RECENT DEVELOPMENTS ON PORTUGUESE RETROSPECTIVE NATIONAL ACCOUNTS

Nuno Valério

Resumo

Este texto descreve desenvolvimentos recentes da contabilidade nacional retrospectiva de Portugal e apresenta novas estimativas (muito provisórias) do produto interno bruto para o período 1837-1952 (o período de 1953 em diante está agora coberto por números oficiais ou semi-oficiais de confiança).

Abstract

This paper describes recent developments on Portuguese retrospective national accounts, and presents new (very provisional) figures of Portuguese gross domestic product for the period 1837-1952 (the period from 1953 on is now covered by reliable official or semi-official figures).

Contents

1. New series of Portuguese national accounts

The Instituto Nacional de Estatística (the Portuguese national statistical office, hereafter INE) began to publish a new series of Portuguese national accounts starting in 1986, the year Portugal became a member of the European Community. This series revised upwards by a significant amount (around 20 %) previous figures of the level of gross domestic product.

Such revision was confirmed by new figures of Portuguese national accounts for the period 1953-1993, prepared by a team of researchers from the Banco de Portugal (the Portuguese central bank, hereafter BP) headed by Maximiano Pinheiro (published in Pinheiro, 1997). However, although aggregate figures and disaggregation by demand items and by income items of the INE and BP series for the overlapping 1986-1993 years do match pretty well, disaggregation by sectors present puzzling differences, even if acknowledged methodological differences are taken into account. Anyway, it is possible to accept BP series as a basis for retrospective work, bearing in mind that their added value figures are based on production units and not on types of goods as the European Accounting System demands.

*

Further improvement came from new figures of Portuguese national accounts for the years 1910-1958, prepared by another team of researchers from the Banco de Portugal, which included some of the authors of the 1953-1993 series (published in Baptista et alii, 1997). However, these series suffer from a few shortcomings:

a) They only cover the continental part of the country — It is true that Madeira and the Azores were always a rather small part of the Portuguese population (less than 5 % according to population censuses) and economy (because their aggregate productivity and per capita gross domestic product was certainly lower than the national average); and it is also true that statistical information about the economic activity of Madeira and the Azores is even more scanty than the one available for the continental part of the country. Anyway, it is possible to generate national estimates based on estimates for the continental part of the country with available data and a few reasonable assumptions, and, for the sake of homogeneity of the series, such a task sould be done.

b) Although the difference between national figures and figures for the continental part of the country is certainly lower than 5 %, the differences between the series now considered and the 1953-1993 BP revised figures for the overlapping 1953-1958 years are around 20 % — This is a consequence of the fact that the 1910-1958 series was linked to the old national accounts figures and not to the revised BP series. Of course, it is possible to overcome this rather surprising choice with some additional boring computations.

c) It was assumed that value added always changed according to production indexes — This implies an upward bias in the rates of growth of sectors that significantly increased the use of intermediate consumption. I think that agriculture was one of the main sectors affected. As a consequence, the Portuguese economy shows a surprisingly stable sector structure (34 % for agriculture, 29 % for industry, 37 % for services on the eve of the First World War; 31 % for agriculture, 31 % for indutry, 38 % for services immediately after the Second World War), in spite of a significant growth of per capita gross domestic product (from 68 current escudos on the eve of the First World War, to 125 escudos at 1914 prices immediately after the Second World War, that is to say an average growth of 1.8 % per year). Moreover, I believe that this upward bias was reflected in the overall rate of growth as well, because of the importance of agriculture.

d) No nominal figures by sector were computed — This is a consequence of the fact that the improvement of price indexes proved much more difficult than might be expected, and prevents a more adequate perspective of the sector structure of the economy for the earlier years covered, because the available data is based on constant 1958 prices and not on current prices.

e) There are some rather heroic assumptions for some sectors in the earlier years covered — This means that the estimates have an unusually large margin of error until the early 1920s.

As a consequence, although much useful material is presented in these 1910-1958 estimates, it is impossible to accept them as a standard starting point for further work.

2. Work in progress

A collection of Portuguese historical statistics (focusing, of course, mainly in the 19th and 20th centuries) is being prepared by researchers from several universities, coordinated by the departament of economic and social history of the Institute of Economics of the Technical University of Lisbon (financed by a grant of the Portuguese government foundation for science and technology). This collection will, hopefully, provide new material, covering the main sectors of economic activity and extending backwards, at least until the mid-19th century, to improve the Portuguese retrospective national accounts.

Firstly, a collection of production indicators shall be available. In spite of the problems to translate production indicators into value added figures, this will provide better data to estimate real gross domestic product, specially in the services sector.

Secondly, a collection of prices and wages figures shall be available. In spite of the unavoidable problems of price indexes construction, this will provide better data to estimate nominal gross domestic product.

Last, a collection of demographic statistics shall be available. Although population figures are certainly the best data already existing for the computation of per capita gross domestic product, some improvements, specially for the 19th century, may still occur.

3. Reconsideration of existing macroeconomic data

Pending the completion of this collection work and the exploration of the possibilities it will open, it is important to reconsider previous retrospective estimates of Portuguese gross domestic product, in the light of existing macroeconomic data and the new official and semi-official series referred above. As a matter of fact, the revision of the current level of gross domestic product by around 20 % and the possibility to study structural relationships between macroeconomic variables for a period of four decades (1953-1993 using the BP figures) made previous retrospective estimates of Portuguese gross domestic product, such as those presented in Nunes, Mata, Valério, 1989 or in Bardini, Carreras, Lains, 1995, clearly obsolete.

Available macroeconomic figures include:

a) Exports and imports for the years 1776, 1777, 1796, 1797, 1799-1831, 1842, 1843, 1851, 1855, 1856, 1861 and from 1865 on — series prepared by Paula Fontoura and myself for the collection of Portuguese historical statistics referred above.

b) Government expenditure and fiscal revenue for the years 1837-1844 and from 1852 on — series prepared by Eugénia Mata for the collection of Portuguese historical statistics referred above.

c) An index of cost of living for the period from 1776 on — this is the series already prepared for Nunes, Mata, Valério, 1989, extended with the same criteria for the early 19th and late 18th centuries.

d) Population for the period from 1800 on — this is the series already prepared for Nunes, Mata, Valério, 1989, extended with the same criteria for the early 19th century.

e) Gross domestic product and its deflator for the period from 1953 on — these are the BP series referred above.

These series are presented in appendix 1.

Using these series, I tried to generate estimates of gross domestic product and its deflator for the years 1837-1844, 1848 and from 1851 on.

