*Monetary and Fiscal Policies in Greece: 1833-1914**

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1. Introduction

From 1833 — when reconstruction started — to 1914 — when the international gold standard broke down — the Greek economy experienced sharp and permanent increases in government expenditure, a continuous fall in income tax revenues as well as a persistent monetization of budget deficits.

It is well known (Phelps, 1973; Barro, 1979, 1987; Mankiw, 1987; Grilli, 1988, 1989) that inflation is viewed as a public finance phenomenon. Studying the behaviour of Greek monetary and fiscal authorities across different time periods in the past, we conclude that governments largely used inflation in order to derive revenues (seigniorage) and finance their budget deficits. Ultimately, several episodes of supension of metallic convertibility took place and Greece experienced long-lived irredeemable paper currency standards.

The main purpose of this paper is to present some historical perspective on the behaviour of the monetary and fiscal policies pursued in Greece during the period from the early 1830s until the collapse of the gold standard. Furthermore, the existence of reliable

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data for monetary and fiscal aggregates gives us the chance to highlight the link that exists between government budget problems, fluctuations of monetary variables and exchange rate movements. It should be noted that these data are not only unpublished but also their existence is probably unknown to Greek scholars. Hence, we consider that an appendix containing the main time-series with their sources would be useful to Greek and non-Greek researchers.

We proceed as follows. We divide the story of Greek monetary and fiscal policies into three parts. The first part (Section 2.1) concerns the period from 1833 to 1876. The starting point is 1833 because this year is the earliest for which we have a complete data series at least for the fiscal variables. The ending point is 1976 when bimetallism ended and a long period of irredeemable paper currency standards started. The second part of the story (Section 2.2) concerns the period from 1877 to 1909. During this period a fiat monetary system prevailed. The third part (Section 2.3) concerns the period from 1910 — when Greece adopted a gold-exchange based regime — until 1914 — when WWI broke out and the gold standard collapsed. Finally, Section 3 offers some concluding remarks while an appendix at the end of the paper contains some of the historical data.

2. The pre-WWI Period (1833-1914)

Tables 1 and 2 present the main features of the fiscal and monetary policies pursued. They reveal the existence of a close link between fiscal considerations and monetary policies. Periods of high levels of government expenditure were characterized by large seigniorage needs, sharp and divergent increases in note circulation and sharp and divergent reductions in the metallic reserves of the central bank. Moreover, linking the Drachma/French franc exchange-rate movements [1] with government financing decisions we can have some evidence on what caused the suspensions of metallic convertibility.

[1] For the pre-WWI period we only study the Drachma/French franc exchange rate movements since the drachma was tied to the French franc, the nominal anchor of the Latin Monetary Union to which Greece belonged.

Table 1
Selected Fiscal Indicators: Greece, 1833-1914

Monetary Episodes	Government Spending (%)	Interest Payments (%)	Income Taxes (%)	Seigniorage (%)
Gold-Silver Standard				
1833-47	144.6	37.6	55.7	0.3*
Suspension of Convertibility(1st epis.)				
1848	118.3	28.9	49.2	-4.5
Gold-Silver Standard				
1849-68	124.0	23.3	45.7	5.03
Suspension of Convertibility(2nd epis.)				
1869-70	126.1	31.6	33.9	5.3
Gold-Silver Standard				
1871-76	109.5	26.6	32.7	4.2
Suspension of Convertibility(3rd epis.)				
1877-84	163.1	32.5	24.3	14.4
Gold Standard				
1885	206.8	51.8	19.0	12.3
Suspension of Convertibility(4th epis.)				
1886-1909	127.5	40.8	18.6	2.8
Inflationary period				
1886-97	135.8	34.5	20.1	5.5
Deflationary period				
1898-1909	119.3	48.3**	17.2	0.07
Gold-Exchange Standard				
1910-14	166.7	31.8***	17.3	18.3

Notes: The Table presents the mean values of the variables in question in selected sub-periods. All variables are expressed as percent of total tax revenues. Government spending is central government spending inclusive of interest payments. Seigniorage has been measured as the product of the rate of growth of monetary base by the real monetary base as percent to total tax revenues, i.e., $(\sigma_t M_{t-1}/TR)$. We measure monetary base as the banknotes in circulation only. This is because commercial banks did not exist and if they did exist they were not obliged to keep deposits at the central bank. Also, data for coin circulation do not exist. Total tax revenues are used as a proxy for GNP. *1846-1847. **Data are not available for the years 1907 and 1909. ***Data are available for the years 1912 and 1913 only. (end-of-period data).

Table 2:
Selected Monetary Indicators: Greece, 1848-1914

Episodes	Banknote Circulation μ (%)	σ (%)	Metallic μ (%)	Reserves[a] σ (%)	Reserve Banknote Ratio(%)
Suspension of Convertibility(1st epis.)					
1848	-66.2	—	-24.5	—	0.4
Gold-Silver Standard					
1849-68	14.6	14.2	15.1	21.3	0.6
Suspension of Convertibility(2rd epis.)					
1869-70	9.8	5.6	13.0	45.2	0.4
Gold-Silver Standard					
1871-76	4.9	7.9	3.7	11.8	0.5
1877-84	11.3	20.5	1.2	39.8	0.2
Gold Standard					
1885	-23.7	—	36.5	—	0.4
Suspension of Convertibility(4th epis.)					
1886-1909	2.6	10.6	2.3	30.2	0.2
Inflationary period					
1886-1897	5.2	14.0	-5.4	38.9	0.1
Deflationary Period					
1898-1909	-0.1	4.6	9.9	16.2	0.2
Gold-Exchange Standard					
1910-1914	14.1	14.6	32.6	24.1	0.8

Notes: μ is the average growth rate of banknote circulation; σ is the standard deviation computed as percent per year.
a. For the period 1848-76 — because of the lack of data — we take as metallic reserves (gold+silver) only those that the Bank used to hold in its Treasury in the form of barren metal. While for the period 1877-1914 metallic reserves (mainly gold) are defined as the sum of reserves that the Bank held in its Treasury and interest-bearing deposits denominated in foreign currencies and readily convertible into gold. (The data are year averages).

Table 3:
Exchange rate volatility: 1877-1914 (annual percentage changes)

Period	μ (%)	σ (%)
Whole sample period		
1877-1914	0.1	6.4
Flexible-rate period		
1877-1884	0.3	5.3
Fixed-rate period		
1885	1.0	—
Flexible-rate period		
1886-1909	0.2	7.5
Inflationary period		
1886-1897	4.1	6.6
Deflationary period		
1898-1909	-3.8	6.4
Fixed-rate period		
1910-14	-0.5	1.3

Note: μ is the year average rate of change of the nominal Dr/FF exchange rate. σ is the standard deviation of exchange rate changes computed as percent per year. (The data are year averages).

2.1 Bimetallism (1833-1876)

1828-1847

From 1828 — when for the first time a national monetary system was introduced[2] — to 1832 Greece was on a silver standard. The legal tender was the silver phoenix. It was 9/10 of pure (or fine) silver and 1/10 of copper; it was equal to 3.747 grams of pure silver[3]. In

[2] Until 1828 money transactions were carried out mainly in Turkish coins and foreign currencies like the Spanish distilo. Greek coins did not exist.

