9	17.2	8.5	1.1	3.1	10.0	11.1	1.8
1941	702	22.2	0.0	0.1	18.6	3.6	5.1	16.6	7.9	1.1	2.6	10.0	10.1	1.9
1942	704	22.7	0.0	0.1	19.4	3.7	3.5	17.0	8.2	1.2	2.8	11.1	8.2	2.0
1943	721	20.9	0.0	0.1	19.3	3.7	3.8	16.7	9.4	1.2	2.1	12.2	8.4	2.3
1944	896	24.4	0.0	0.1	18.3	3.4	5.0	17.7	7.5	1.0	1.3	10.9	8.1	2.4
1945	1,027	20.4	0.0	0.1	19.1	3.3	6.7	18.1	7.3	0.9	2.7	10.6	8.2	2.6
1946	1,236	20.5	0.0	0.1	19.6	2.7	6.5	20.0	6.6	0.8	1.3	9.8	8.2	3.7
1947	1,454	20.5	0.0	0.1	19.4	2.5	7.7	19.9	7.0	0.7	1.4	9.3	7.4	4.1
1948	1,640	21.9	0.0	0.1	19.0	2.4	5.6	20.2	6.8	0.8	1.5	9.3	7.7	4.6
1949	1,934	23.1	0.0	0.1	19.0	2.1	5.2	19.3	6.8	0.7	1.7	9.7	7.9	4.4
1950	2,108	20.2	0.0	0.2	19.6	1.9	5.6	18.8	6.7	0.7	2.2	10.6	8.6	5.1
1951	2,574	19.5	0.0	0.1	19.5	1.7	6.2	18.2	7.3	0.6	3.2	9.6	8.5	5.4
1952	2,793	19.2	0.0	0.2	19.1	1.8	6.5	17.5	8.2	0.6	2.6	10.1	7.7	6.4
1953	3,212	18.4	0.0	0.2	19.4	1.6	5.6	17.0	7.8	0.6	3.3	10.6	8.1	7.6
1954	3,779	16.9	0.0	0.2	19.8	1.5	5.5	16.3	7.6	0.5	3.5	11.6	8.5	8.1
1955	4,109	15.5	0.0	0.2	19.2	1.5	5.5	15.2	7.5	0.8	3.9	11.8	8.9	9.9

	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1956	4,644	14.7	0.0	0.2	20.5	1.5	5.9	14.5	7.7	0.7	4.1	11.7	8.4	10.0
1957	5,618	14.8	0.0	0.2	20.0	1.5	5.4	16.5	7.5	0.8	4.0	10.9	9.2	9.1
1958	6,186	13.5	0.0	0.3	21.9	1.5	5.1	14.0	7.9	0.8	4.3	11.2	9.6	9.8
1959	8,443	16.7	0.0	0.3	23.9	1.2	5.0	16.7	6.8	0.7	4.1	8.6	7.7	8.3
1960	12,615	19.2	0.1	0.3	20.8	1.5	5.1	18.6	7.2	0.7	4.3	6.1	8.1	8.0
1961	15,435	15.8	0.1	0.2	21.7	1.8	5.4	17.7	7.6	0.8	4.4	5.6	10.0	8.8
1962	17,229	13.8	0.1	0.2	20.1	1.8	4.8	17.0	8.0	0.9	5.0	5.9	12.8	9.7
1963	20,599	15.1	0.1	0.2	21.0	2.1	4.5	15.2	7.8	0.8	5.1	5.6	12.4	10.1
1964	29,762	16.0	0.1	0.2	22.1	1.8	3.9	15.4	7.8	1.1	4.9	4.5	12.3	10.0
1965	48,898	14.7	0.1	0.2	26.6	1.7	3.7	15.7	6.9	0.9	4.8	3.6	12.6	8.5
1966	86,971	16.7	0.1	0.2	23.5	1.4	4.3	16.0	8.4	0.8	4.6	2.9	11.7	9.3
1967	152,856	12.7	0.1	0.2	23.4	1.5	4.5	16.3	7.5	1.0	4.4	3.5	13.1	11.7
1968	334,064	12.4	0.1	0.2	27.3	1.4	3.9	16.0	7.9	0.8	3.6	3.7	12.5	10.2
1969	451,373	12.3	0.1	0.2	24.7	1.4	3.5	15.8	8.2	0.8	3.4	4.8	14.1	10.7
1970	536,599	12.5	0.1	0.3	23.4	1.5	3.8	14.8	8.0	0.8	3.9	5.4	14.3	11.5
1971	649,778	12.8	0.1	0.3	21.1	1.6	4.4	14.1	8.1	0.8	3.5	6.0	14.8	12.7
1972	1,036,210	17.8	0.1	0.3	20.5	1.6	4.4	15.1	7.8	0.8	4.8	4.8	12.1	10.0
1973	2,256,114	19.1	0.1	0.2	22.4	1.8	3.6	15.0	6.6	0.9	3.9	3.2	13.0	10.2
1974	4,138,309	16.0	0.1	0.2	24.8	2.0	3.8	14.8	6.8	1.3	3.5	3.1	13.4	10.2
1975	7,365,443	11.5	0.1	0.2	26.0	2.0	4.4	16.4	6.8	0.9	4.5	4.7	12.0	10.6
1976	11,035,513	10.9	0.1	0.3	23.9	1.9	4.6	17.2	7.0	0.8	5.0	5.4	12.4	10.6
1977	17,430,956	12.5	0.2	0.4	23.8	1.4	4.2	19.1	6.6	0.7	4.3	5.9	10.7	10.3
1978	26,292,000	10.9	0.3	0.3	24.2	1.4	5.0	18.2	5.8	0.7	5.2	6.8	11.1	10.1
1979	49,811,389	12.6	0.3	0.3	26.9	1.2	5.3	18.4	5.5	0.6	5.4	6.2	9.0	8.2
1980	79,950,863	12.5	0.2	0.4	25.0	1.6	5.7	15.9	6.0	0.6	5.9	8.0	9.1	9.0
1981	107,294,625	11.2	0.3	0.3	21.5	1.9	6.4	14.5	6.1	0.7	6.6	11.4	9.6	9.4
1982	116,389,793	11.0	0.2	0.2	17.6	2.6	6.7	10.6	6.3	1.1	8.0	16.2	9.8	9.7
1983	167,879,957	13.6	0.4	0.2	21.2	3.0	4.2	10.5	4.5	1.3	9.3	15.1	7.8	8.9
1984	272,689,897	14.0	0.4	0.2	21.9	2.9	3.6	12.3	4.3	1.4	12.3	12.2	6.5	8.0
1985	485,711,617	12.9	0.3	0.1	23.6	3.0	3.1	13.0	4.7	1.4	11.9	10.6	6.8	8.6
1986	894,474,473	12.0	0.3	0.1	24.3	3.2	3.0	14.0	5.6	1.4	10.1	9.7	7.1	9.3
1987	1,651,584,579	13.1	0.4	0.2	24.1	3.1	3.8	14.5	5.6	1.3	8.0	9.9	6.8	9.3
1988	2,772,083,658	12.4	0.3	0.1	23.2	2.5	4.2	14.6	5.0	1.3	10.0	10.4	6.6	9.5
1989	5,064,110,368	10.9	0.3	0.2	22.4	2.0	4.5	14.5	4.9	1.6	11.3	11.5	6.4	9.5
1990	10,518,302,989	9.1	0.3	0.1	23.6	2.5	3.8	15.3	4.9	1.8	10.8	11.8	6.3	9.7
1991	21,863,290,332	8.3	0.4	0.1	24.1	2.6	4.4	15.2	4.9	1.8	8.8	12.3	6.0	11.0
1992	37,745,368,740	8.6	0.3	0.2	21.2	2.6	5.3	16.0	5.1	1.8	7.6	14.3	5.7	11.3
1993	59,573,706,499	6.9	0.2	0.2	17.6	2.3	5.9	16.8	5.0	1.8	9.1	15.6	5.8	12.9
1994	88,166,157,864	7.5	0.2	0.2	16.0	2.7	6.2	17.4	5.2	1.9	6.9	16.9	5.5	13.5
1995	123,636,565,500	8.1	0.2	0.2	16.7	3.1	5.8	15.7	5.1	2.1	5.9	17.9	5.4	13.8
1996	165,320,044,129	7.5	0.2	0.2	16.4	3.1	5.9	15.4	5.1	2.4	6.0	18.5	5.8	13.5
1997	208,198,046,458	6.9	0.2	0.3	16.2	3.1	6.0	15.6	5.4	2.5	6.0	18.7	5.5	13.8
1998	245,597,149,084	7.2	0.2	0.2	15.3	3.2	6.6	15.4	5.2	2.8	6.1	18.5	5.3	13.9
1999	253,626,176,005	6.1	0.2	0.2	14.4	3.1	7.3	14.8	5.5	3.3	6.2	19.0	5.6	14.4
2000	257,820,322,409	6.2	0.2	0.2	13.4	3.2	6.8	14.3	5.6	3.6	6.5	19.4	5.7	15.0