In spite of their lousy econometric look, the most plausible estimates were generated using the following equations:

$$\ln Y = 3.719 + 0.419\,(4.714)\ln X + 0.184\,(4.556)\ln G + 0.517\,(9.530)\ln T$$

df=40   r=1.000 r^2=1.000 r'^2=1.000   σ=0.030   f=48080   dw=1.198

$$\ln D = 0.825\,(76.2)\ln P$$

df=28   r=0.998 r^2=0.995 r'^2=0.995   σ=0.042   f=5810   dw=0.841

Where:

Y — nominal gross domestic product

X — exports

M — imports

G — government expenditure

T — fiscal revenue

D — gross domestic product deflator

P — index of cost of living

Figures in brackets are the value of t-statistic.

Comparison of actual figures with estimates generated by these equations (for the periods 1953-1993 in what concerns nominal gross domestic product and 1953-1981 in what concerns its deflator) suggests margins of error of 8 % for gross domestic product estimates and 14 % for gross domestic product deflator estimates.

Appendix 2 contains the result of these estimates for years 1842, 1843, 1855, 1856, 1861 and from 1865 on. Additional estimates were built by interpolating and extrapolating these estimates with the results generated by the following equations:

$$\ln Y = 3.811 + 0.162 \ (3.232) \ \ln G + 0.684 \ (13.316) \ \ln T$$

df=40	r=1.000	r²=1.000	r'²=1.000	σ=0.038	f=46272	dw=1.134

$$\ln Y = 3.067 + 0.295 \ (3.773) \ \ln X + 0.580 \ (7.453) \ \ln M$$

df=40	r=0.999	r²=0.998	r'²=0.998	σ=0.078	f=10867	dw=1.066

The first equation was used for years 1837-1841, 1844, 1852-1854, 1857-1860 and 1862-1864.

The second equation was used for years 1848 and 1851.

I decided not to extrapolate for the years before 1837, because the results based on foreign trade figures are rather unplausible.

Two additonal remarks must be made.

The foreign trade figures used do not include the revision of pre-World War I official figures presented in Lains, 1992, because it isimpossible to link them to official figures of later years with the data available.

Esteves, 1993 presented very persuasive arguments to criticise the use of a gross domestic product deflator which presents an elasticity to the index of cost of living different from one. However, actual figures show a persistent divergence between the two series, which may be explained by the fact that the index of cost of living gives excessive weight to agricultural items. Moreover, the use of the index of the cost of living (or any deflator with an unit elasticy to it) tends to generate an unplausible picture of the evolution of the Portuguese economy, until the Second World War. The estimates of Marques, Esteves, 1994 are a clear example of this. As a matter of fact, they present the following unplausible features:

a) Significant downward trends of the ratios exports / gross domestic product, imports / gross domestic product, government expenditure / gross domestic product and fiscal revenue / gross domestic product before the First World War.

b) Very slow recovery of the First World War crisis — per capita gross domestic product remains below the level attained on the eve of the First World War until the post-Second World War years.

Attempts to generate alternative estimates of nominal gross domestic product with more sophisticated econometric techniques using the new BP gross domestic product series led to similar problems. Appendix 3 presents an alternative estimate generated by the following equation (further lags do not improve the quality of the estimate):

$$\Delta \ln Y = 0.012 + 0.230 \ (6.570) \ \Delta \ln X + 0.189 \ (2.945) \ \Delta \ln G + 0.360 \ (5.394) \ \Delta \ln T - 0.106 \ (4.252) \ \Delta 2 \ln M - 0.094 \ (2.378) \ \Delta 3 \ln G$$

df=39   r=0.944   r^2=0.891   r'^{2}=0.875   σ=0.024   f=55.582   dw=1.749

The index of cost of living was used as gross domestic product deflator until 1952, and the figures of population are the same than in appendix 2.

Graphs 1 to 4 try to ilustrate the reasons of the choice of the standard estimate (appendix 2), with stable, gently rising, or gently declining exports / gross domestic product, imports / gross domestic product, government expenditure / gross domestic product and fiscal revenue / gross domestic product ratios between 1868 and 1913 (graph 1), and recovery of the First World War crisis until the eve of the Great Depression (graph 3), as against the alternative estimate (appendix 3), with clearly declining exports / gross domestic product, imports / gross domestic product, government expenditure / gross domestic product and fiscal revenue / gross domestic product ratios between 1868 and 1913 (graph 2), and recovery of the First World War crisis only in the 1950s (graph 4).

The main features of the evolution of the Portuguese economy pictured in the figures of appendix 2 may be summarised as follows (see table of average rates of growth below):

a) Until the mid-1850s, stagnation predominated, in a context of rising prices (various kinds of paper-money schemes plagued the Portuguese monetary situation during the first half of the 19th century).

b) Between the late 1850s and the late 1880s, there was a kind of false start of modern economic growth, in a context of stable prices (gold-standard was adopted in 1854). Anyway, growth was moderate and irregular, and there was no clear upward trend of the degree of openess of the economy or of the weight of the state in the economy.

c) Between the late 1880s and the First World War, growth became very slow and remained irregular, in a context of rising prices. The turning point was linked to the adoption of significant protectionist measures for the agricultural sector (1889) and to a financial crisis that led to the suspension of the gold-standard (1891) and a partial bankrupcy of the Portuguese government (1892). The degree of openess of the economy and of the weight of the state in the economy remained almost stable.

d) The First World War and the immediate post-First World War years witnessed a serious slump, followed by a recovery during the 1920s, specially after inflation was controled in 1924. The weight of the state in the economy increased significantly during the war, and the degree of openess of the economy increased significantly in the immediate post-war years, but the upward long-term trends of these characteristics were rather slow until the post-Second World War years.

e) Between the late 1920s and the late 1930s, there was moderate and irregular growth, in a context of stable prices.

f) During the Second World War, stagnation predominated again, in a context of inflation.

g) Between the late 1940s and the early 1970s, Portugal underwent a significant and continuous growth, common to Western Europe, Northern America and Japan, and made its definitive take-off to modern economic growth. At the begining, prices were relatively stable, but inflation began to accelerate after the second halh of the 1960s. At the same time, the Portuguese economy gradually became more open, in the context of the process of European integration, and there was a significant increase of the weight of the state in the economy.

h) Since the early1970s, there was moderate and irregular growth again. At the begining, inflation accelerated, but since the mid-1980s it was tamed, until it reached the low levels compatible with the so-called Maastricht criteria. At the same time, the degree of openess of the Portuguese economy went on increasing in the context of the process of European integration, and the weight of the state in the economy went on increasing as well.