[3] Although the phoenix was defined as equal to 1/6 of the Spanish distilo (4.511 grams or 4.074 grams of pure silver) it weighed (perhaps by a "mistake") only 4.163 grams (or 3.747 grams of pure silver). Probably, this "mistake" was one of the main reasons for the subsequent monetary reform. (See the decree of 8 February 1833).

1831 silver convertibility was suspended and paper currency was issued to finance the budget deficits [4].

Bimetallism was introduced in 1833 as a consequence of the political reform that took place (monarchy succeeded democracy). The new legal tender was the silver drachma (9/10 of pure silver and 1/10 of copper) and the gold drachma, equal to 20 drachmas, (9/10 of pure gold and 1/10 of copper). The silver drachma was fixed as equal to 4.029 grams of pure silver (and 0.448 grams of copper) and the gold drachma as equal to 0.25994 ($\times 20 = 5.199$) grams of pure gold (and 0.577 grams of copper). In other words, the silver drachma contained 15.5 times as many grams of silver *as of* gold. Thus, the legal ratio was 1:15.5 [5].

In 1842 the National Bank of Greece was established. It had two departments: the Issuing Department and the Banking Department. It had the exclusive privilege of banknote issue [6]. At the same time, it accepted private deposits in banknotes and metallic money, and provided loans. Also, it had reserve responsibilities: it held metallic (gold plus silver) reserves in its treasury and interest-bearing deposits

[4] By the decree of 17 June 1831, it was defined that the upper limit of paper money in circulation should be 3 mil. phoenix. The money transactions between the government and the private sector were to be carried out 1/3 in paper money and 2/3 in silver coins. Six months later, by the decree of 4 January 1832, it was defined that the money transactions were be carried out only in paper money.

[5] It should be noted that due to the limited quantity of Greek circulation currency, foreign currencies were allowed by law to circulate freely in the Greek money market. (By the decree of 8 February 1833, the parities between Greek and foreign coins — 29 silver and 16 gold coins — were fixed). As a result, Greek silver and gold coins quickly outflowed since holders of foreign debased coins exchanged them for drachmas. Ultimately, the Greek money market was flooded by foreign currencies with a face value much higher than their market value. The silver drachma,like the phoenix, was also tied to the Spanish distilo. Although it was defined as equal to 1/6 of the distilo, it equals only to 4.477 grams (or 4.029 gm of pure silver). In other words, the same «mistake» was made again. We should note that the distilo was mainly used in trade transactions in the Spanish Colonies in South America. It was a coin that counterfeiters could copy easily and cheaply. If we make the assumption that the monetary authorities knew that the distilo had a false market value, we can get an explanation of this "mistake".

[6] There were also three other central banks. The Ionian Bank, established in 1839, had the exclusive privilege of banknote issue in the Ionian Islands only. This privilege was withdrawn in 1920. The Bank of Epirus and Thessaly, established in 1880, had the exclusive privilege of issuing banknotes in Epirus and Thessaly. In 1899 it merged with

readily convertible into gold or silver in foreign banks abroad [7]. The lower limit of metallic reserves to banknote ratio was fixed at 1/4, i.e, 25% of banknotes in circulation could be readily converted into metallic coins. It becomes clear that although the National Bank acted as a commercial bank, it had all the responsibilities and privileges of a central bank.

1848-1868

Six years after the establishment of the National Bank, metallic redemption was suspended for the first time on 4 April 1848. However, that was the only time in the monetary history of Greece that the decision of suspension of convertibility was not directly related to government-financing decisions. A world-wide trade crisis occurred due to political instability in West Europe (originated in the social upheaval in France) which quickly took the form of a world-wide monetary crisis. The increased trade balance deficits caused large reserve losses. While in January 1848 35% of banknote circulation was redeemable in gold or silver, in April the reserve banknote ratio was sharply reduced to 10%. Thus, the National Bank of Greece suspended convertibility in order to keep its metallic reserves intact. The episode of metallic inconvertibility lasted for eight months only. On 16 December, Greece reverted back to the bimetallic standard.

The numerous gold discoveries in Russia, California and Australia in 1850s and 1860s depressed the market price of gold relative to silver. The consequence was an inflow of gold and an outflow of silver. In 1865, France, Belgium, Italy and Switzerland agreed to maintain the bimetallic standard. So, the Latin Monetary Union was established. The legal gold-silver ratio was fixed at 1:15.5 and France provided her currency as

the National Bank. The Bank of Crete, established in 1899 after the Greek-Turkish war of 1897, had the exclusive privilege of note issue in Crete. This privilege was withdrawn in 1919. Due to the limited quantity of note circulation of the other banks and mainly to the lack of data, we consider as total note circulation only the banknote circulation of the National Bank.

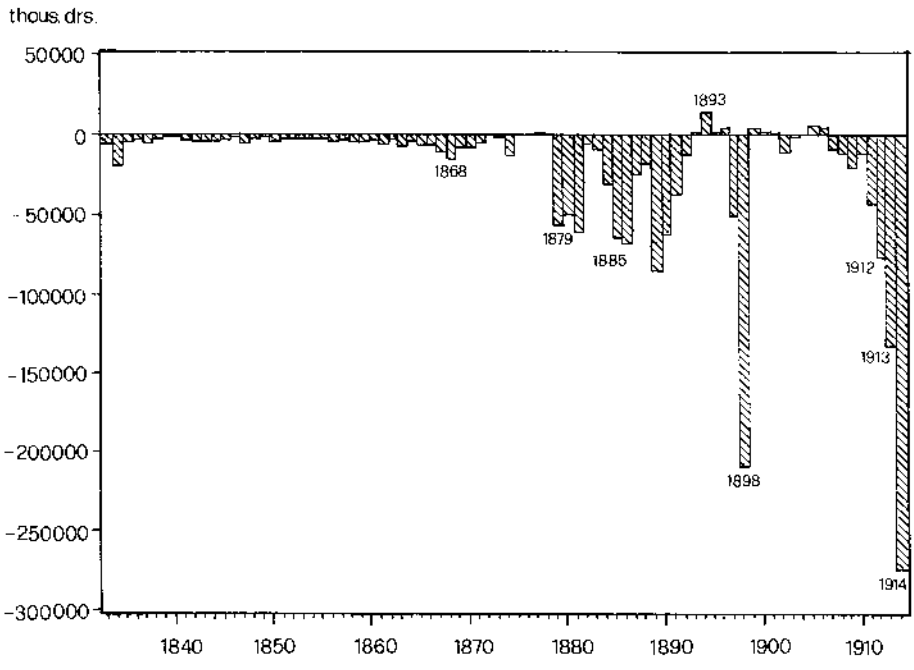
[7] The Bank of England, Banque de France and Reichsbank.

the common monetary unit. On 10 April 1867, Greece signed the LMU agreement but she did not adopt it until November 1882.