	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
2001	260,070,656,862	5.8	0.2	0.2	13.6	3.4	6.3	13.6	5.5	3.7	7.3	19.6	5.8	15.1
2002	269,888,850,283	7.8	0.3	0.2	14.0	3.7	5.5	12.5	5.6	3.5	8.1	18.7	5.9	14.3
2003	311,731,260,115	10.2	0.3	0.2	16.2	4.1	4.7	13.2	5.9	3.3	7.0	16.3	5.6	13.1
2004	352,406,257,339	12.0	0.3	0.2	16.6	3.2	5.0	14.3	5.8	3.2	5.9	15.2	5.5	12.8
2005	379,260,409,628	9.6	0.2	0.3	16.6	3.5	6.2	14.3	5.7	3.6	6.0	15.4	5.5	13.2
2006	417,627,329,681	9.8	0.3	0.3	16.4	2.3	6.8	14.3	5.4	3.8	5.8	15.5	5.7	13.5
2007	489,132,645,062	9.3	0.2	0.3	15.4	3.6	7.2	15.2	5.3	3.4	5.4	15.5	5.7	13.3
2008	569,839,187,774	10.1	0.2	0.3	16.7	0.8	7.6	16.1	5.4	3.0	4.9	15.5	5.5	14.0
2009	645,504,478,626	8.5	0.2	0.5	16.4	1.5	8.2	15.5	5.2	2.8	4.8	16.0	5.8	14.7
2010	727,070,162,491	7.9	0.1	0.5	15.0	3.5	8.2	15.2	5.1	2.7	4.8	16.6	5.6	14.7
2011	832,101,930,812	9.7	0.1	0.5	14.2	2.1	8.5	15.3	4.9	2.5	4.8	16.8	5.6	14.9
2012	940,453,135,351	8.9	0.1	0.5	13.5	1.2	10.2	15.4	4.9	2.3	4.9	17.5	5.6	15.0
2013	1,065,073,967,610	8.3	0.1	0.5	12.5	2.5	10.7	15.2	4.5	2.2	4.9	17.8	5.6	15.3
2014	1,204,532,622,560	7.4	0.1	0.5	13.4	2.6	10.8	14.8	4.4	1.9	4.9	18.0	5.6	15.6
2015	1,323,346,681,195	6.7	0.1	0.5	14.6	2.4	10.5	14.3	4.2	1.9	5.1	18.5	5.5	15.7
2016	1,443,660,594,937	6.5	0.0	0.5	14.0	2.9	10.4	14.3	4.0	1.9	5.2	18.3	5.7	16.2
2017	1,539,090,549,974	5.7	0.0	0.5	12.9	3.0	10.4	15.5	4.2	1.8	5.2	18.6	5.7	16.6

Source: See Appendix A1

Notes;

(1) It includes electricity, gas and water

(2) It includes education, health, social work, and other community, social and personal service activities

A2.2 Sectoral Value Added, 1870-2017. Thousands of pesos, at 2005 constant prices.