Graph 1 — Export / gdp, import / gdp, government expenditure / gdp and fiscal revenue / gdp ratios 1868-1913 standard estimate
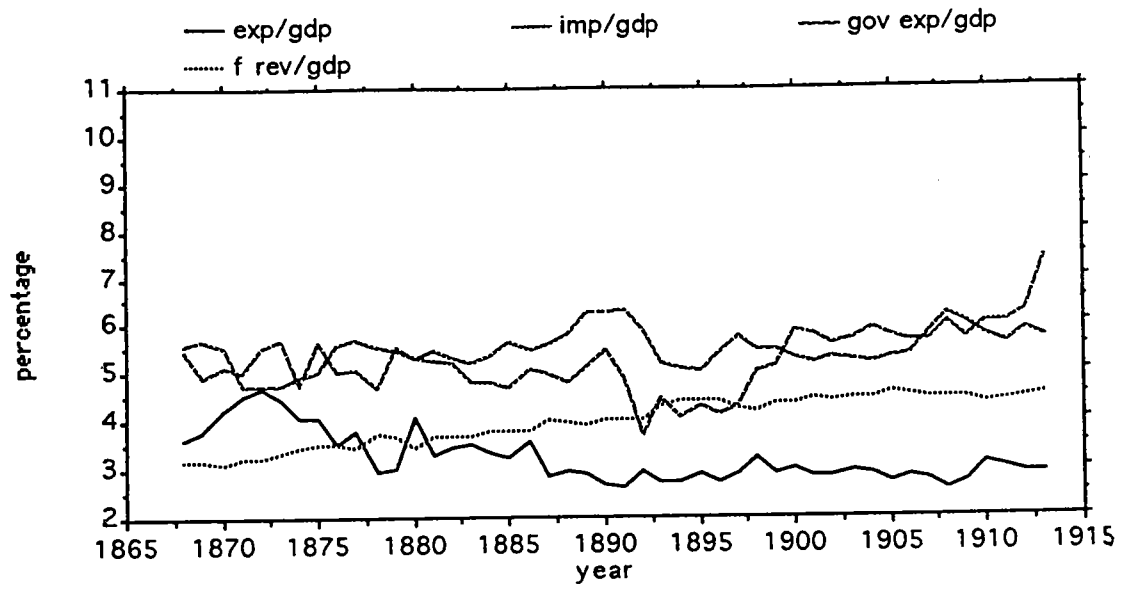
Graph 2 — Export / gdp, import / gdp, government expenditure / gdp and fiscal revenue / gdp ratios 1868-1913 alternative estimate

— exp/gdp   — imp/gdp   — gov exp/gdp

······ f rev/gdp
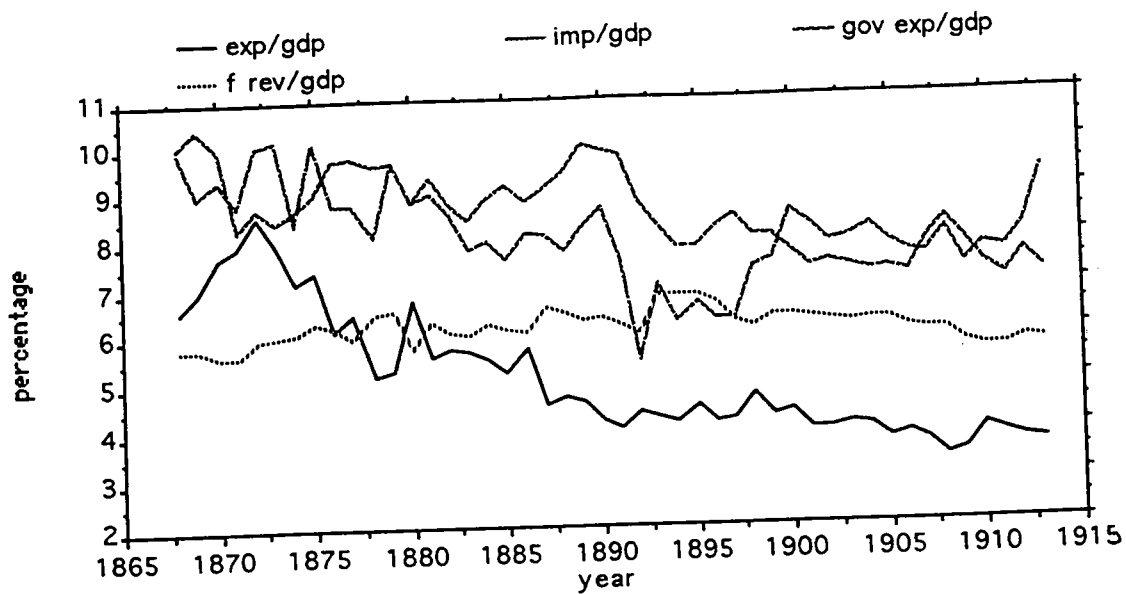
Graph 3 — Real per capita gross domestic product 1913-1953 standard estimate
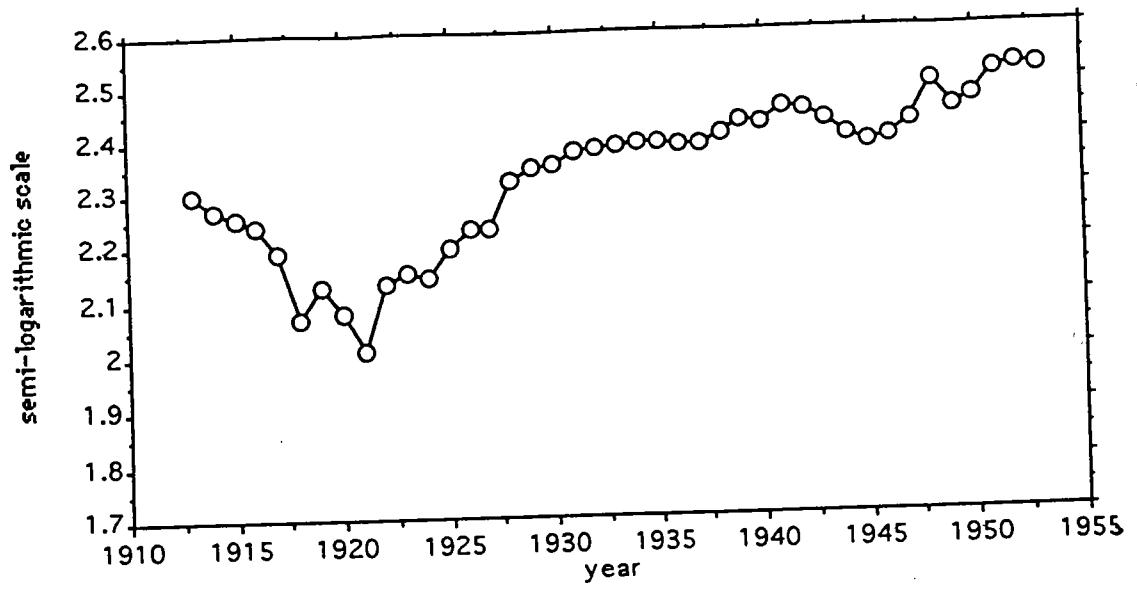
Graph 4 — Real per capita gross domestic product 1913-1953 alternative estimate
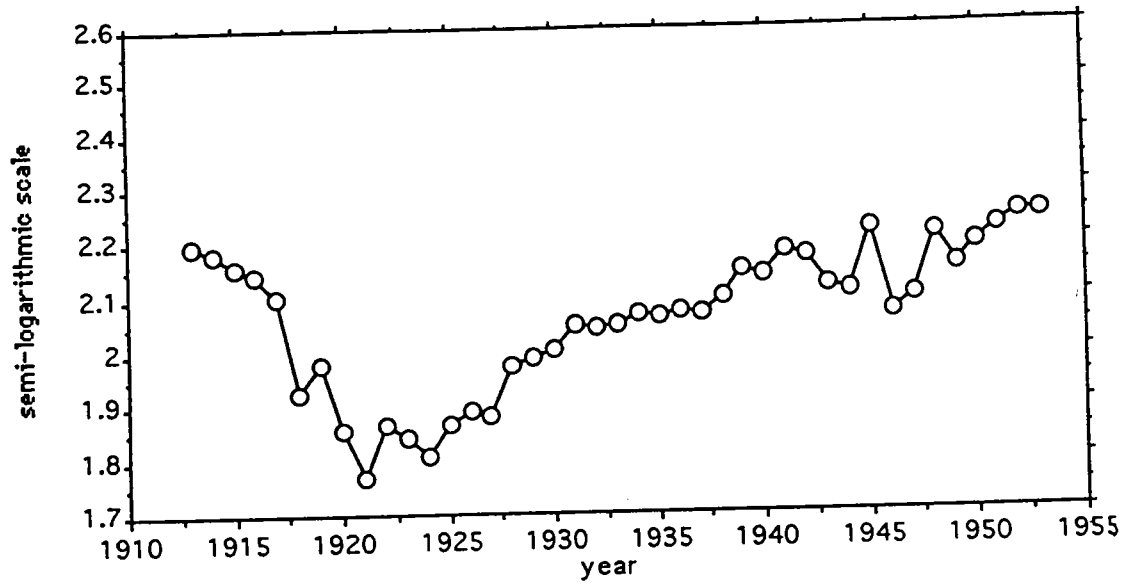
Table — Average rates of growth (percentage)