1869-1876

In December 1868 for the first time monetary expansion was closely related to government budget problems. A fiat monetary standard prevailed for almost two years. From 1865 a continuous increase in interest payments on domestic debt was in progress. The Crete revolution in 1868[8] caused an increase in military expenditure and threw some burden on the budget. Consequently, the large budget deficits and the

Figure 1: Government Budget Deficits, 1833-1914



[8] Crete was under Turkish occupation until 1899.

inability to finance them either through tax revenues (income tax over the total tax revenues ratio was reduced from 38.6% in 1868 to 30.8% in 1869) or issuing debt, forced monetary authorities to use inflation as a financing instrument [9]. In July 1870 convertibility was restored and Greece reverted back to bimetallism.

The Franco-Prussian War of 1870-71 brought an end to bimetallism. France lost the war and was forced to pay a huge war indemnity to Germany in funds redeemable in gold. Germany used the war indemnity to shift from a silver to a gold standard. The huge German silver sales together with the discovery of a vast amount of silver in Nevada, depressed the market price of silver relative to gold [10]. The consequence was a reversal of the movement of 1860s; an outflow of the gold and an inflow of silver. The continuous flood of silver coinage and convertibility threatened the economies with inflationary pressures. Hence, in 1874 the four members of the LMU agreed to limit silver coinage. In 1875 the National Bank of Greece devalued silver relative to gold in order to avoid the inflation threat. In 1876 France and Belgium prohibited silver coinage and convertibility while a year earlier Italy suspended silver coinage. Following the LMU members, Greece closed her mint to silver.

[9] The data for budget deficits are expressed in nominal terms rather than in real terms. This is because data for a price index do not exist. A cost-of-living price index started to be constructed only from 1914.

[10] It is quite interesting to note that the National Bank was unwilling to finance the budget deficits through inflation. To preserve the confidence in its banknote, the Bank refused to lend its metallic reserves and banknotes to the government, and issue irredeemable paper currency. The pressing finance requirements, however, forced the government to threaten the Bank with suspension of its exclusive privilege of note issue. In fact, by a decree of 23 December 1868 the government announced that it was going to issue paper money. As a result, there was a run on the Bank as people rushed to redeem their banknotes in metallic coins. Thus, the pressure on the metallic reserves forced the Bank to suspend convertibility and create money. It lent the government 4 mil. drs in metallic money and 10 mil. drs in banknotes and issued fiat money until the upper allowable limit of 36 mil.drs. (Valaoritis (1902, pp. 50-58) offers a description of the chronology of the conflict).

2.2 Fiat Monetary Standards (1877-1909)

1877-1885

However, Greece did not adopt the gold standard, like the other LMU members, since new government budget problems forced monetary authorities for the third time to revert back to an irredeemable paper currency standard (June 1877-December 1884). In 1876 a new period of high levels of government expenditure and thus large budget deficits started. To ensure convertibility of domestic banknotes, the government tried to avoid inflation as a tax instrument but rather incurred welfare losses in return for income tax revenues. Indeed, income taxes (as a percentage of total tax revenues) sharply increased (from 23% in 1875 to 33% in 1876) while seigniorage revenues were reduced. Considering the increase in wartime expenditures that occurred in 1877 [11] as temporary, the government decided to finance them by issuing domestic debt [12]. However, the ability to derive funds from domestic loans [13] was limited, so the government decided to use inflation for revenue collection. Indeed, seigniorage increased to 21% while income taxes were reduced to 30%. Therefore, Greece switched back to a flexible-rate regime.

Figure 2 plots the time-series of note circulation and metallic reserves. Note that while in the pre-1877 sub-period the two variables moved together (the episode of 1868 was so brief that it did not seriously affect the long-run time series properties of the variables), in the post-1877 period they moved in opposite directions. The upward

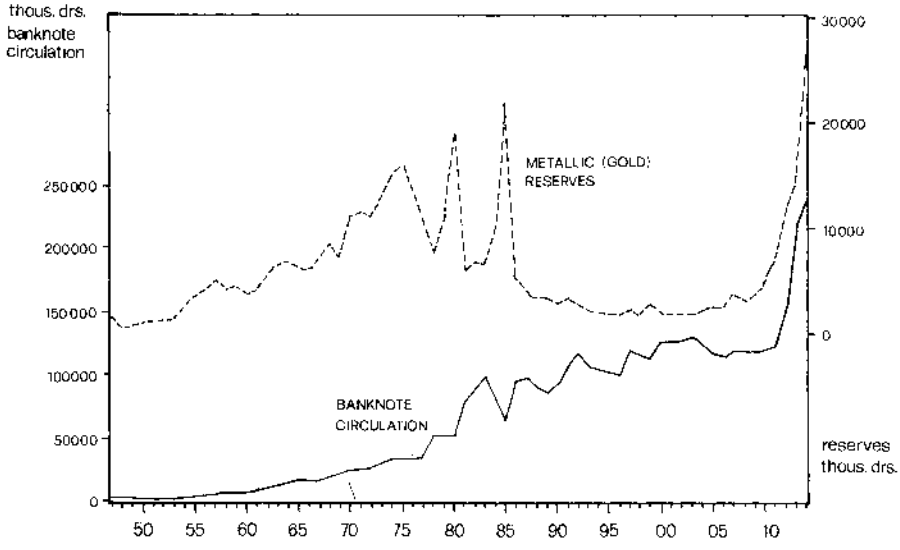
[11] While in the 1840s the market price ratio was 1:15.83, the many gold discoveries in 1850s and 1860s reduced the ratio to 1:15.36 and 1:15.45, respectively. However, the downward movement was quickly reversed by an upward one. In the first half of the 1870s the ratio increased to 1:15.98 while in the second half it sharply increased to 1:17.87. (Katselidis (1902, p. 61) and Simantiras (1905, p. 207) present the time-series data for the market price ratio during the nineteenth century).

[12] The Russian-Turkish War of 1877-78. Greece freed Thessaly and Epirus from Turkish occupation.

[13] In March 1877 the upper limit of issued Treasury Bills was increased by the law of 7 March to 9 mil. drs.

movement of note circulation was accompanied by a downward movement of metallic reserves so that the reserve-banknote ratio was reduced at very low levels, as seen in Figure 3. It becomes apparent that a long period of fiat money had started.