	Thousands of uruguayan pesos, at constant 2005 prices	Constant 2005 prices (2005=100)													
	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1870	7,243,003.6	6.1	0.9	0.2	2.4	0.04	2.2	4.0	0.1	0.002	0.2	0.5	1.9	0.1
1871	7,280,821.2	6.5	0.9	0.2	2.4	0.04	1.8	4.1	0.2	0.002	0.2	0.3	2.2	0.1
1872	8,746,172.0	7.8	1.0	0.2	2.9	0.04	2.4	4.8	0.3	0.002	0.2	0.3	2.5	0.1
1873	9,113,816.2	8.3	1.0	0.2	2.6	0.04	2.4	4.9	0.5	0.003	0.2	0.8	2.9	0.1
1874	8,599,787.9	7.7	1.1	0.2	2.4	0.04	1.9	4.5	0.4	0.003	0.2	0.9	3.4	0.1
1875	7,549,399.1	6.0	1.1	0.2	2.4	0.04	2.2	3.8	0.3	0.003	0.2	0.9	2.8	0.1
1876	8,322,650.5	7.0	1.1	0.1	2.6	0.03	1.9	3.9	0.3	0.003	0.2	1.5	2.8	0.1
1877	8,549,243.2	7.2	1.2	0.1	2.9	0.03	1.7	4.2	0.3	0.003	0.2	1.3	2.7	0.1
1878	9,367,932.1	8.4	1.2	0.1	3.1	0.03	1.7	4.6	0.4	0.003	0.2	1.3	2.6	0.1
1879	8,583,571.0	7.0	1.3	0.1	2.8	0.03	1.8	4.4	0.4	0.003	0.1	1.3	2.6	0.1
1880	9,611,794.6	8.4	1.3	0.2	3.1	0.03	2.1	4.9	0.4	0.003	0.1	1.3	2.5	0.1
1881	9,460,512.2	7.6	1.4	0.2	3.1	0.03	2.2	4.8	0.5	0.003	0.1	1.4	3.0	0.1
1882	10,265,695.0	8.7	1.5	0.2	3.3	0.03	2.1	5.2	0.5	0.004	0.1	1.6	2.7	0.1
1883	12,508,427.8	10.9	1.6	0.3	3.8	0.04	3.3	6.0	0.7	0.004	0.1	1.9	3.9	0.1
1884	13,148,852.8	10.3	1.6	0.4	3.8	0.03	4.5	6.2	0.8	0.01	0.1	2.4	4.1	0.1
1885	15,522,987.6	10.4	1.7	1.3	4.8	0.04	10.1	6.5	0.8	0.01	0.1	2.8	4.3	0.2
1886	16,355,482.4	11.4	1.8	1.1	4.5	0.05	9.4	6.7	0.7	0.02	0.2	3.8	4.9	0.2
1887	15,212,189.8	9.6	1.9	0.7	4.4	0.05	7.0	6.4	0.9	0.02	0.3	4.2	4.7	0.2
1888	18,551,980.5	12.9	2.0	1.2	5.4	0.1	10.7	8.1	1.3	0.03	0.7	3.7	4.2	0.2
1889	17,793,586.2	12.0	2.1	0.4	5.1	0.1	10.1	8.2	1.1	0.03	0.8	3.0	5.1	0.2
1890	15,836,750.9	9.8	2.2	0.9	4.5	0.1	8.6	7.1	1.3	0.03	0.8	3.1	5.1	0.3
1891	15,862,399.5	11.5	2.2	0.5	5.3	0.1	5.0	6.9	1.2	0.03	0.3	3.2	5.1	0.3
1892	15,637,803.3	12.4	2.3	0.4	5.1	0.1	3.9	6.4	1.2	0.03	0.3	3.3	5.4	0.3
1893	16,636,696.4	13.1	2.4	0.3	5.8	0.1	3.2	7.0	1.3	0.03	0.3	3.4	5.6	0.3
1894	18,366,867.3	16.1	2.5	0.2	6.0	0.1	2.8	8.0	1.4	0.03	0.3	3.5	5.9	0.3
1895	18,862,591.1	16.0	2.6	0.3	6.0	0.1	4.1	8.2	1.4	0.04	0.3	3.6	5.9	0.3
1896	19,669,091.3	16.1	2.7	0.4	7.0	0.1	4.2	8.3	1.4	0.04	0.4	3.7	6.1	0.3
1897	19,061,429.1	16.0	2.8	0.3	6.4	0.1	3.7	8.1	1.4	0.04	0.4	3.7	6.2	0.2
1898	18,298,849.3	13.4	2.9	0.4	6.6	0.1	4.3	7.6	1.5	0.04	0.5	3.8	6.4	0.2
1899	18,412,422.5	12.8	3.0	0.4	6.6	0.1	4.7	7.7	1.5	0.05	0.5	3.9	6.6	0.3
1900	18,964,908.4	12.8	3.1	0.5	7.2	0.1	4.4	7.8	1.6	0.05	0.6	4.1	6.8	0.3
1901	19,741,588.7	15.0	3.1	0.5	6.6	0.1	5.0	8.0	1.8	0.05	0.6	4.3	6.9	0.3
1902	21,209,463.3	17.0	3.2	0.6	7.4	0.1	3.5	8.6	1.9	0.05	0.6	4.5	7.0	0.3
1903	22,396,891.1	17.6	3.3	0.6	7.9	0.1	4.4	9.1	2.0	0.05	0.6	4.8	7.1	0.3
1904	22,327,839.9	18.1	3.4	0.5	8.1	0.2	2.8	8.8	2.1	0.05	0.7	5.0	7.3	0.3
1905	21,547,192.0	13.9	3.6	0.7	8.2	0.2	3.5	9.2	2.3	0.1	0.8	5.2	7.4	0.4
1906	23,776,166.2	17.4	3.7	0.8	8.2	0.2	3.7	10.4	2.6	0.1	0.7	5.5	7.5	0.4
1907	26,119,011.5	18.5	3.8	1.0	9.5	0.2	4.8	11.4	3.2	0.1	0.8	5.8	7.7	0.5

	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1908	27,492,459.3	19.4	3.9	0.9	10.1	0.2	5.2	11.7	3.3	0.1	0.7	5.8	9.4	0.5
1909	27,551,586.7	19.6	4.1	1.0	9.9	0.2	5.5	11.6	3.4	0.1	0.7	5.5	9.9	0.6
1910	29,645,684.8	19.7	4.2	1.2	11.4	0.3	7.7	12.6	3.7	0.1	0.8	5.3	10.8	0.7
1911	29,622,327.7	18.4	4.4	1.8	10.8	0.4	8.8	12.7	4.1	0.1	1.0	5.5	11.7	0.8
1912	33,902,656.5	23.5	4.5	1.3	12.1	0.5	8.9	14.7	4.5	0.1	1.0	5.7	12.8	0.8
1913	34,169,511.6	20.3	4.7	0.9	12.1	0.6	14.2	14.2	5.0	0.2	1.0	5.9	14.0	0.7
1914	29,274,859.4	15.8	4.8	0.6	11.5	0.6	6.9	12.1	4.5	0.2	0.9	6.1	14.1	0.7
1915	27,286,383.3	15.7	4.9	0.5	10.3	0.6	4.4	10.8	4.5	0.2	0.8	6.2	14.2	0.6
1916	28,543,373.8	15.9	5.1	0.4	11.8	0.7	4.2	10.9	4.9	0.2	0.9	6.4	14.3	0.6
1917	30,910,574.8	18.9	5.2	0.3	12.3	0.8	3.6	12.8	4.4	0.3	0.9	6.6	14.4	0.6
1918	32,753,412.0	19.7	5.4	0.2	14.1	0.9	4.2	12.8	4.8	0.3	0.9	6.8	14.7	0.7
1919	34,733,528.8	23.4	5.6	0.4	13.0	1.0	5.2	14.1	5.2	0.3	1.1	7.0	14.9	0.9
1920	32,711,689.4	16.4	5.7	1.2	13.3	1.2	9.2	11.8	5.8	0.4	1.4	7.2	15.2	1.3
1921	34,003,048.6	17.3	5.8	1.1	13.3	1.3	8.5	13.2	5.6	0.4	1.6	7.4	15.7	1.5
1922	37,208,717.9	19.3	6.0	1.1	15.8	1.3	10.7	13.7	5.3	0.4	1.5	7.7	15.8	1.5
1923	39,252,660.1	21.4	6.2	1.8	15.9	1.4	12.5	14.5	5.5	0.5	1.6	8.0	15.9	1.6
1924	42,565,628.5	23.5	6.4	2.1	17.2	1.5	14.0	15.9	6.4	0.5	1.7	8.3	16.6	1.8
1925	43,186,287.5	22.1	6.5	2.5	17.4	1.6	15.1	16.0	6.9	0.5	1.7	8.6	18.2	1.8
1926	45,440,528.4	25.6	6.8	3.5	17.7	1.7	13.0	17.6	8.0	0.6	1.9	8.9	17.7	1.9
1927	51,445,121.7	28.8	6.9	4.9	20.0	1.9	19.6	19.6	9.4	0.6	2.0	9.2	18.1	2.2
1928	54,638,834.6	29.2	7.1	6.6	22.1	2.1	21.1	20.8	10.6	0.7	2.3	9.5	18.5	2.4
1929	55,972,663.4	28.3	7.3	7.2	22.9	2.4	22.6	21.1	11.2	0.8	2.5	9.8	18.9	2.7
1930	61,435,658.3	36.6	7.5	7.3	24.8	2.7	20.4	22.9	12.3	0.9	2.9	10.1	19.4	2.9
1931	53,434,679.1	26.0	7.7	6.4	21.4	3.0	18.7	18.9	12.8	1.0	2.8	10.6	19.8	3.0
1932	49,685,240.0	24.4	7.9	5.0	20.0	2.9	14.3	16.6	12.3	1.0	2.9	11.0	20.4	2.5
1933	46,116,710.9	21.8	8.1	4.0	17.1	2.8	13.2	14.7	12.4	0.9	2.9	11.4	21.4	2.8
1934	51,744,818.8	25.8	8.3	3.4	21.5	3.0	11.6	16.6	12.9	1.0	2.9	11.8	22.5	2.9
1935	54,045,346.2	27.8	8.9	3.2	21.0	3.1	15.0	17.2	13.7	1.0	2.9	12.1	23.9	3.1
1936	56,728,277.1	26.3	8.7	3.5	23.0	3.3	17.0	18.7	14.5	1.1	2.9	12.5	24.4	3.5
1937	60,340,645.7	25.4	8.5	5.0	25.0	3.7	21.9	19.0	15.5	1.3	3.2	12.9	26.1	4.1
1938	66,558,484.8	28.1	10.8	5.4	28.1	4.1	28.8	20.4	16.6	1.2	4.0	13.3	26.5	4.4
1939	66,705,263.3	28.9	7.9	5.4	27.3	4.5	28.4	20.1	17.1	1.3	4.1	13.6	26.5	4.9
1940	63,454,961.2	25.9	6.1	4.7	25.4	5.0	25.3	18.9	17.4	1.1	4.0	13.9	27.8	4.8
1941	68,179,387.9	26.4	7.5	6.5	29.3	5.4	29.0	19.9	17.1	1.2	4.1	14.4	27.8	5.5
1942	65,405,795.7	27.3	7.4	5.6	28.2	5.3	17.9	19.1	16.6	1.3	4.7	14.9	29.2	5.5
1943	63,557,507.0	27.7	7.4	5.1	25.8	5.1	16.4	17.8	16.5	1.4	3.8	15.4	30.3	6.2
1944	71,047,573.1	32.5	7.5	3.8	29.0	5.8	22.2	19.7	15.6	1.4	3.1	15.8	32.4	7.9
1945	77,503,024.1	27.8	7.7	4.3	34.7	6.6	32.0	21.3	16.3	1.5	3.3	16.3	34.2	8.7
1946	88,449,925.9	30.5	7.8	4.7	40.7	6.8	34.4	25.2	17.6	1.6	4.6	16.8	35.4	13.5
1947	90,121,517.8	27.4	8.0	6.1	39.7	7.8	38.5	24.8	20.7	1.7	6.8	17.3	36.6	15.1
1948	93,411,525.3	30.0	8.2	6.7	41.5	8.7	27.4	25.5	22.4	1.8	8.8	17.9	37.8	18.9
1949	101,418,974.8	34.6	8.3	7.2	46.8	9.1	28.5	27.4	23.1	1.9	10.0	18.4	39.1	20.1
1950	113,870,396.5	34.4	8.3	13.0	54.1	9.8	34.9	30.5	25.5	2.1	11.6	18.8	40.5	26.4

