

# The making of a developing fiscal state: A new historical dataset and a graphical network analysis for Greece, 1833-1939

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**Abstract:** The paper studies the historical process of fiscal state-building in 19<sup>th</sup> and early 20<sup>th</sup> century Greece. A new public finances dataset, compiled from primary sources, is combined with international databases in a graphical network analysis revealing a rich set of dynamic interactions between economic (tax revenue, debt payments and GDP per capita) and institutional variables (army and representation). The emphasis is on two particular results closely related to the fiscal capacity literature: (a) the size of the army had a positive causal effect on tax revenues whereas (b) representation had a negative causal effect on tax revenue.

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## 1. Introduction

Institutional structures are widely acknowledged as key determinants for economic performance. Different ways of acquiring and exercising political power, allocating and enforcing property rights, accommodating conflicting interests and containing violence, can result in considerably different economic outcomes. The central object of analysis is, naturally, the state. It is not only the largest economic entity in every national economy but it also encompasses the institutional structure of every organized society. Markets and private economic decisions can operate only under the rules defined and enforced by the political power of the states. In turn, states can perform their functions only as long as they can extract enough resources from the private sector to cover the cost of these functions. Hence, a major strand of the literature focuses on the fiscal capacity of the state, defined as ‘the necessary infrastructure—in terms of administration, monitoring, and enforcement—to raise revenue from broad tax bases such as income and consumption’ (Besley and Persson, 2011: 6).

But what determines the development of fiscal capacity? Most of the research effort has identified two major drivers, warfare and representation. Regarding the former, Besley and Persson (2009), Dincecco and Prado (2012) and Gennaioli and Voth (2015) have provided empirical evidence from cross-country analyses suggesting that the elevated cost of warfare and military preparations encouraged state rulers to improve revenue collection and fiscal management, essentially confirming the classic maxim ‘War made the state’ (Tilly, 1975). However, Queralt (2019) has challenged the above claim, suggesting that it did not apply to states with access to international borrowing and without strong commitment for repayment. Regarding representation, Dincecco (2009) argued that the participation of different social groups in political decision-making provided the ground for legitimizing taxation, expanding the tax base and eventually collecting more revenue. Again, this is not entirely in accordance with the findings of Aidt and Jensen (2009) and Mares and Queralt (2015) showing that the income tax, the most advanced instrument of revenue collection, was more likely to be introduced in non-democratic states.

Apparently, the issue is not entirely settled. This is due to the fact that even when universal mechanisms are at work, they do not operate in the same way for every single national case. Historical country studies on fiscal state building (Brewer, 1989; Bonney, 1999; Glete, 2002; Storrs, 2009; Yun-Casalilla and O’Brien, 2012; He, 2013) have revealed the impressive extent of national diversity. It may be true that all states face similar challenges, but the nature and relative strength of the parties involved, the process of conflict and accommodation and the resulting outcomes may differ substantially. Therefore, instead of showing how countries with different warfare and representation experiences end up at different levels of fiscal capacity, as cross-country panel data studies do, it may be useful to narrow the scope of analysis to a single country. This approach comes at the cost of limited generality but can reveal robust causal interactions between fiscal capacity and economic performance, on the one hand, and institutional variables, such as warfare and representation, on the other.

The subject of this paper is Greece, a developing agrarian economy that emerged as a sovereign state in 1833. She was the first independent state to break out of the Ottoman Empire, following the first successful revolution in post-Napoleonic Europe, with the support of the first international intervention on a humanitarian pretext. Put together, this series of ‘firsts’ render Greece a pioneer case for national state-building and a blueprint for the international settlements that reshaped the European map of the 19<sup>th</sup> and early 20<sup>th</sup> century. Despite her peculiarities, Greece had to face the universal historical challenges

associated with national state-building, such as securing domestic order, defending and expanding her borders and accommodating competing groups into the political system. Most importantly for the purposes of this study, she had to extract and allocate the necessary economic resources, i.e. build fiscal capacity, so as to meet those challenges. Therefore, it is straightforward to examine the relevant questions. Did wars and military mobilizations lead to the development of fiscal capacity or, on the contrary, external loans and default served as a better alternative? Did representational institutions justify and facilitate tax collection, or promoted partial arrangements with special interests instead? The purpose of this paper is to describe and interpret this historical process of fiscal state building.