Figure 2: Banknote Circulation and Metallic Reserves (1847-1914)

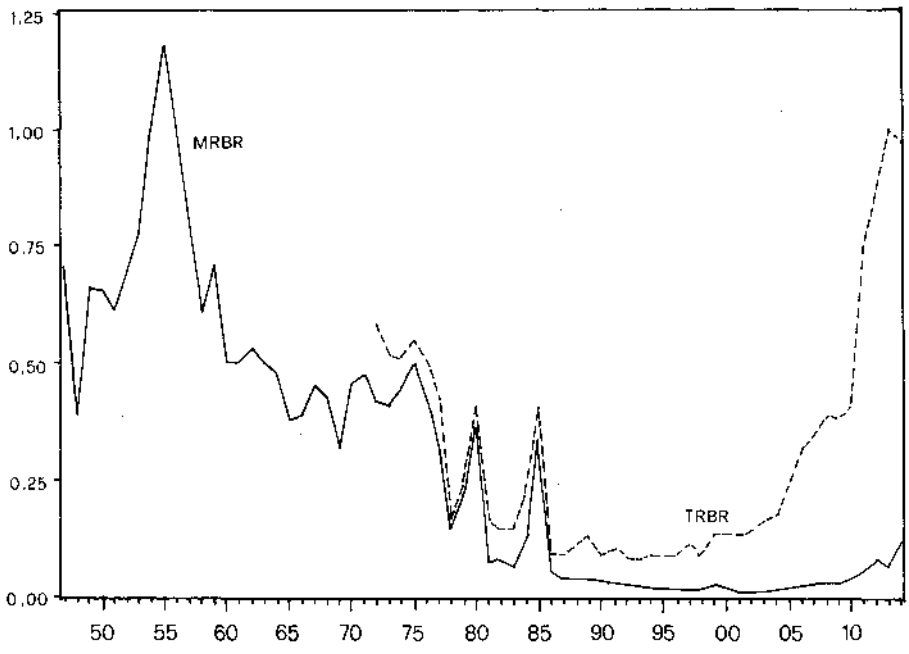


1879 was the beginning of a period of extensive foreign borrowing [14]. The foreign loans were used for financing the budget deficits and increasing the gold reserves of the Bank. As can be seen in Figure 1, the budget deficit was sharply reduced in 1882 and remained at low levels until 1884. In addition, the curve of the metallic reserves (see Figure 2) exhibits two peaks in the years of the heavy foreign gold loans (1879, 1884). Consequently, the devaluation pressures of the drachma/French franc exchange rate were restrained (see Figure 4) and the monetary authorities were able to restore

[14] Foreign creditor countries seemed reluctant to lend to Greece. The political instability of the time and the underdeveloped financial market reduced the country's credit-worthiness and prevented the inflow of foreign capital.

a fixed-rate regime. This occurred in December 1884 when Greece adopted the gold standard [15].

Figure 3: Reserve-Banknote Ratio, 1847-1914



MRBR = metallic reserves - banknote ratio
TRBR = total reserves - banknote ratio

Even though the monetary authorities waived discretionary power over money-supply policies— as is required by a fixed-rate regime, like the international gold standard— at the same time, they desired to maintain some degree of fiscal sovereignty. As Tables 1 and 2 show, while note circulation decreased by 23.7%, government spending was more than double the total tax revenues.

[15] In 1879 Greece borrowed from abroad 60 mil. gold FF. It was agreed that the loan be used to restore gold convertibility but in actual fact the government used it to finance its deficits. In 1881 the country borrowed 120 mil. gold FF; it was also used for financing the budget deficit. In 1883 a loan of 10 mil. gold FF was contracted; it was used for paying interest on the foreign debt. In 1884 Greece borrowed 170 mil. gold FF. The loan was used to increase the gold reserves of the Bank and restore convertibility. (For details see Valaoritis (1902), pp. 69-92).

An interesting fact is that during the period from 1885 the servicing cost of the national debt started to increase rapidly. In 1885 interest payments absorbed more than half of total revenues and produced an increased burden on the budget. The high interest payments as well as the trade crisis that occurred in the second semester of 1884 —due to a bad domestic crop [16]— caused large gold outflows.

In addition, the long-lived fiat standard that the country experienced before its entrance to the gold standard, caused a lack of confidence in domestic banknotes and set in motion a run on the gold reserves of the Bank [17]. From December to August 1885 the rate of reduction of gold reserves was almost 48%. [18] However, the exchange rate was not maintained fixed at the 1:1 parity. The drachma tended to devalue against the FF: Jan. 1.01, Feb. 1.01, Mar. 1.005, Apr. 1.01, May 1.02, Jun. 1.0225, July 1.0105, Aug. 1.0105. The situation got out of hand in September. For one more time, the government faced increased military expenditure. As a result, a new phase of money creation occurred and thus, Greece switched back to an inconvertible paper currency standard [19].

[16] In November 1882, a change in the Greek monetary system occurred in order to adopt the standard of the LMU. According to the LMU agreement, the members' currencies were equal to one another, i.e. one gold drachma should be equal to one gold French franc. The gold French franc (20 FF) was fixed as equal to 0.2903 (x20=5.806) grams of pure gold while one Greek gold drachma was equal to only 0.2599 (x20=5.199) grams of pure gold. Thus, the par exchange rate was 1FF=1.1168 drs. To achieve the 1 FF=1 Dr parity, the new drachma was introduced as the new monetary unit. It was fixed as 0.29 grams of pure gold and was equal to 0.8954185 of the old drachma.

[17] Greek trade exports were completely made up of agricultural products.

[18] To defend its gold reserves against the speculative runs on them, the Bank used several expedients (e.g. it converted banknotes into silver and not into gold, it reduced the office hours for transactions with the public, etc). However, it did not carry out a discount rate policy since the underdeveloped domestic financial market could not attract foreign capital.

[19] While in December 1884 the reserve-banknote ratio was 0.68, in August 1885 it was enormously reduced to 0.43, in September to 0.39 and in December it was just 0.18.

1886-1909

The period from 1886 to 1909 can be separated into two different subperiods: an inflationary period from 1886 to 1897 and a deflationary one from 1898 to 1909. The first period was characterized by high government spending, high rates of money creation, large reserve losses and a strong devaluation of the Dr/FF exchange rate.

The massive scale of foreign borrowing [20] and the persistent budget deficits led to government failure to pay off the accumulated and enlarged foreign debt by 1893. In December the government started negotiations with foreign lenders that continued until 1896, without any result. The government reduced the interest payments on its outstanding foreign debt to 30% and refused to amortize it. The negotiations stopped in 1897 when the Greek-Turkish war broke out (April-May 1897).

It is quite striking to note that while the war was completely financed by paper money creation [21] the downward movement of the Dr/FF exchange rate was not restrained, as seen in Figure 4. When debt repudiation occurred and negotiations started, private agents expected that a debt compromise would soon occur and gold would flow into the country. Thus, they acted so that the revaluation movement of the Dr/FF exchange rate was not affected by the 1897 monetary expansion.