	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1951	122,699,581.3	37.5	8.3	9.2	55.6	10.8	41.2	32.0	31.4	2.3	15.0	19.1	41.9	30.2
1952	124,772,918.9	38.2	7.0	12.5	54.1	11.6	39.1	31.6	35.3	2.3	15.4	19.5	43.4	33.9
1953	138,319,679.8	42.1	4.1	11.0	60.5	12.7	42.2	34.4	36.6	2.3	16.5	20.0	44.9	43.2
1954	146,138,676.6	44.2	6.2	11.6	62.1	13.6	45.5	35.6	37.8	2.4	20.4	20.5	46.5	48.6
1955	150,963,295.1	44.3	7.0	14.5	60.3	14.8	40.2	35.1	39.1	2.4	24.1	20.9	47.8	59.8
1956	154,473,615.2	43.4	9.3	20.7	63.4	16.0	43.6	33.6	39.4	2.6	25.5	21.6	49.1	60.9
1957	155,377,324.4	40.6	11.7	24.4	64.5	17.2	42.6	37.2	39.6	2.6	25.9	22.3	50.0	58.0
1958	150,849,504.5	41.2	8.2	24.8	63.7	18.6	39.4	31.1	36.6	2.7	27.1	22.9	50.9	56.9
1959	146,227,381.5	37.7	10.5	25.5	61.1	18.4	38.8	31.5	36.6	2.8	26.1	23.5	51.8	52.7
1960	149,750,602.0	37.8	14.0	30.8	62.8	18.6	40.5	35.2	39.8	2.9	27.2	24.1	52.8	49.5
1961	152,439,770.6	43.4	12.8	21.4	61.5	20.4	36.9	38.4	38.8	2.9	27.7	24.6	53.9	49.6
1962	149,166,845.2	36.4	8.2	21.4	61.5	22.2	31.1	39.3	38.9	3.1	31.6	25.2	56.7	45.8
1963	148,692,015.3	45.8	7.0	16.7	60.9	22.3	27.8	35.2	35.8	3.3	32.5	25.6	58.2	44.6
1964	152,204,234.4	41.6	11.7	16.7	65.0	23.7	27.7	36.5	40.5	3.6	31.8	26.1	60.4	44.3
1965	152,249,783.2	44.2	16.3	25.4	64.6	23.1	27.0	38.1	40.3	3.6	32.2	26.7	62.2	40.0
1966	159,154,885.0	48.4	16.3	25.4	65.6	24.6	30.5	35.8	40.8	3.8	30.0	27.3	65.6	48.6
1967	154,309,562.8	41.5	15.2	29.5	62.6	25.6	28.3	35.5	37.0	3.7	28.3	27.9	67.3	49.7
1968	159,017,015.2	40.9	16.3	29.5	65.7	25.7	29.2	34.3	37.5	3.8	23.4	28.8	70.4	56.3
1969	165,764,109.0	46.8	17.5	38.6	69.2	27.4	30.4	38.2	38.8	3.9	23.8	29.4	75.6	51.9
1970	172,080,546.1	50.9	18.7	38.6	71.9	29.5	33.2	40.2	39.9	4.0	27.6	30.0	78.2	49.9
1971	170,646,443.6	50.3	19.8	36.8	70.5	31.0	35.2	38.7	41.0	4.2	24.6	30.2	78.1	50.3
1972	163,064,331.6	45.2	29.2	36.8	70.2	30.5	35.7	38.0	38.8	4.2	30.6	30.3	78.5	37.6
1973	174,843,639.2	47.1	24.5	38.9	69.8	30.9	28.9	36.5	39.9	4.4	26.9	30.4	80.6	65.3
1974	180,878,318.2	47.3	22.2	38.9	72.3	29.7	32.0	38.6	42.5	4.6	26.2	30.3	83.7	68.7
1975	186,835,056.8	48.7	37.4	50.4	76.8	33.0	43.5	40.3	44.1	4.9	34.3	30.4	85.1	60.1
1976	194,861,603.0	47.7	47.9	50.4	79.8	34.8	48.9	43.1	47.2	5.4	38.9	30.5	87.2	62.4
1977	197,111,997.3	48.3	68.9	68.7	84.1	36.5	49.4	45.0	48.0	5.6	33.9	31.1	89.3	57.7
1978	213,637,315.8	45.2	105.0	70.7	89.1	39.9	63.1	48.3	47.8	5.8	42.9	31.6	86.4	71.4
1979	227,776,436.2	47.8	141.3	84.6	94.0	42.9	74.2	51.4	50.1	6.6	52.0	34.7	87.5	72.0
1980	241,471,810.7	59.9	149.6	81.4	94.8	48.0	80.6	53.7	51.4	7.5	65.7	38.5	88.2	70.8
1981	249,184,772.2	67.6	164.4	94.3	89.2	52.5	86.9	53.2	48.1	8.2	82.2	42.4	88.2	72.8
1982	233,066,569.3	67.7	128.7	73.7	73.0	55.1	88.3	40.4	39.7	9.3	101.2	46.5	88.7	64.2
1983	221,970,392.3	73.8	142.6	58.0	66.9	58.4	61.3	35.8	35.5	10.0	119.9	50.8	90.5	49.4
1984	224,603,609.2	63.7	160.8	49.3	70.5	57.9	56.2	40.4	34.3	9.9	164.4	39.8	92.7	47.0
1985	226,975,130.5	71.5	161.1	39.3	70.0	59.8	42.5	45.3	37.3	10.7	162.9	38.9	96.4	46.3
1986	242,637,877.5	69.7	120.5	45.9	78.8	62.3	46.5	52.6	44.8	12.1	148.5	41.5	97.2	57.5
1987	263,380,516.7	72.7	110.6	52.4	87.3	70.5	60.5	60.2	48.2	13.6	126.5	50.2	99.0	66.4
1988	273,495,994.5	71.5	78.3	41.9	87.3	76.5	68.2	63.0	52.2	14.9	161.5	48.6	100.8	63.2
1989	283,708,962.7	73.9	96.7	43.6	88.0	69.1	70.9	63.7	54.8	18.5	183.7	50.3	100.1	66.7
1990	281,796,139.4	70.8	82.2	35.3	87.5	76.6	63.1	63.9	53.4	22.3	169.1	53.0	100.1	70.7
1991	287,594,129.8	72.7	102.9	44.4	87.9	82.7	71.9	70.6	58.0	24.2	139.3	59.2	105.3	68.5
1992	310,260,412.2	81.1	90.5	52.8	90.1	94.6	85.0	81.5	66.1	26.8	124.9	68.7	104.3	75.7
1993	324,710,708.2	75.9	92.1	60.8	82.8	92.6	101.5	96.8	76.0	30.2	154.4	65.9	105.5	77.8