period	nominal gdp	price level	real gdp	population	per capita real gdp
1837-1856	+2.4	+1.5	+0.8*	+0.3	+0.5*
1856-1890	+2.7	-0.1*	+2.8	+0.7	+2.1
1890-1913	+1.6	+0.6	+1.1	+0.8	+0.3
1913-1929	+21.4	+20.2	+1.1*	+0.7	+0.5*
1929-1938	+1.7	-0.8*	+2.5	+1.3	+1.2
1938-1947	+8.0	+7.6	+0.3*	+0.9	-0.6*
1947-1973	+7.2	+2.2	+5.1	+0.3	+4.7
1973-1993	+19.6	+15.7	+4.0	+0.6	+3.4

* statistically not different from 0 at a 5 % confidence level

14

References

Baptista, Dina; Martins, Carlos; Pinheiro, Maximiano; Reis, Jaime, *New estimates for Portugal's GDP 1910-1958* , Banco de Portugal, Lisboa, 1997.

Bardini, Carlo; Carreras, Albert; Lains, Pedro, "The national accounts for Italy, Spain and Portugal", *Scandinavian Economic History Review,* volume 43 (1), 1995.

Esteves, Paulo, *Portuguese prices before 1947: inconsistency between the observed cost of living index and the gdp price estimation of Nunes, Mata, Valério, 1989,* Banco de Portugal, Lisboa, working paper no. 19/93, 1993.

Lains, Pedro, *Foreign trade and economic growth in the European periphery: Portugal, 1851-1913,* Ph. D. thesis presented at the European University Institute, Firenze, 1992.

Marques, Carlos; Esteves, Paulo , *Portuguese gdp and its deflator before 1947: a revision of the data produced by Nunes, Mata, Valério, 1989,* Banco de Portugal, Lisboa, working paper no. 4/94, 1994.

Nunes, Ana Bela; Mata, Eugénia; Valério, Nuno , "Portuguese economic growth 1835-1985", *The Journal of European Economic History* , volume 18, no. 2, 1989.

Pinheiro, Maximiano; et allii , *Séries longas para a economia portuguesa* , Banco de Portugal, Lisboa, 1997.

Appendix 1 — Basic data

year	gross domestic product (10^6 PTE)	exports (10^6 PTE)	imports (10^6 PTE)	public expenditure (10^6 PTE)	fiscal revenue (10^6 PTE)	index of cost of living (basis 1914)	gdp deflator (basis 1953)	population (10^3)
1776	•	9	10	•	•	0.44	•	•
1777	•	8	9	•	•	0.47	•	•
1778	•	•	•	•	•	0.49	•	•
1779	•	•	•	•	•	0.46	•	•
1780	•	•	•	•	•	0.53	•	•
1781	•	•	•	•	•	0.49	•	•
1782	•	•	•	•	•	0.47	•	•
1783	•	•	•	•	•	0.52	•	•
1784	•	•	•	•	•	0.54	•	•
1785	•	•	•	•	•	0.50	•	•
1786	•	•	•	•	•	0.53	•	•
1787	•	•	•	•	•	0.52	•	•
1788	•	•	•	•	•	0.51	•	•
1789	•	•	•	•	•	0.61	•	•
1790	•	•	•	•	•	0.66	•	•
1791	•	•	•	•	•	0.60	•	•
1792	•	•	•	•	•	0.60	•	•
1793	•	•	•	•	•	0.67	•	•
1794	•	•	•	•	•	0.63	•	•
1795	•	•	•	•	•	0.62	•	•
1796	•	21	24	•	•	0.64	•	•
1797	•	11	19	•	•	0.69	•	•
1798	•	•	•	•	•	0.80	•	•
1799	•	32	33	•	•	0.79	•	•
1800	•	31	33	•	•	1.03	•	3186
1801	•	35	34	•	•	0.97	•	3190
1802	•	32	29	•	•	0.93	•	3194
1803	•	30	28	•	•	1.01	•	3198
1804	•	30	30	•	•	1.15	•	3202
1805	•	30	35	•	•	0.98	•	3206
1806	•	31	31	•	•	0.92	•	3209