Greece suffered a defeat and was forced to pay a huge war indemnity in funds convertible into gold. So, she restarted negotiations with creditor countries that led to the establishment of an International Committee for Greek debt management. By law (26 February 1898) [22]

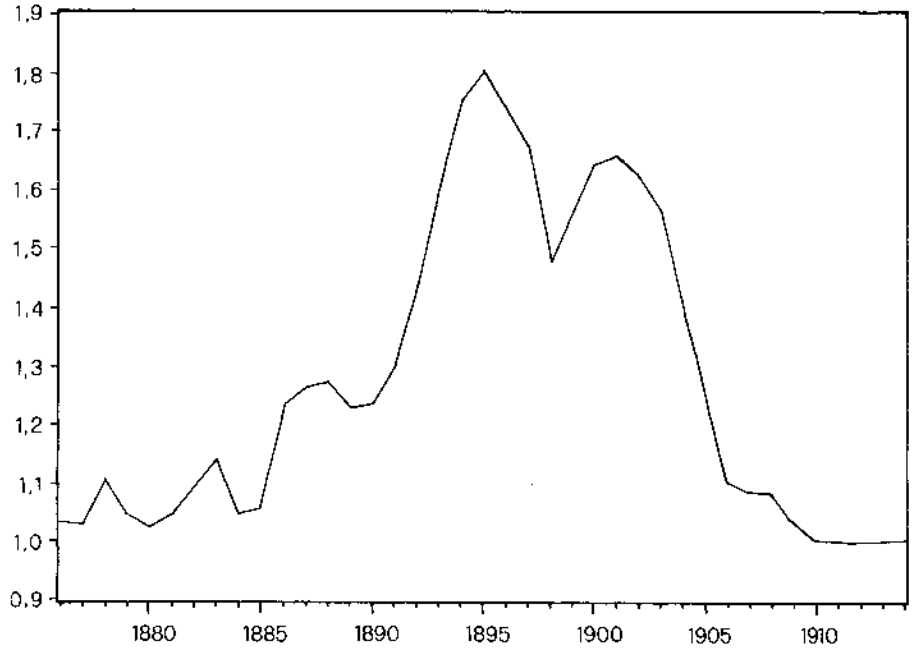
[20] From January to August 1885 banknote circulation decreased by —2.3% while from September to December it increased by 7.2%. As a consequence, the drachma started to devalue heavily. In September the Dr/FF exchange rate was 1.05, in October it was 1.08 while in November it sharply increased to 1.21.

[21] From 1886 to 1890 Greece borrowed 255 mil. gold FF. Governments relied primarily on borrowing to service the outstanding foreign debt. (see Simantiras (1905), pp. 63-64).

[22] In 1896 note circulation had decreased by 1.8%; in 1897 it had sharply increased by 17.4%.

the use of money creation as a financing instrument was strictly prohibited (article 30). By the same article, it was arranged that the government, starting from 1900, should pay to the Bank every year 2 mil. drs in banknotes until its domestic debt [23] was reduced to 40 mil. drs. (This was only achieved in 1924). A loan of 150 mil.gold FF was provided to Greece in order to pay the war indemnity to Turkey. Finally, it was agreed by the Treaty of Peace (September 1897, article 2) that tax revenues collected by the Debt Service Committee [24] should be used for a period of 30 years for paying interests on foreign debt.

Figure 4: The Drachma/French franc Nominal Exchange Rate (1876-1914)



[23] See Valaoritis (1902), pp. 177-194.
[24] i.e. the government's debt to the Bank.

Figure 5: Government Spending and Seigniorage (1833-1914)

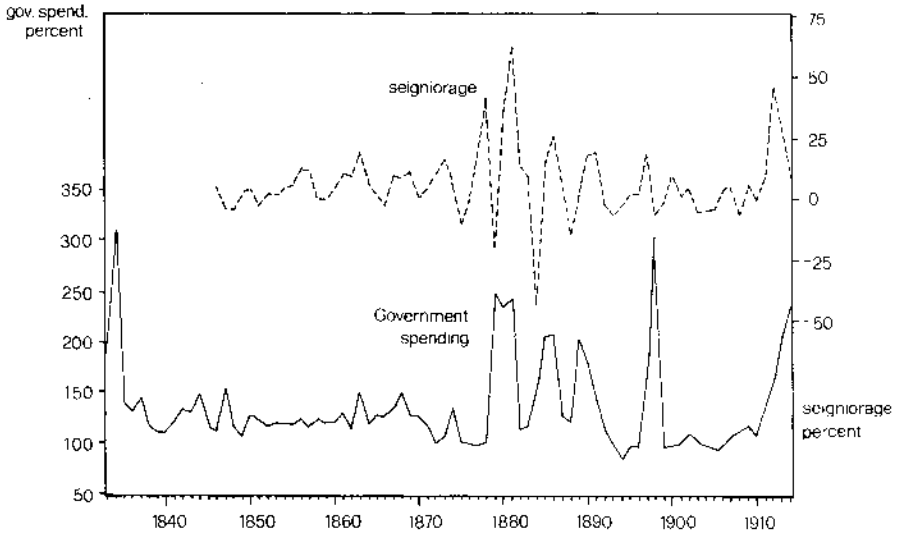
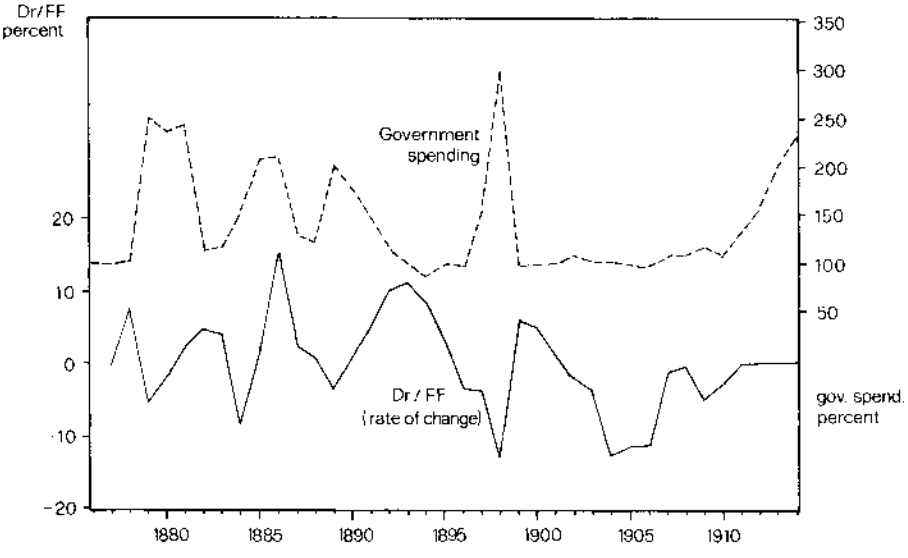


Figure 6: Government Spending and the Dr/FF Exchange Rate (1876-1914)



It becomes apparent that a deflationary period had begun. It was characterized by reductions in government expenditure, low seigniorage needs, large gold inflows and a strong revaluation of the Dr/FF exchange rate[25]. The average growth rate of note circulation was negative (-0.13%) and seigniorage revenues were close to zero (0.07%). Confidence in domestic currency was fostered (agents not only noticed the annual reduction in note circulation but they also knew that governments could not increase it any more) and large gold inflows occurred. As a result, a sharp revaluation of the drachma against the FF was in progress (see Figure 4)[26]. In 1909 the par exchange rate was achieved. Since government expenditure remained stable at low levels, the monetary authorities could switch to a fixed-rate regime. This occurred in March 1910.

2.3 A Gold-Exchange-Based Regime, 1910-1914

The tight monetary policy pursued since 1898 threatened the economy with deflation. In order to avoid deflationary pressures while at the same time ensuring the maintenance of the fixed Dr/FF parity, the Bank was allowed by law (19 March 1910)[27] to increase note circulation only if banknotes were fully convertible into gold or foreign exchange. In other words, the Bank could create money in an amount equal to the increase in gold or foreign exchange reserves.