	Total value added	Agriculture	Fishing	Mining	Manufacturing	Utilities (1)	Construction	Wholesale and retail trade	Transport	Communications	Financial intermediation	Real estate activities	Government	Other services (2)
1994	343,496,180.7	84.7	92.5	67.5	86.9	88.9	112.5	109.2	93.3	34.3	120.0	76.9	104.4	80.7
1995	339,759,593.5	88.9	103.9	84.5	85.2	94.7	103.1	100.3	98.7	38.2	100.2	83.0	101.2	84.2
1996	359,208,876.5	96.9	102.5	94.1	89.5	98.2	103.4	108.0	105.2	43.7	103.1	88.1	98.6	91.8
1997	378,541,199.0	90.5	112.3	119.1	95.7	104.0	108.2	119.5	110.4	48.6	105.2	93.1	97.7	100.5
1998	397,532,082.6	94.2	111.2	118.6	96.2	114.3	119.4	127.1	113.6	59.7	119.8	95.6	97.6	104.9
1999	390,735,889.2	90.1	92.5	115.3	91.8	105.1	122.5	121.5	116.6	66.1	124.5	94.3	97.6	103.7
2000	384,124,142.6	86.8	101.5	114.8	88.4	111.3	112.5	114.6	115.2	67.4	131.0	94.8	97.0	104.3
2001	370,998,274.5	79.6	92.6	97.7	82.4	120.7	103.1	108.3	105.5	69.4	138.3	94.7	95.8	101.0
2002	342,098,963.6	81.6	87.8	90.9	77.7	114.0	84.3	89.1	88.5	67.6	122.9	92.5	95.8	96.8
2003	340,806,760.8	89.6	86.3	80.3	81.5	109.1	81.8	85.7	89.5	68.3	99.2	94.6	97.7	96.9
2004	355,208,553.0	96.9	96.5	82.7	87.6	94.2	87.2	93.2	93.3	78.3	95.8	98.0	99.6	98.3
2005	379,260,409.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2006	390,347,511.9	105.2	106.1	119.0	104.8	74.3	107.0	104.6	106.6	118.2	95.4	101.2	101.4	102.6
2007	415,183,158.1	94.7	87.4	126.4	113.5	111.6	117.1	113.7	115.3	150.7	95.9	104.7	101.0	108.0
2008	443,301,871.5	96.8	85.1	128.6	122.7	54.6	120.1	127.2	124.5	238.6	106.2	107.0	99.6	115.5
2009	464,553,836.4	100.2	82.4	168.6	129.2	60.9	123.3	128.4	125.1	302.4	113.4	106.7	104.9	119.4
2010	497,922,599.0	98.8	78.6	228.5	132.5	115.4	126.3	143.3	136.8	359.1	122.7	109.6	104.6	121.8
2011	522,664,208.3	112.2	77.5	180.2	135.1	87.4	129.4	153.4	140.5	414.8	141.2	112.6	105.3	125.5
2012	541,125,114.7	111.6	66.5	176.0	129.8	68.2	150.5	162.0	149.9	463.9	156.7	115.3	104.8	128.2
2013	568,366,432.1	114.4	44.2	180.5	131.3	105.6	151.9	175.0	148.7	514.5	169.9	117.3	107.8	131.6
2014	587,747,728.1	114.9	38.4	161.1	136.8	122.1	153.0	174.1	148.4	570.5	183.9	118.6	109.4	136.1
2015	592,533,216.1	113.8	24.2	136.2	143.5	113.9	143.7	167.1	133.7	632.8	194.4	119.6	108.6	136.6
2016	602,695,492.7	116.9	16.0	161.0	144.1	131.6	138.1	162.4	122.9	718.7	198.2	119.6	107.7	136.4
2017	612,362,668.9	116.0	19.5	127.2	139.4	126.3	131.6	174.5	130.8	784.2	188.1	121.2	105.9	136.6

Source: See Appendix A1

Notes:

(1) It includes electricity, gas and water

(2) It includes education, health, social work, and other community, social and personal service activities

Appendix A3. Time series analysis

All the time series analysis was done using the series estimated in this work, in EVIEWS 10 (©)

A3.1. Augmented Dickey-Fuller tests

A3.1.1. GDP pc

A3.1.1.1. 1871-2017 sample

Null Hypothesis: LPIBPC has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.887546	0.1697
Test critical values:	1% level	-4.022586	
	5% level	-3.441111	
	10% level	-3.145082	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPIBPC)
Method: Least Squares
Sample (adjusted): 1873 2017
Included observations: 145 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPIBPC(-1)	-0.077457	0.026825	-2.887546	0.0045
D(LPIBPC(-1))	0.162688	0.080428	2.022794	0.0450
C	0.738263	0.256705	2.875922	0.0047
@TREND("1870")	0.001352	0.000418	3.232876	0.0015