16

year	gross domestic product (10⁶ PTE)	exports (10⁶ PTE)	imports (10⁶ PTE)	public expenditure (10⁶ PTE)	fiscal revenue (10⁶ PTE)	index of cost of living (basis 1914)	gdp deflator (basis 1953)	population (10³)
	gross domestic product $(10^6$ PTE$)$	exports $(10^6$ PTE$)$	imports $(10^6$ PTE$)$	public expenditure $(10^6$ PTE$)$	fiscal revenue $(10^6$ PTE$)$	index of cost of living (basis 1914)	gdp deflator (basis 1953)	population (10^3)
1807	•	27	29	•	•	0.91	•	3213
1808	•	7	3	•	•	0.98	•	3217
1809	•	12	14	•	•	1.01	•	3221
1810	•	13	21	•	•	1.30	•	3225
1811	•	8	43	•	•	1.56	•	3229
1812	•	9	39	•	•	1.34	•	3233
1813	•	10	38	•	•	1.12	•	3237
1814	•	20	32	•	•	0.96	•	3241
1815	•	23	37	•	•	0.96	•	3245
1816	•	21	30	•	•	0.91	•	3249
1817	•	21	27	•	•	1.02	•	3253
1818	•	23	31	•	•	0.85	•	3257
1819	•	16	24	•	•	0.65	•	3261
1820	•	16	21	•	•	0.52	•	3282
1821	•	14	22	•	•	0.55	•	3304
1822	•	14	19	•	•	0.64	•	3325
1823	•	10	17	•	•	0.68	•	3347
1824	•	10	17	•	•	0.70	•	3369
1825	•	13	16	•	•	0.63	•	3390
1826	•	9	15	•	•	0.63	•	3413
1827	•	11	16	•	•	0.59	•	3435
1828	•	10	12	•	•	0.54	•	3457
1829	•	9	12	•	•	0.58	•	3480
1830	•	9	13	•	•	0.52	•	3502
1831	•	7	10	•	•	0.58	•	3525
1832	•	•	•	•	•	0.53	•	3548
1833	•	•	•	•	•	0.46	•	3571
1834	•	•	•	•	•	0.56	•	3594
1835	•	•	•	•	•	0.70	•	3618
1836	•	•	•	•	•	0.63	•	3641
1837	•	•	•	9	6	0.49	•	3665
1838	•	•	•	8	6	0.49	•	3689
1839	•	•	•	8	6	0.51	•	3713
1840	•	•	•	8	6	0.58	•	3737

17

year	gross domestic product (10⁶ PTE)	exports (10⁶ PTE)	imports (10⁶ PTE)	public expenditure (10⁶ PTE)	fiscal revenue (10⁶ PTE)	index of cost of living (basis 1914)	gdp deflator (basis 1953)	population (10³)
1841	·	·	·	11	6	0.61	·	3748
1842	·	7	10	14	7	0.54	·	3759
1843	·	7	12	13	8	0.50	·	3771
1844	·	·	·	12	8	0.42	·	3782
1845	·	·	·	·	·	0.42	·	3793
1846	·	·	·	·	·	0.54	·	3804
1847	·	·	·	·	·	0.51	·	3816
1848	·	8	11	·	·	0.45	·	3827
1849	·	·	·	·	·	0.48	·	3838
1850	·	·	·	·	·	0.55	·	3850
1851	·	8	12	·	·	0.50	·	3861
1852	·	·	·	11	10	0.49	·	3873
1853	·	·	·	12	9	0.62	·	3884
1854	·	·	·	12	9	0.76	·	3892
1855	·	12	16	13	10	0.74	·	3901
1856	·	15	19	14	10	0.93	·	3909
1857	·	·	·	16	10	0.77	·	3923
1858	·	·	·	17	10	0.70	·	3960
1859	·	·	·	16	11	0.78	·	3998
1860	·	·	·	15	11	0.75	·	4035
1861	·	14	25	18	12	0.80	·	4110
1862	·	·	·	21	12	0.81	·	4149
1863	·	·	·	21	13	0.77	·	4188
1864	·	·	·	20	14	0.80	·	4213
1865	·	16	24	20	14	0.77	·	4238
1866	·	17	25	21	13	0.80	·	4264
1867	·	16	26	25	13	0.86	·	4289
1868	·	16	24	24	14	0.80	·	4314
1869	·	17	22	26	14	0.79	·	4340
1870	·	20	24	26	15	0.74	·	4366
1871	·	21	24	22	15	0.72	·	4392
1872	·	23	27	24	16	0.72	·	4418
1873	·	24	30	25	18	0.95	·	4444
1874	·	23	27	28	20	0.78	·	4471

year	gross domestic product (10⁶ PTE)	exports (10⁶ PTE)	imports (10⁶ PTE)	public expen-diture (10⁶ PTE)	fiscal revenue (10⁶ PTE)	index of cost of living (basis 1914)	gdp deflator (basis 1953)	popu-lation (10³)
1875	•	24	34	30	21	0.79	•	4497
1876	•	21	30	33	21	0.80	•	4524
1877	•	23	31	35	21	0.91	•	4551
1878	•	18	29	34	23	0.90	•	4591
1879	•	18	33	33	22	0.86	•	4632
1880	•	25	32	32	21	0.80	•	4673
1881	•	21	33	35	23	0.82	•	4715
1882	•	23	34	34	24	0.83	•	4757
1883	•	23	31	34	24	0.79	•	4799
1884	•	23	33	36	26	0.73	•	4842
1885	•	23	33	39	26	0.70	•	4885
1886	•	26	37	40	28	0.72	•	4929
1887	•	21	37	42	30	0.70	•	4973
1888	•	23	38	46	32	0.70	•	5017
1889	•	23	42	51	32	0.76	•	5062
1890	•	22	44	50	32	0.86	•	5105
1891	•	21	40	51	32	0.83	•	5138
1892	•	25	31	49	34	0.85	•	5182
1893	•	23	38	45	37	0.87	•	5220
1894	•	24	36	44	39	0.89	•	5251
1895	•	27	40	47	41	0.84	•	5275
1896	•	26	40	51	42	0.85	•	5297
1897	•	27	40	54	40	0.92	•	5331
1898	•	31	49	53	40	0.96	•	5365
1899	•	29	51	54	43	0.94	•	5407
1900	•	31	60	54	45	0.91	•	5450
1901	•	28	58	52	44	0.90	•	5497
1902	•	28	56	53	44	0.87	•	5552
1903	•	31	59	54	46	0.90	•	5613
1904	•	31	62	55	47	0.96	•	5670
1905	•	29	61	56	48	0.95	•	5720
1906	•	31	60	57	48	0.95	•	5758
1907	•	30	62	64	49	0.95	•	5800
1908	•	28	67	69	50	0.96	•	5840