Moreover, the Bank was obliged by law to exchange domestic banknotes into French francs using the parity 1:1 (gold points: $\pm$ 0.5

[25] This was established in 1895 and came under the control of the International Committee in 1898.

[26] It is interesting to note that creditor countries forced Greek authorities to adhere to the "monetary discipline rules", since they benefited from the drachma's revaluation. In particular, according to the debt compromise (article 5), Greece starting from 1903 should pay every year a fixed amount of 15 mil. drs (or 9 mil. gold FF) to the creditor countries. It was agreed that when the drachma was revalued against the FF, interest payments as well as amortization should increase by 30%. (see Simantiras (1905), p. 113).

[27] Note in Table 3 that during the deflationary period the drachma was revalued against the FF at a rate almost equal to the rate of devaluation during the inflationary period.

drs.) and into gold using the parity 1:1 ($\pm$ 0.001). It was also stipulated that the Bank could hold as official reserves interest-bearing deposits denominated in foreign currencies (mainly in French francs) and readily convertible into gold, while only 10% of its reserves could be held as gold stock [28]. It becomes apparent that a kind of gold-exchange standard was established [29].

As can be seen in Table 2, note circulation co-varied positively with gold reserves. Both moved in a way so that the reserve-banknote ratio remained stable and was close to unity (see Figure 3). Consequently, the Dr/FF exchange rate exhibited a small variability [30]. Indeed, as Table 3 shows, the Dr/FF exchange rate was almost four and six times as volatile (measured by the standard deviation computed as percent per year) in the flexible-rate period as in the fixed-rate period.

In the summer of 1914 WWI broke out. The pressure to finance wartime expenditures was so high that the use of money creation was inevitable. The sharp monetary expansion soon caused a confidence problem and set in motion a run on the central banks' gold stock. Consequently, all European governments closed the «gold window» and imposed controls on gold outflows. Greece was not involved in

[28] For a description of the law see Pharmakidis (1921), pp. 111-127.

[29] Note in Figure 3 that while the metallic reserves-banknote ratio remained at very low levels, the reserve-banknote ratio was close to unit.

[30] There were many powerful advocates as well as opponents to the gold-exchange-based regime of the early 1910s. The advocates (Valaoritis (1911), Larkworthy (1917), Damiris (1920)) supported the well-known advantages of the gold-exchange standard: (i) foreign exchange or gold flows through the effects on relative prices caused an automatic adjustment of balance-of-payments towards equilibrium; (ii) the central bank gained some profit by keeping interest-bearing deposits denominated in foreign currencies instead of holding barren metal in its treasury; (iii) since currency circulation was not based on gold coins but rather on banknotes, the money supply could exhibit a critical flexibility towards money-demand shocks. On the contrary, the opponents of the system (Thompson (1919), Zolotas (1927), Spourgitis (1929)) believed that potential devaluations of foreign currencies as well as wars would endanger the foreign reserves of the Bank. Indeed, when WWI broke out, the devaluation of the French franc and the controls imposed on gold exports caused a loss in foreign reserves. They also argued that the system did not introduce a rapid adjustment of the money supply since the increase in banknote circulation had to be 100% convertible into foreign exchange or gold. Finally, they foresaw that the system would cause inflation since gold or exchange inflows accommodated an increase in banknote circulation.

the war (until the summer of 1917) and remained on the gold-exchange based regime of the early 1910s. However, in July, following the belligerent countries, she prohibited gold outflows [31] and the central bank raised the discount rate (from 6.5% to 8%) but in November lowered it to the initial level.

Using the data for the pre-WWI period we plot in Figure 5 government expenditure with seigniorage and in Figure 6 with the Dr/FF exchange rate movements. The figures suggest that there exists a positive relationship between government expenditure and seigniorage as well as between government expenditure and exchange rate movements [32]. Note that government expenditure and seigniorage move together. Note, also, that high and persistent increases (decreases) in government spending are accompanied by strong devaluations (revaluations) of the drachma exchange rate while moderate spending is associated by small exchange-rate movements [33].

[31] The International Committee stipulated that the central bank could issue banknotes (i.e. paper money) up to the limit of 66 mil. drs. The inelasticity that this imposed on note issue caused an excess money demand and strong revaluations of the drachma against the FF, mainly in the months of exports of agricultural products. In order to restrain deflationary pressures, the Bank was allowed to issue banknotes over the above limit only for buying gold or foreign exchange in the parity. In November 1910 the upper limit of banknote circulation (convertible to gold or foreign exchange) was fixed at 25 mil. drs. In December 1911 it increased by 10 mil. drs. Furthermore, increased foreign borrowing to finance the Balkan Wars of 1912-14, as well as increased emigrants remittances and the high profits from shipping during the war, produced large reserve inflows and accommodated an increase in note circulation. In 1912 the upper limit of banknote circulation increased to 100 mil. drs, in 1913 to 165 mil. drs and in 1914 to 200 mil. drs. Since banknotes were 100% convertible into FF or gold, confidence in the domestic currency was not affected and thus, the Dr/FF exchange rate remained fixed at parity.

[32] Although the controls on gold outflows suspended gold convertibility, foreign-exchange convertibility was still maintained. Moreover, the quantity of gold coins circulated in the Greek money market was very limited. Therefore, the controls were meaningless.

[33] Using the historical time-series for the pre-WWI period it is found (Lazaretou, 1991) that a strong positive long-run relationship exists between inflation tax (seigniorage) and permanent government spending as well as between permanent government spending and the Dr/FF exchange rate movements.

3. Concluding Remarks

This brief overview of the history of Greek monetary and fiscal policies reveals the existence of a link between fiscal behaviour and fluctuations of monetary variables. Furthermore, this link was one of the main causes of the Dr/FF exchange rate crises in the nineteenth century.

More specifically, studying the time-series behaviour of the monetary and fiscal variables we conclude that in periods of high levels of government spending and thus, high revenue needs, governments used inflation as a financing instrument. Monetary expansion produced a confidence problem and set in motion a run on the reserves of the Bank. The monetary authorities could not maintain the Dr/FF exchange rate fixed and thus, they switched to a flexible-rate regime. This occurred three times: in December 1868, in June 1877 and in September 1885. When government spending became moderate and confidence in the domestic currency was strengthened, monetary authorities reverted back to a fixed-rate regime. This occurred three times: in July 1870, in December 1884 and in March 1910.