R-squared	0.091924	Mean dependent var	0.013795
Adjusted R-squared	0.072604	S.D. dependent var	0.060237
S.E. of regression	0.058009	Akaike info criterion	-2.829235
Sum squared resid	0.474473	Schwarz criterion	-2.747118
Log likelihood	209.1195	Hannan-Quinn criter.	-2.795868
F-statistic	4.757804	Durbin-Watson stat	2.005491
Prob(F-statistic)	0.003432		

A3.1.1.2. 1871-1929 sample

Null Hypothesis: LPIBPC has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.714700	0.4187
Test critical values:	1% level	-3.548208	
	5% level	-2.912631	
	10% level	-2.594027	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPIBPC)
Method: Least Squares
Sample (adjusted): 1872 1929
Included observations: 58 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPIBPC(-1)	-0.143613	0.083754	-1.714700	0.0919
C	1.450645	0.841370	1.724146	0.0902

R-squared	0.049884	Mean dependent var	0.008044
Adjusted R-squared	0.032918	S.D. dependent var	0.075050
S.E. of regression	0.073804	Akaike info criterion	-2.340923
Sum squared resid	0.305037	Schwarz criterion	-2.269873
Log likelihood	69.88675	Hannan-Quinn criter.	-2.313247
F-statistic	2.940195	Durbin-Watson stat	1.747917
Prob(F-statistic)	0.091930		

A3.1.1.3. 1930-1971 sample

Null Hypothesis: LPIBPC has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.627989	0.9729
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPIBPC)
Method: Least Squares
Sample: 1930 1971
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPIBPC(-1)	0.001406	0.000863	1.627989	0.1112

R-squared	-0.001338	Mean dependent var	0.015185
Adjusted R-squared	-0.001338	S.D. dependent var	0.059793
S.E. of regression	0.059833	Akaike info criterion	-2.770984
Sum squared resid	0.146781	Schwarz criterion	-2.729611
Log likelihood	59.19066	Hannan-Quinn criter.	-2.755819
Durbin-Watson stat	1.504484		

A3.1.1.4. 1972-2017 sample

Null Hypothesis: LPIBPC has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.476631	0.0540
Test critical values:	1% level	-4.170583	
	5% level	-3.510740	
	10% level	-3.185512	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPIBPC)
Method: Least Squares
Sample (adjusted): 1972 2017
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPIBPC(-1)	-0.223225	0.064207	-3.476631	0.0012
D(LPIBPC(-1))	0.620980	0.121468	5.112311	0.0000
C	2.465320	0.706153	3.491198	0.0011
@TREND("1972")	0.004900	0.001437	3.410301	0.0014

R-squared	0.426382	Mean dependent var	0.022807
Adjusted R-squared	0.385409	S.D. dependent var	0.039031
S.E. of regression	0.030598	Akaike info criterion	-4.052801
Sum squared resid	0.039323	Schwarz criterion	-3.893789
Log likelihood	97.21443	Hannan-Quinn criter.	-3.993234
F-statistic	10.40649	Durbin-Watson stat	2.099850
Prob(F-statistic)	0.000030		

A3.1.2. SCI

A3.1.2.1. 1871-2017 sample

Null Hypothesis: SCI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.274023	0.0747
Test critical values:	1% level	-4.022135	
	5% level	-3.440894	
	10% level	-3.144955	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SCI)
Method: Least Squares
Included observations: 146 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SCI(-1)	-0.137892	0.042117	-3.274023	0.0013
C	-0.002622	0.007031	-0.372924	0.7098
@TREND("1870")	0.000890	0.000268	3.320785	0.0011

R-squared	0.072353	Mean dependent var	0.005986
Adjusted R-squared	0.059379	S.D. dependent var	0.042237
S.E. of regression	0.040964	Akaike info criterion	-3.531921
Sum squared resid	0.239959	SCIwarz criterion	-3.470614
Log likelihood	260.8302	Hannan-Quinn criter.	-3.507010
F-statistic	5.576708	Durbin-Watson stat	1.959669

Prob(F-statistic)	0.004655

A3.1.2.2. 1871-1929 sample

Null Hypothesis: SCI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.200805	0.2083
Test critical values:	1% level	-3.548208	
	5% level	-2.912631	
	10% level	-2.594027	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SCI)
Method: Least Squares
Included observations: 58 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SCI(-1)	-0.192050	0.087263	-2.200805	0.0319
C	0.032118	0.013632	2.356072	0.0220

R-squared	0.079607	Mean dependent var	0.003315
Adjusted R-squared	0.063171	S.D. dependent var	0.030010
S.E. of regression	0.029047	Akaike info criterion	-4.205956
Sum squared resid	0.047247	SCIwarz criterion	-4.134907
Log likelihood	123.9727	Hannan-Quinn criter.	-4.178281
F-statistic	4.843542	Durbin-Watson stat	2.044483
Prob(F-statistic)	0.031890		

A3.1.2.3. 1930-1971 sample

Null Hypothesis: SCI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.582158	0.0436
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SCI)
Method: Least Squares
Sample: 1930 1971
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.

SCI(-1)	-0.496921	0.138721	-3.582158	0.0009
C	0.141235	0.039802	3.548399	0.0010
@TREND("1930")	0.003941	0.001218	3.236346	0.0025

R-squared	0.247775	Mean dependent var	0.008264
Adjusted R-squared	0.209200	S.D. dependent var	0.049442
S.E. of regression	0.043967	Akaike info criterion	-3.341991
Sum squared resid	0.075392	SCIwarz criterion	-3.217872
Log likelihood	73.18181	Hannan-Quinn criter.	-3.296497
F-statistic	6.423104	Durbin-Watson stat	1.919897
Prob(F-statistic)	0.003880		

A3.1.2.4. 1972-2017 sample

Null Hypothesis: SCI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.242706	0.0890
Test critical values:	1% level	-4.170583	
	5% level	-3.510740	
	10% level	-3.185512	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SCI)
Method: Least Squares
Sample (adjusted): 1972 2017
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SCI(-1)	-0.321592	0.099174	-3.242706	0.0023
D(SCI(-1))	0.329148	0.144091	2.284308	0.0275
C	0.180233	0.056408	3.195181	0.0027
@TREND("1972")	0.002864	0.000964	2.970326	0.0049

R-squared	0.226949	Mean dependent var	0.007273
Adjusted R-squared	0.171731	S.D. dependent var	0.048627
S.E. of regression	0.044255	Akaike info criterion	-3.314740
Sum squared resid	0.082258	SCIwarz criterion	-3.155728
Log likelihood	80.23903	Hannan-Quinn criter.	-3.255174
F-statistic	4.110068	Durbin-Watson stat	1.545562
Prob(F-statistic)	0.012077		

A3.2. Vector Error Correction models' outputs, cointegration tests and weak exogeneity tests
A3.2.1. 1871-2017
A3.2.1.1. VEC output

Vector Error Correction Estimates
Sample (adjusted): 1873 2017
Included observations: 145 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:

B(1,1)=1, A(2,1)=0

Convergence achieved after 1 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(1)	0.001778
Probability	0.966368