year	gross domestic product (10^6 PTE)	exports (10^6 PTE)	imports (10^6 PTE)	public expen- diture (10^6 PTE)	fiscal revenue (10^6 PTE)	index of cost of living (basis 1914)	gdp deflator (basis 1953)	popu- lation (10^3)
1909	•	31	65	69	51	0.97	•	5883
1910	•	36	70	66	50	0.93	•	5937
1911	•	34	68	63	50	0.99	•	6004
1912	•	34	75	70	53	0.98	•	6008
1913	•	35	89	69	55	1.01	•	6004
1914	•	27	69	78	49	1.00	•,	6053
1915	•	34	76	114	46	1.12	•	6107
1916	•	56	129	138	48	1.37	•	6147
1917	•	55	137	157	50	1.62	•	6186
1918	•	83	178	221	57	2.93	•	6104
1919	•	107	229	309	76	3.35	•	6082
1920	•	222	691	383	109	5.80	•	6084
1921	•	225	933	484	152	9.09	•	6148
1922	•	444	1252	868	247	10.99	•	6216
1923	•	684	2229	1179	438	17.26	•	6271
1924	•	949	2958	1299	644	23.99	•	6344
1925	•	862	2484	1468	774	23.06	•	6429
1926	•	736	2342	1665	861	22.08	•	6507
1927	•	723	2663	1744	988	23.71	•	6580
1928	•	1029	2679	1712	1257	22.69	•	6658
1929	•	1073	2529	1809	1496	23.61	•	6729
1930	•	945	2406	1796	1494	22.43	•	6812
1931	•	812	1674	1787	1460	19.90	•	6908
1932	•	791	1707	1888	1489	19.49	•	7003
1933	•	802	1905	1952	1522	19.48	•	7096
1934	•	909	1965	1946	1583	19.68	•	7189
1935	•	923	2294	1919	1617	19.72	•	7279
1936	•	1026	1994	1984	1612	20.22	•	7379
1937	•	1202	2353	2035	1663	21.02	•	7476
1938	•	1139	2300	2257	1752	20.37	•	7575
1939	•	1336	2077	2357	1684	19.18	•	7677
1940	•	1619	2441	2382	1727	20.09	•	7758
1941	•	2972	2468	2786	1911	22.58	•	7800
1942	•	3939	2477	2928	2364	27.58	•	7859

20

year	gross domestic product	exports	imports	public expen- diture	fiscal revenue	index of cost of living	gdp deflator	popu- lation
	(10^6 PTE)	(10^6 PTE)	(10^6 PTE)	(10^6 PTE)	(10^6 PTE)	(basis 1914)	(basis 1953)	(10^3)
1943	•	4035	3323	3619	2453	31.18	•	7934
1944	•	3166	3920	3456	2526	32.08	•	8013
1945	•	3237	4050	3835	2570	34.97	•	8101
1946	•	4587	6857	4394	2968	39.80	•	8182
1947	•	4307	9445	5621	3386	41.03	•	8258
1948	•	4295	10351	5631	3494	33.81	•	8358
1949	•	4089	9043	5581	3687	39.20	•	8434
1950	•	5334	7879	5024	3842	38.19	•	8512
1951	•	7559	9472	5493	4280	38.72	•	8547
1952	•	6811	9988	5701	4548	38.78	•	8563
1953	58993	6283	9513	6238	4539	39.13	1.00	8579
1954	62564	7297	10085	6520	4777	39.44	1.01	8632
1955	65447	8165	11453	7156	5135	40.77	1.02	8693
1956	69943	8621	12725	7389	5465	42.56	1.06	8756
1957	74250	8289	14422	8009	5790	42.57	1.07	8818
1958	79191	8299	13809	8453	6255	43.18	1.08	8889
1959	84042	8351	13681	9494	6637	43.75	1.10	8962
1960	88994	9408	15695	11057	7269	44.72	1.11	9037
1961	92648	9373	18863	13158	8233	44.61	1.12	9031
1962	103987	10632	16830	14542	8608	44.59	1.13	9020
1963	107438	12024	18866	15355	9428	45.75	1.13	9082
1964	116626	14831	22377	16789	9750	47.99	1.16	9122
1965	135681	16573	26553	17249	11527	49.55	1.23	9129
1966	144812	17812	29406	18648	12631	50.81	1.25	9109
1967	162217	20166	30453	22022	14928	52.93	1.35	9103
1968	175432	21917	33858	24051	16409	53.98	1.39	9115
1969	188229	24526	37262	26842	18872	55.43	1.45	9097
1970	212358	27299	45495	30802	23010	58.22	1.51	9044
1971	245768	30248	52416	35640	24798	62.53	1.58	8990
1972	289955	35255	60684	39832	29478	67.78	1.69	8970
1973	342817	45410	74776	47609	34623	72.99	1.90	8976
1974	405744	58014	118095	61863	41694	100.64	2.18	9098
1975	469776	49328	99474	84847	47250	119.29	2.65	9426
1976	561947	55089	130859	122687	64787	143.91	3.09	9665

year	gross domestic product (10⁶ PTE)	exports (10⁶ PTE)	imports (10⁶ PTE)	public expenditure (10⁶ PTE)	fiscal revenue (10⁶ PTE)	index of cost of living (basis 1914)	gdp deflator (basis 1953)	population (10³)
1977	722257	77685	190684	155583	89714	191.36	3.73	9736
1978	893364	106451	230128	210545	108792	242.57	4.34	9801
1979	1135905	176051	331927	273312	137455	301.03	5.13	9856
1980	1476316	231623	475486	364681	189414	356.41	6.34	9909
1981	1773726	256913	609014	481709	252614	413.72	7.40	9957
1982	2144820	331743	756981	582143	317135	•	8.69	10059
1983	2740339	508568	899340	737078	426834	•	10.90	10123
1984	3365099	760580	1160633	913641	502138	•	13.42	10197
1985	4131014	971747	1326529	1202886	617711	•	16.12	10173
1986	5048501	1082261	1444026	1456746	747596	•	19.01	10199
1987	5948432	1311003	1965315	1624305	986916	•	20.75	10228
1988	7100357	1581231	2555163	1911435	1293349	•	23.43	10254
1989	8388429	2015711	3003196	2296570	1621140	•	25.85	10281
1990	10072063	2335798	3589570	2836654	1891001	•	28.66	10302
1991	11534190	2354083	3811076	3356655	2295918	•	31.73	10304
1992	12951001	2475202	4087577	4124947	2845346	•	34.40	10280
1993	13545854	2546037	3982457	4218861	2786209	•	36.05	10313