Appendix

Table A1: Main Fiscal Variables, 1833-1914 (in '000. new. drs)

Year	(1)	(2)	(3)	(4)	(5)	(6)
1833	13357	7098	1907	4250	1971	n.a.
1834	28849	9280	14241	5065	2478	n.a.
1835	16085	11563	3361	7464	2447	n.a.
1836	15560	11878	2550	6948	2646	n.a.
1837	17814	12357	3124	6774	3177	n.a.
1838	15290	13012	3432	7264	3644	n.a.
1839	15424	13814	3341	7878	3472	n.a.
1840	15927	14259	4123	8232	3764	n.a.
1841	15972	13243	4289	7600	3718	n.a.
1842	15871	11779	3685	6548	3611	n.a.
1843	14356	10990	3472	5771	3340	n.a.
1844	13717	9271	3468	4910	3116	n.a.
1845	14672	12505	3466	6530	3366	n.a.
1846	14395	13012	3469	6481	3658	4.4
1847	15290	9952	4063	5237	2980	-3.8
1848	15719	13293	3853	6543	3800	-4.5
1849	15639	14718	3646	7694	3630	2.0
1850	16610	13105	3632	6713	3623	4.4
1851	15885	12752	3461	6508	3544	-3.3
1852	16267	13955	3473	6247	4237	2.0
1853	16183	13632	3465	6477	3844	0.8
1854	17494	14655	3480	8281	3355	4.3
1855	19204	16342	3641	8381	4638	4.9
1856	19292	15551	3559	7643	4455	12.6
1857	19667	17031	3688	8470	4559	10.9
1858	22769	18360	3710	7981	5939	-1.1
1859	23165	19348	3576	9389	5953	-0.3
1860	23281	19453	3643	8451	6061	2.9
1861	25101	19335	4566	9344	6037	10.4
1862	25414	22319	3568	10494	6464	8.3
1863	23397	15526	3920	7167	4796	19.5
1864	24426	20847	4895	9368	6616	6.0
1865	28256	22216	6060	6310	9951	1.1
1866	27867	22067	6404	7793	9069	-3.0
1867	37923	28124	6399	10398	11273	9.8
1868	44335	29918	6233	11562	12411	8.5
1869	37116	29403	8956	9044	11673	10.5
1870	35701	28335	9263	10486	11222	0.02
1871	36744	31817	9017	10794	12970	4.9
1872	32847	32309	7266	11456	12588	9.9
1873	32202	31030	7298	10901	12902	16.1
1874	45221	33402	14344	12086	13261	6.3
1875	27927	27650	6259	6245	15208	-11.6
1876	34628	34668	6851	11370	14469	-0.3

1877	32547	33148	6827	9953	16088	20.6
1878	36853	36174	8414	11479	16327	41.6
1879	95312	38234	12149	9914	19373	-21.0
1880	88063	37644	12809	8575	20067	32.7
1881	101657	41789	16695	8542	22816	63.8
1882	57375	50983	18176	10819	25811	13.5
1883	67796	58538	20641	12003	32151	7.9
1884	91347	60745	24063	13309	33719	-44.1
1885	122798	59375	30736	11283	33038	12.3
1886	129717	62151	35486	13067	36820	26.3
1887	107128	82850	29949	17178	43536	3.4
1888	108051	89551	36006	18860	46848	-15.9
1889	168739	83732	29817	17415	51448	2.2
1890	141465	79932	35806	14763	51513	18.1
1891	122836	86112	36881	18347	53055	19.4
1892	107683	94973	33742	18580	59387	-2.7
1893	92134	92954	26248	20718	59701	-6.8
1894	85136	99718	22284	19145	64916	-4.2
1895	91642	93828	22721	19107	64059	2.1
1896	90891	95282	23216	18546	66295	2.0
1897	137044	86359	20023	14145	60634	20.9
1898	312057	102685	229401	17416	73978	-7.4
1899	104608	109778	29706	19418	75242	-0.9
1900	109318	111597	33420	19209	75950	10.5
1901	114131	114746	33737	21589	80425	0.7
1902	124504	114410	33460	20674	80444	5.1
1903	116260	114838	36234	19671	82572	-5.4
1904	116150	115883	35294	19080	83753	-4.7
1905	116321	122436	33593	19949	84345	-4.9
1906	121600	125910	32245	20885	92815	2.9
1907	132123	123032	n.a.	20794	87868	5.5
1908	133697	122989	35206	20979	89512	-6.9
1909	136970	117049	n.a.	20837	84060	6.3
1910	140547	129574	n.a.	21642	92935	-1.5
1911	181020	137871	n.a.	21795	99668	8.3
1912	207984	131129	38028	20607	96190	46.8
1913	261973	129059	44537	19338	97541	29.2
1914	482341	207684	n.a.	48342	151511	8.5

Definitions:

(1) Central Government Expenditure (inclusive of interest payments).

(2) Total Tax Revenues.

(3) Interest payments on foreign and domestic public debt.

(4) Income Tax Revenues.

(5) Indirect Tax Revenues.

(6) Seigniorage Revenues, % of total tax revenues.

The variables are in nominal terms. (end-of-year data).

Source: (1)-(5) Greek Government Budget: Annual Report, 1833-1914. (Various issues). General Records of the Government.
(6) see notes at the bottom of Table 1.

n.a.: not available.

Table A2: Main Monetary Variables, 1847-1914 (in '000 new drs)

Year	(7)	(8)	(9)	(10)
1847	2077	1433	n.a.	n.a.
1848	1071	413	n.a.	n.a.
1849	1095	729	n.a.	n.a.
1850	1519	1004	n.a.	n.a.
1851	1882	1153	n.a.	n.a.
1852	1762	1239	n.a.	n.a.
1853	1800	1401	n.a.	n.a.
1854	2574	2648	n.a.	n.a.
1855	2987	3545	n.a.	n.a.
1856	4143	4080	n.a.	n.a.
1857	6145	5085	n.a.	n.a.
1858	6911	4182	n.a.	n.a.
1859	6356	4542	n.a.	n.a.
1860	7325	3684	n.a.	n.a.
1861	8267	4155	n.a.	n.a.
1862	10745	5719	n.a.	n.a.
1863	12941	6504	n.a.	n.a.
1864	14179	6795	n.a.	n.a.
1865	16420	6262	n.a.	n.a.
1866	15175	5977	n.a.	n.a.
1867	16207	7379	n.a.	n.a.
1868	19699	8476	n.a.	n.a.
1869	22604	7012	n.a.	n.a.
1870	23964	10994	n.a.	n.a.
1871	24130	11533	n.a.	n.a.
1872	26586	11115	4407	15522
1873	31317	12924	3612	16491
1874	34004	14960	2380	17341
1875	32405	16107	1866	18013
1876	32210	13770	2591	16335
1877	34475	10810	3870	14680
1878	50719	7423	798	8221
1879	50365	11250	1206	12457
1880	50809	19115	1752	20866

1881	77651	5825	6725	12550
1882	87782	6834	5755	12589
1883	97605	6593	7614	14207
1884	80362	10235	7714	17948
1885	63383	21935	4409	25844
1886	94879	5222	3417	8640
1887	97271	3882	4841	8723
1888	89015	3374	6926	10300
1889	85576	3282	8244	11525
1890	91850	2907	5488	8396
1891	108841	3451	8147	11598
1892	116129	2638	7301	9939
1893	107154	2263	6214	8477
1894	103226	2024	7243	9267
1895	101692	1887	6918	8805
1896	99834	1787	6903	8694
1897	118807	2226	11361	13587
1898	115594	1841	8632	10473
1899	112192	2949	12342	15208
1900	125441	2035	14434	16469
1901	127038	1904	14993	16897
1902	126753	1899	15475	17373
1903	129804	1638	19607	21244
1904	123170	2251	19523	21775
1905	116626	2393	25730	28123
1906	113836	2422	32882	35303
1907	118528	3658	37417	41075
1908	118661	3095	42212	46140
1909	116985	3592	41451	45043
1910	119353	4759	44672	49430
1911	122013	6847	57748	90778
1912	149301	11742	70783	132380
1913	215253	14315	65571	216157
1914	236389	26605	37100	229920

Definitions:

(7) Banknotes in Circulation.