Cointegrating Eq:	CointEq1
SCI(-1)	1.000000
LPIBPC(-1)	-0.417114 (0.01514) [-27.5430]
C	4.039710

Error Correction:	D(SCI)	D(LPIBPC)
CointEq1	-0.281635 (0.05117) [-5.50397]	0.000000 (0.00000) [NA]
D(SCI(-1))	0.023685 (0.06857) [0.34540]	-0.110313 (0.10634) [-1.03733]
D(LPIBPC(-1))	0.004837 (0.05105) [0.09474]	0.142391 (0.07917) [1.79850]
C	0.008579 (0.00296) [2.90024]	0.017689 (0.00459) [3.85616]
D(@YEAR>=1875)	-0.054827 (0.03320) [-1.65122]	-0.167860 (0.05149) [-3.25987]
D(@YEAR>=1879)	-0.010458 (0.03287) [-0.31819]	-0.144765 (0.05097) [-2.84016]
D(@YEAR>=1888)	0.009268 (0.03344) [0.27714]	0.168108 (0.05186) [3.24150]
D(@YEAR>=1890)	-0.058693 (0.03307) [-1.77498]	-0.153685 (0.05128) [-2.99695]
D(@YEAR>=1914)	-0.030036 (0.03313) [-0.90661]	-0.190683 (0.05138) [-3.71129]
D(@YEAR>=1931)	0.096147 (0.03319) [2.89656]	-0.189861 (0.05148) [-3.68824]

D(@YEAR>=1959)	-0.093883	-0.045785
	(0.03317)	(0.05144)
	[-2.83041]	[-0.89008]
D(@YEAR>=1960)	-0.115252	-0.001147
	(0.03366)	(0.05221)
	[-3.42353]	[-0.02197]
D(@YEAR>=1972)	-0.157117	-0.049707
	(0.03291)	(0.05104)
	[-4.77415]	[-0.97393]
R-squared	0.455184	0.351487
Adj. R-squared	0.405656	0.292531
Sum sq. resids	0.140892	0.338851
S.E. equation	0.032671	0.050666
F-statistic	9.190315	5.961882
Log likelihood	297.1498	233.5263
Akaike AIC	-3.919307	-3.041743
SCIwarz SC	-3.652428	-2.774863
Mean dependent	0.005928	0.013795
S.D. dependent	0.042378	0.060237

Determinant resid covariance (dof adj.)	2.73E-06
Determinant resid covariance	2.27E-06
Log likelihood	530.8222
Akaike information criterion	-6.935479
SCIwarz criterion	-6.360661
Number of coefficients	28

A3.2.1.2. Cointegration tests and weak exogeneity test (restrictions over “alphas”)

Sample (adjusted): 1873 2017
Included observations: 145 after adjustments
Trend assumption: Linear deterministic trend
Series: SCI LPIBPC
Exogenous series: D(@YEAR>=1875) D(@YEAR>=1879) D(@YEAR>=1888) D(@YEAR>=1890) D(@YEAR>=1914) D(@YEAR>=1931) D(@YEAR>=1959) D(@YEAR>=1960) D(@YEAR>=1972)
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.186668	30.00489	15.49471	0.0002
At most 1	0.000315	0.045616	3.841466	0.8308

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.186668	29.95927	14.26460	0.0001

At most 1	0.000315	0.045616	3.841466	0.8308

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Restrictions:

b(1,1)=1, a(2,1)=0

Tests of cointegration restrictions:

Hypothesized No. of CE(s)	Restricted Log-likehood	LR Statistic	Degrees of Freedom	Probability
1	530.8222	0.001778	1	0.966368

1 Cointegrating Equation(s): Convergence achieved after 1 iterations.

Restricted cointegrating coefficients (standard error in parentheses)

SCI	LPIBPC
1.000000	-0.417114
(0.00000)	(0.01514)

Adjustment coefficients (standard error in parentheses)

D(SCI)	-0.281635
	(0.05117)
D(LPIBPC)	0.000000
	(0.00000)

A3.2.2. 1871-1929

A3.2.2.1. VEC output
Vector Error Correction Estimates
Sample (adjusted): 1873 1929
Included observations: 57 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:
B(1,1)=1, A(2,1)=0
Convergence achieved after 8 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(1)	1.403312
Probability	0.236170

Cointegrating Eq:	CointEq1	
LPIBPC(-1)	1.000000	
SCI(-1)	-3.316549	
	(0.74208)	
	[-4.46928]	
C	-9.545619	
Error Correction:	D(LPIBPC)	D(SCI)

CointEq1	-0.310982	0.000000
	(0.08764)	(0.00000)
	[-3.54830]	[NA]
D(LPIBPC(-1))	-0.035156	-0.054600
	(0.12354)	(0.03686)
	[-0.28456]	[-1.48142]
D(SCI(-1))	-0.350675	-0.179739
	(0.32966)	(0.09835)
	[-1.06374]	[-1.82760]
C	0.015575	0.005066
	(0.00851)	(0.00254)
	[1.82961]	[1.99496]
D(@YEAR>=1890)	-0.223836	-0.066922
	(0.06276)	(0.01872)
	[-3.56671]	[-3.57451]
D(@YEAR>=1891)	-0.111186	-0.093562
	(0.06697)	(0.01998)
	[-1.66032]	[-4.68328]
D(@YEAR>=1875)	-0.204616	-0.066034
	(0.06169)	(0.01840)
	[-3.31690]	[-3.58816]
D(@YEAR>=1873)	0.073354	0.082479
	(0.06434)	(0.01920)
	[1.14003]	[4.29682]
D(@YEAR=1919)	0.068042	0.060532
	(0.04332)	(0.01292)
	[1.57060]	[4.68361]
D(@YEAR>=1885)	0.114960	0.057069
	(0.06018)	(0.01795)
	[1.91041]	[3.17902]
D(@YEAR>=1887)	-0.154100	0.028302
	(0.06062)	(0.01808)
	[-2.54199]	[1.56492]
R-squared	0.456731	0.717115
Adj. R-squared	0.338629	0.655619
Sum sq. resids	0.162777	0.014487
S.E. equation	0.059486	0.017746
F-statistic	3.867253	11.66104
Log likelihood	86.08558	155.0312
Akaike AIC	-2.634582	-5.053728
SCIwarz SC	-2.240309	-4.659455
Mean dependent	0.005498	0.003122
S.D. dependent	0.073147	0.030240
Determinant resid covariance (dof adj.)		1.11E-06
Determinant resid covariance		7.23E-07
Log likelihood		240.6406
Akaike information criterion		-7.601426

SCIwarz criterion	-6.741194
Number of coefficients	24

A3.2.2.2. Cointegration tests and weak exogeneity test (restrictions over “alphas”)

Sample (adjusted): 1873 1929
Included observations: 57 after adjustments
Trend assumption: Linear deterministic trend
Series: LPIBPC SCI
Exogenous series: D(@YEAR>=1890) D(@YEAR>=1891) D(@YEAR>=1875) D(@YEAR>=1873) D(@YEAR=1919) D(@YEAR>=1885) D(@YEAR>=1887)
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.230609	17.40607	15.49471	0.0255
At most 1	0.042293	2.463143	3.841466	0.1165

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.230609	14.94293	14.26460	0.0390
At most 1	0.042293	2.463143	3.841466	0.1165