Appendix 2 — Portuguese gross domestic product and related variables

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports/gdp (%)	imports/gdp (%)	gov. exp./gdp (%)	f. rev./gdp (%)
1837	204	367	100	•	•	4	3
1838	198	356	97	•	•	4	3
1839	198	345	93	•	•	4	3
1840	200	313	84	•	•	4	3
1841	223	335	89	•	•	5	3
1842	243	403	107	3	4	6	3
1843	250	442	117	3	5	5	3
1844	257	525	139	•	•	4	3
...							
1848	247	477	125	3	4	•	•
...							
1851	255	451	117	3	5	•	•
1852	300	540	139	•	•	4	3
1853	296	439	113	•	•	4	3
1854	295	370	95	•	•	4	3
1855	308	395	101	4	5	4	3
1856	324	344	88	5	6	4	3
1857	335	415	106	•	•	5	3
1858	341	457	115	•	•	5	3
1859	344	422	106	•	•	5	3
1860	346	438	109	•	•	4	3
1861	366	440	107	4	7	5	3
1862	388	461	111	•	•	5	3
1863	402	498	119	•	•	5	3
1864	428	514	122	•	•	5	3
1865	429	532	126	4	6	5	3
1866	415	499	117	4	6	5	3
1867	430	487	113	4	6	6	3
1868	441	530	123	4	5	6	3
1869	455	552	127	4	5	6	3

year	gross domestic product nominal (10⁶ PTE)	gross domestic product 1914 prices (10⁶ PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1870	470	602	138	4	5	6	3
1871	469	615	140	5	5	5	3
1872	497	651	147	5	5	5	3
1873	528	550	124	4	6	5	3
1874	563	690	154	4	5	5	3
1875	595	722	161	4	6	5	4
1876	599	720	159	4	5	6	4
1877	613	662	145	4	5	6	3
1878	612	667	145	3	5	6	4
1879	596	674	146	3	6	5	4
1880	608	730	156	4	5	5	3
1881	634	746	158	3	5	5	4
1882	650	757	159	3	5	5	4
1883	649	788	164	4	5	5	4
1884	678	878	181	3	5	5	4
1885	700	939	192	3	5	6	4
1886	737	966	196	4	5	5	4
1887	754	1011	203	3	5	6	4
1888	798	1070	213	3	5	6	4
1889	813	1018	201	3	5	6	4
1890	810	916	179	3	5	6	4
1891	811	945	184	3	5	6	4
1892	841	961	185	3	4	6	4
1893	860	964	185	3	4	5	4
1894	880	968	184	3	4	5	4
1895	931	1074	204	3	4	5	4
1896	953	1088	205	3	4	5	4
1897	946	1013	190	3	4	6	4
1898	967	999	186	3	5	5	4
1899	988	1038	192	3	5	5	4
1900	1019	1101	202	3	6	5	4
1901	994	1084	197	3	6	5	4
1902	998	1119	202	3	6	5	4

24

year	gross domestic product nominal (10⁶ PTE)	gross domestic product 1914 prices (10⁶ PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1903	1033	1126	201	3	6	5	4
1904	1053	1088	192	3	6	5	4
1905	1059	1104	193	3	6	5	5
1906	1068	1113	193	3	6	5	4
1907	1096	1142	197	3	6	6	4
1908	1120	1157	198	3	6	6	4
1909	1137	1165	198	3	6	6	4
1910	1150	1220	205	3	6	6	4
1911	1133	1141	190	3	6	6	4
1912	1191	1210	201	3	6	6	4
1913	1209	1197	199	3	7	6	5
1914	1129	1128	186	2	6	7	4
1915	1208	1099	180	3	6	9	4
1916	1383	1065	173	4	9	10	4
1917	1431	960	155	4	10	11	3
1918	1737	715	117	5	10	13	3
1919	2227	821	135	5	10	14	3
1920	3119	731	120	7	22	12	4
1921	3870	626	102	6	24	13	4
1922	6131	848	136	7	20	14	4
1923	9299	886	141	7	24	13	5
1924	12133	881	139	8	24	11	5
1925	13450	1009	157	6	18	11	6
1926	14203	1104	170	5	16	12	6
1927	15344	1125	171	5	17	11	6
1928	18249	1388	208	6	15	9	7
1929	20304	1494	222	5	12	9	7
1930	19877	1526	224	5	12	9	8
1931	19191	1626	235	4	9	9	8
1932	19508	1681	240	4	9	10	8
1933	19892	1715	242	4	10	10	8
1934	20668	1767	246	4	10	9	8
1935	20890	1783	245	4	11	9	8

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1936	21322	1783	242	5	9	9	8
1937	22288	1805	241	5	11	9	7
1938	23149	1924	254	5	10	10	8
1939	23414	2045	266	6	9	10	7
1940	24454	2056	265	7	10	10	7
1941	29039	2217	284	10	8	10	7
1942	34111	2208	281	12	7	9	7
1943	36282	2122	267	11	9	10	7
1944	35228	2013	251	9	11	10	7
1945	36351	1954	241	9	11	11	7
1946	42294	2023	247	11	18	10	7
1947	46930	2189	265	9	20	12	7
1948	47693	2609	312	9	22	12	7
1949	48599	2354	279	8	19	11	8
1950	50664	2507	295	11	16	10	8
1951	57360	2806	328	13	17	10	7
1952	58678	2867	335	12	17	10	8
1953	58993	2861	334	11	16	11	8
1954	62564	3010	349	12	16	10	8
1955	65447	3103	357	12	17	11	8
1956	69943	3215	367	12	18	11	8
1957	74250	3363	381	11	19	11	8
1958	79191	3567	401	10	17	11	8
1959	84042	3709	414	10	16	11	8
1960	88994	3887	430	11	18	12	8
1961	92648	4026	446	10	20	14	9
1962	103987	4450	493	10	16	14	8
1963	107438	4622	509	11	18	14	9
1964	116626	4903	538	13	19	14	8
1965	135681	5366	588	12	20	13	8
1966	144812	5614	616	12	20	13	9
1967	162217	5850	643	12	19	14	9
1968	175432	6151	675	12	19	14	9

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports /gdp (%)	imports /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1969	188229	6305	693	13	20	14	10
1970	212358	6845	757	13	21	15	11
1971	245768	7569	842	12	21	15	10
1972	289955	8363	932	12	21	14	10
1973	342817	8785	979	13	22	14	10
1974	405744	9054	995	14	29	15	10
1975	469776	8609	913	11	21	18	10
1976	561947	8832	914	10	23	22	12
1977	722257	9399	965	11	26	22	12
1978	893364	10013	1022	12	26	24	12
1979	1135905	10759	1092	15	29	24	12
1980	1476316	11323	1143	16	32	25	13
1981	1773726	11648	1170	14	34	27	14
1982	2144820	11992	1192	15	35	27	15
1983	2740339	12219	1207	19	33	27	16
1984	3365099	12185	1195	23	34	27	15
1985	4131014	12452	1224	24	32	29	15
1986	5048501	12908	1266	21	29	29	15
1987	5948432	13923	1361	22	33	27	17
1988	7100357	14722	1436	22	36	27	18
1989	8388429	15768	1534	24	36	27	19
1990	10072063	17075	1657	23	36	28	19
1991	11534190	17663	1714	20	33	29	20
1992	12951001	18297	1780	19	32	32	22
1993	13545854	18263	1771	19	29	31	21