(8) Metallic (gold + silver) Reserves in the form of barren metal that the central bank held in its treasury.

(9) Foreign Exchange Reserves in the form of interest-bearing deposits denominated in foreign currencies and readily convertible into gold.

(10) Total Reserves. (the data are year averages).

Source: National Bank of Greece: Annual Report of the Governor, 1847-1914. (arious issues). Historical Records of the National Bank of Greece.

Table A3: Reserve-Banknote Ratio

Year	(11)	(12)	Year	(11)	(12)
1847	0.69	n.a.	1881	0.07	0.16
1848	0.39	n.a.	1882	0.08	0.14
1849	0.67	n.a.	1883	0.07	0.15
1850	0.66	n.a.	1884	0.13	0.22
1851	0.61	n.a.	1885	0.34	0.41
1852	0.70	n.a.	1886	0.05	0.09
1853	0.78	n.a.	1887	0.04	0.09
1854	1.03	n.a.	1888	0.04	0.12
1855	1.19	n.a.	1889	0.04	0.13
1856	0.98	n.a.	1890	0.03	0.09
1857	0.83	n.a.	1891	0.03	0.11
1858	0.60	n.a.	1892	0.02	0.08
1859	0.71	n.a.	1893	0.02	0.08
1860	0.50	n.a.	1894	0.02	0.09
1861	0.50	n.a.	1895	0.02	0.09
1862	0.53	n.a.	1896	0.02	0.09
1863	0.52	n.a.	1897	0.02	0.11
1864	0.48	n.a.	1898	0.01	0.09
1865	0.38	n.a.	1899	0.03	0.14
1866	0.39	n.a.	1900	0.02	0.13
1867	0.45	n.a.	1901	0.01	0.13
1868	0.43	n.a.	1902	0.01	0.14
1869	0.31	n.a.	1903	0.01	0.16
1870	0.46	n.a.	1904	0.02	0.18
1871	0.48	n.a.	1905	0.02	0.24
1872	0.42	0.58	1906	0.02	0.31
1873	0.41	0.53	1907	0.03	0.34
1874	0.44	0.51	1908	0.02	0.39
1875	0.49	0.56	1909	0.03	0.38
1876	0.43	0.51	1910	0.04	0.41
1877	0.31	0.43	1911	0.06	0.74
1878	0.14	0.16	1912	0.08	0.89
1879	0.22	0.24	1913	0.07	1.00
1880	0.38	0.41	1914	0.11	0.97

Definition:

(11) Metallic Reserves-Banknote Ratio: (8)/(7)
(12) Total Reserves-Banknote Ratio: (10)/(7)

Table A4: The Drachma/French franc Nominal Exchange Rate, 1876-1914

Year	(13)	Year	(13)
1876	1.0320	1896	1.7389
1877	1.0257	1897	1.6757
1878	1.1071	1898	1.4741
1879	1.0476	1899	1.5650
1880	1.0254	1900	1.6439
1881	1.0476	1901	1.6580
1882	1.0971	1902	1.6250
1883	1.1406	1903	1.5650
1884	1.0475	1904	1.3782
1885	1.0580	1905	1.2312
1886	1.2325	1906	1.1000
1887	1.2633	1907	1.0865
1888	1.2733	1908	1.0812
1889	1.2300	1909	1.0296
1890	1.2350	1910	0.9998
1891	1.2983	1911	0.9994
1892	1.4363	1912	0.9993
1893	1.6077	1913	1.0000
1894	1.7492	1914	1.0017
1895	1.8021		

Definition:

(13) Drachmas per French franc (spot), year average data.

Sources: 1876-1901 Valaoritis, J. A. (1902) and Simantiras, J. (1905).
1902-1908 Pharmakidis, E. (1921).
1909-1914 National Bank of Greece: Annual Report of the Governor. (Various issues).

REFERENCES

Barro, J. R. (1979), «On the Determination of the Public Debt», *Journal of Political Economy,* 87, 940-971.

Barro, J. R. (1987), «Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom, 1701-1918», *Journal of Monetary Economics,* 20, 221-247.

Damiris, C. (1920), *Le Système Monétaire Grec et la Change.* Paris.

Eichengreen, B. (1985), Editor's Introduction in B. Eichengreen (Ed.): *The Gold Standard in Theory and Practice.* Metheun, London.

Friedman, M. (1990), «Bimetallism Revisited», *Journal of Economic Perspectives,* 4, 85-104.

Grilli, V. (1988), «Fiscal Policies and the Dollar/Pound Exchange Rate: 1870-1984», NBER Working Paper, no 2482.

Grilli, V. (1989), «Exchange Rates and Seigniorage», *European Economic Review,* 33, 580-587.

Greek Government Budget, Annual Report, 1833-1914. (Various issues). General Records of the Government.

Katselidis, G. (1902), *The Currency.* Athens. (in Greek).

Larkworthy, F. (1917), Memorandum explaining the desirability of supplementing the existing laws in Greece relating to the forced currency and to the exchanges. London.

Lazaretou, S. (1991), «Government Spending, Monetary Policies and Exchange Regime Switches: the drachma in the gold standard period», Ph.D. Dissertation, Athens University of Economics and Business. Ch.4. (Unpublished).

Mankiw, G. (197), «The Optimal Collection of Seigniorage: Theory and Evidence», *Journal of Monetary Economics,* 20, 327-341.

National Bank of Greece, Annual Report of the Governor, 1847-1914. (Various issues). Historical Records of the National Bank of Greece.

Pharmakidis, E. (1921), *Exchange Rates during and after World War I.* Athens. (in Greek).

Phelps, E. (1973), «Inflation in the Theory of Public Finance», *Swedish Journal of Economics,* 75, 67-82.

Simantiras, J. (1905), *The Issue over the Suspension of Convertibility.* Athens. (in Greek).

Spourgitis, A. N. (1928), Studies on Banking and Exchange Rates, Book 1: 255-349 and Book 2: 431-660. Athens. (in Greek).

Thompson, N. (1919), « Mr Falconer Larkworthy's Currency Proposals», *The Economic Journal,* 19, 363-367.

Tsalikis, C. (1929), *The Drachma Exchange Rate during the 30-year period 1898-1928.* Athens. (in Greek).

Valaoritis, J. A. (1902), *The History of the National Bank of Greece, 1842-1902.* Athens. (in Greek).

Valaoritis, J. A. (1911), Annual Report of the Governor for the year 1910. National Bank of Greece.

Zolotas, X. (1927), *Monetary and Exchange Rate Phenomena in Greece: 1910-1927.* Greka, Athens. (in Greek).