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Restrictions:

b(1,1)=1, a(2,1)=0

Tests of cointegration restrictions:

Hypothesized No. of CE(s)	Restricted Log-likehood	LR Statistic	Degrees of Freedom	Probability
1	240.6406	1.403312	1	0.236170

1 Cointegrating Equation(s): Convergence achieved after 8 iterations.

Restricted cointegrating coefficients (standard error in parentheses)

LPIBPC	SCI
1.000000	-3.316549
(0.00000)	(0.74208)

Adjustment coefficients (standard error in parentheses)

D(LPIBPC)	-0.310982
	(0.08764)
D(SCI)	0.000000
	(0.00000)

A3.2.3. 1930-1971

A3.2.3.1. VEC output

Vector Error Correction Estimates
Sample: 1930 1971
Included observations: 42
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:
B(1,1)=1, A(2,1)=0
Convergence achieved after 9 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(1)	1.131350
Probability	0.287488

Cointegrating Eq:	CointEq1
SCI(-1)	1.000000
LPIBPC(-1)	-0.447465
	(0.06122)
	[-7.30969]
C	4.352416

Error Correction:	D(SCI)	D(LPIBPC)
CointEq1	-0.244880	0.000000
	(0.06485)	(0.00000)
	[-3.77636]	[NA]
D(SCI(-1))	-0.135430	-0.013683
	(0.10899)	(0.20115)
	[-1.24255]	[-0.06802]
D(LPIBPC(-1))	-0.016464	0.344319
	(0.09280)	(0.17127)
	[-0.17741]	[2.01041]
C	0.011571	0.016024
	(0.00528)	(0.00974)
	[2.19313]	[1.64564]
D(@YEAR>=1960)	-0.139846	0.023697
	(0.03304)	(0.06098)
	[-4.23262]	[0.38862]
D(@YEAR>=1931)	0.089130	-0.188083
	(0.03010)	(0.05555)
	[2.96139]	[-3.38603]
D(@YEAR>=1959)	-0.094999	-0.044552
	(0.02987)	(0.05513)

	[-3.18033]	[-0.80815]
D(@YEAR=1966)	-0.066495	0.038484
	(0.02106)	(0.03887)
	[-3.15747]	[0.99016]
D(@YEAR>=1943)	0.069523	-0.047426
	(0.02984)	(0.05507)
	[2.32980]	[-0.86115]
R-squared	0.727419	0.365198
Adj. R-squared	0.661339	0.211306
Sum sq. resids	0.027319	0.093053
S.E. equation	0.028773	0.053102
F-statistic	11.00814	2.373085
Log likelihood	94.49893	68.76202
Akaike AIC	-4.071378	-2.845810
SCIwarz SC	-3.699020	-2.473453
Mean dependent	0.008264	0.015185
S.D. dependent	0.049442	0.059793

Determinant resid covariance (dof adj.)	2.20E-06
Determinant resid covariance	1.36E-06
Log likelihood	163.9544
Akaike information criterion	-6.854972
SCIwarz criterion	-6.027510
Number of coefficients	20

A3.2.3.2. Cointegration tests and weak exogeneity test (restrictions over “alphas”)

Sample: 1930 1971
Included observations: 42
Trend assumption: Linear deterministic trend
Series: SCI LPIBPC
Exogenous series: D(@YEAR>=1960) D(@YEAR>=1931) D(@YEAR>=1959) D(@YEAR=1966) D(@YEAR>=1943)
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.315250	17.33545	15.49471	0.0261
At most 1	0.033474	1.429995	3.841466	0.2318

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.315250	15.90545	14.26460	0.0273
At most 1	0.033474	1.429995	3.841466	0.2318

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Restrictions:

b(1,1)=1, a(2,1)=0

Tests of cointegration restrictions:

Hypothesized No. of CE(s)	Restricted Log-likehood	LR Statistic	Degrees of Freedom	Probability
1	163.9544	1.131350	1	0.287488

1 Cointegrating Equation(s): Convergence achieved after 9 iterations.

Restricted cointegrating coefficients (standard error in parentheses)

SCI	LPIBPC
1.000000	-0.447465
(0.00000)	(0.06122)

Adjustment coefficients (standard error in parentheses)

D(SCI)	-0.244880
	(0.06485)
D(LPIBPC)	0.000000
	(0.00000)

A3.3. Vector Autorregresive model output, and Granger causality tests, 1972-2017
A3.3.1. VAR model
Vector Autoregression Estimates
Sample (adjusted): 1972 2017
Included observations: 46 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DLPIBPC	DSCI
DLPIBPC(-1)	0.351322	0.215906
	(0.11320)	(0.12038)
	[3.10346]	[1.79349]
DLPIBPC(-2)	0.057072	0.164111
	(0.11946)	(0.12704)
	[0.47773]	[1.29178]
DSCI(-1)	-0.091827	-0.043263
	(0.08796)	(0.09354)
	[-1.04394]	[-0.46250]
DSCI(-2)	-0.114975	-0.370518
	(0.07848)	(0.08346)
	[-1.46499]	[-4.43947]
C	0.022296	0.010243
	(0.00531)	(0.00564)
	[4.20212]	[1.81536]

D(@YEAR>=1972)	-0.054133	-0.178646
	(0.02450)	(0.02605)
	[-2.20948]	[-6.85673]
D(@YEAR>=1982)	-0.125715	0.070575
	(0.02417)	(0.02570)
	[-5.20154]	[2.74592]
D(@YEAR>=1975)	0.015057	0.077337
	(0.02465)	(0.02621)
	[0.61084]	[2.95030]
D(@YEAR>=1979)	0.016850	-0.071070
	(0.02453)	(0.02609)
	[0.68682]	[-2.72409]
D(@YEAR>=2002)	-0.092899	0.078825
	(0.03591)	(0.03819)
	[-2.58689]	[2.06406]
TC2002	0.031687	-0.138315
	(0.02904)	(0.03088)
	[1.09109]	[-4.47863]
TC1999	-0.058752	0.024253
	(0.01876)	(0.01994)
	[-3.13260]	[1.21603]
R-squared	0.728886	0.802477
Adj. R-squared	0.641172	0.738572
Sum sq. resids	0.018586	0.021018
S.E. equation	0.023380	0.024863
F-statistic	8.309855	12.55741
Log likelihood	114.4512	111.6222
Akaike AIC	-4.454399	-4.331402
SCIwarz SC	-3.977362	-3.854365
Mean dependent	0.022807	0.007273
S.D. dependent	0.039031	0.048627

Determinant resid covariance (dof adj.)	3.23E-07
Determinant resid covariance	1.77E-07
Log likelihood	227.0790
Akaike information criterion	-8.829523
SCIwarz criterion	-7.875450
Number of coefficients	24

A3.3.2. Granger causality tests
VAR Granger Causality/Block Exogeneity Wald Tests
Sample: 1972 2018
Included observations: 46

Dependent variable: DLPIBPC

Excluded	Chi-sq	df	Prob.
DSCI	3.521726	2	0.1719

All	3.521726	2	0.1719

Dependent variable: DSCI

Excluded	Chi-sq	df	Prob.
DLPIBPC	9.591131	2	0.0083
All	9.591131	2	0.0083