Appendix 3 — Alternative estimate of Portuguese gross domestic product

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1868	243	304	70	7	10	10	6
1869	248	314	72	7	9	10	6
1870	260	352	81	8	9	10	6
1871	269	373	85	8	9	8	6
1872	272	378	85	9	10	9	6
1873	296	312	70	8	10	8	6
1874	320	410	92	7	8	9	6
1875	331	419	93	7	10	9	6
1876	342	428	95	6	9	10	6
1877	355	391	86	6	9	10	6
1878	353	392	85	5	8	10	6
1879	339	394	85	5	10	10	7
1880	367	458	98	7	9	9	6
1881	371	453	96	6	9	9	6
1882	393	474	100	6	9	9	6
1883	399	505	105	6	8	8	6
1884	408	559	115	6	8	9	6
1885	430	614	126	5	8	9	6
1886	456	634	129	6	8	9	6
1887	461	659	132	5	8	9	7
1888	491	702	140	5	8	9	6
1889	506	666	132	5	8	10	6
1890	511	594	116	4	9	10	6
1891	522	629	123	4	8	10	6
1892	562	661	127	4	5	9	6
1893	544	625	120	4	7	8	7
1894	569	640	122	4	6	8	7
1895	601	715	136	4	7	8	7
1896	628	738	139	4	6	8	7
1897	641	696	131	4	6	8	6

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1898	659	687	128	5	7	8	6
1899	673	716	132	4	8	8	6
1900	699	768	141	4	9	8	6
1901	701	779	142	4	8	7	6
1902	706	811	146	4	8	7	6
1903	737	819	146	4	8	7	6
1904	758	789	139	4	8	7	6
1905	770	811	142	4	8	7	6
1906	790	832	144	4	8	7	6
1907	809	852	147	4	8	8	6
1908	831	860	148	3	8	8	6
1909	876	904	154	4	7	8	6
1910	893	960	162	4	8	7	6
1911	893	902	150	4	8	7	6
1912	918	937	156	4	8	8	6
1913	956	940	156	4	9	7	6
1914	918	918	152	5	8	8	5
1915	978	873	144	5	8	12	5
1916	1167	851	139	5	11	12	4
1917	1264	780	128	4	11	12	4
1918	1503	513	84	6	12	15	4
1919	1946	561	90	5	12	16	4
1920	2554	440	72	9	27	15	4
1921	3280	361	59	7	28	15	5
1922	5011	450	73	9	25	17	5
1923	7507	485	81	9	30	16	6
1924	9824	410	68	10	30	13	7
1925	10919	474	74	8	23	13	7
1926	11221	500	78	7	21	15	8
1927	11848	500	70	6	22	15	8
1928	14296	610	95	7	19	12	9
1929	15621	660	98	7	16	12	10
1930	15508	601	101	6	16	12	10

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1931	15432	775	112	5	11	12	9
1932	15090	774	111	5	11	13	10
1933	15509	796	112	5	12	13	10
1934	16535	840	117	5	12	12	10
1935	16617	843	116	6	14	12	10
1936	17776	879	119	6	11	11	9
1937	18451	878	117	7	13	11	9
1938	19390	952	126	6	12	12	9
1939	20676	1078	140	6	10	11	8
1940	21446	1068	138	8	11	11	8
1941	26645	1180	151	11	9	10	7
1942	32133	1165	148	12	8	9	7
1943	32613	1046	132	12	10	11	8
1944	32978	1028	128	10	12	10	8
1945	33601	1346	166	10	12	11	8
1946	38207	960	117	12	18	12	8
1947	42480	1035	125	10	22	13	8
1948	46043	1362	163	9	22	12	8
1949	46992	1199	142	9	19	12	8
1950	50726	1328	156	11	16	10	8
1951	55306	1428	167	14	17	10	8
1952	58374	1505	176	12	17	10	8
1953	58993	1508	176	11	16	11	8
1954	62564	1586	184	12	16	10	8
1955	65447	1635	188	12	17	11	8
1956	69943	1694	193	12	18	11	8
1957	74250	1772	201	11	19	11	8
1958	79191	1879	211	10	17	11	8
1959	84042	1954	218	10	16	11	8
1960	88994	2048	227	11	18	12	8
1961	92648	2121	235	10	20	14	9
1962	103987	2345	260	10	16	14	8
1963	107438	2435	268	11	18	14	9

year	gross domestic product nominal (10^6 PTE)	gross domestic product 1914 prices (10^6 PTE)	per capita gdp 1914 prices (PTE)	exports/ /gdp (%)	imports/ /gdp (%)	gov. exp. /gdp (%)	f. rev./ /gdp (%)
1964	116626	2583	283	13	19	14	8
1965	135681	2827	310	12	20	13	8
1966	144812	2958	325	12	20	13	9
1967	162217	3082	339	12	19	14	9
1968	175432	3241	356	12	19	14	9
1969	188229	3322	365	13	20	14	10
1970	212358	3606	399	13	21	15	11
1971	245768	3988	444	12	21	15	10
1972	289955	4406	491	12	21	14	10
1973	342817	4629	516	13	22	14	10
1974	405744	4770	524	14	29	15	10
1975	469776	4536	481	11	21	18	10
1976	561947	4653	481	10	23	22	12
1977	722257	4952	509	11	26	22	12
1978	893364	5275	538	12	26	24	12
1979	1135905	5669	575	15	29	24	12
1980	1476316	5966	602	16	32	25	13
1981	1773726	6137	616	14	34	27	14
1982	2144820	6318	628	15	35	27	15
1983	2740339	6438	636	19	33	27	16
1984	3365099	6420	630	23	34	27	15
1985	4131014	6561	645	24	32	29	15
1986	5048501	6801	667	21	29	29	15
1987	5948432	7336	717	22	33	27	17
1988	7100357	7756	756	22	36	27	18
1989	8388429	8308	808	24	36	27	19
1990	10072063	8996	873	23	36	28	19
1991	11534190	9306	903	20	33	29	20
1992	12951001	9640	938	19	32	32	22
1993	13545854	9622	933	19	29	31	21