The main empirical findings for Greece can be summarized as follows: Military preparation, as a response to domestic or external security pressures, motivated the Greek state to improve revenue collection. Indeed, the empirical analysis establishes a robust positive causal link from the size of the army to tax revenue, confirming the 'war made the state' hypothesis. On the other hand, representation, instead of legitimizing taxation, undermined it. All model specifications identify a negative causal effect from indices of representation to tax revenue, implying that extensions of the franchise and legislative checks were detrimental to fiscal performance.

The paper's contribution is twofold. First, it introduces a new historical dataset for Greek public finances, carefully compiled from official records from 1833 (the establishment of the modern Greek state) to 1939 (the eve of the Second World War), covering a little more than the first century of the Greek state's existence.<sup>2</sup> Consistent long-term fiscal data series for developing states are rather rare, due either to the scarcity of official records or to the insufficiency of research efforts. Hence, evidence-based historical studies are usually limited to strong or imperial states. Second, the present study employs a graphical network analysis exploring the historical interactions between fiscal and other economic and institutional variables. Graphical networks have been extensively used in financial economics and can reveal dynamic causal relationships which they visualize in simple and intuitive graphs. More importantly, they can overcome issues such as spurious causality, over-parametrization and identification. To the best of my knowledge, this is the first application of graphical networks in historical economics.

The rest of the paper is organized as follows. The next section offers a brief outline of Greek political history and frames the relevant questions. Section 3 describes the construction of the dataset and presents the evolution of the fiscal aggregates. Section 4 performs the empirical analysis, reports and discusses the results and examines robustness with three additional specifications. The final section concludes.

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<sup>2</sup> The limitation to the period before the Second World War is justified by the substantial economic, political and social changes that followed at its aftermath. Kostis (2018: 4) claims that 'the country's great social transformation did not take place until after the Second World War' while Alogoskoufis (2021) clearly separates pre- from post-war Greece, as in the former period the political priorities were state building and territorial expansion whereas economic growth became an issue only in the latter period.

## 2. A brief historical outline

### 2.1. Literature sources

The historical exposition that follows relies on the few sources on the political history of Greece in the English language. For the broad picture, the most insightful and systematic reference is the work of Kostis (2018). A well-written overview can also be found in Campbell and Sherrard (1968: 65-185) while Alogoskoufis (2021) offers a long-term economic discussion and Levantis (1944) an authoritative presentation of Greece's 19th century debt crises and defaults. Turning to specific periods, the indisputable source for the initial state-building of the Bavarian regime is the classic work of Petropoulos (1968). For the subsequent decades, 1844-55 and 1875-85, Economopoulou (1984) and Gardikas (1988), respectively, provide excellent political accounts with the former referring to the introduction of universal suffrage and the latter to the establishment of parliamentary rule. Kofos (1975) provides the background and consequences of the Eastern crisis in the 1870s while Tatsios (1984) describes thoroughly the events of the 1897 war. For the early 20<sup>th</sup> century, Papacosma (1977) presents in detail the 1909 coup and Leontaritis (1974, 1990) offers elaborate accounts of international and domestic politics during the First World War and the National Schism. Finally, Mavrogordatos (1983), Mazower (1991) and Christodoulakis (2013) are excellent analyses of the interwar period, the former for political developments and the latter two for economic implications while Koliopoulos (1977) is the standard resource for the Metaxas' regime.

### 2.2. Independence

Greece gained her independence after a revolution against the Ottomans (1821). A long and brutal war ensued, the outcome of which was decided, to a large extent, by the diplomatic and military intervention of Britain, France and Russia. Despite the fortunate conclusion of the conflict, the prospects of Greece did not look bright. War had taken a heavy toll on population and infrastructure, leaving the liberated country effectively in ruins. Moreover, several attempts by the Greeks to establish their own political authorities and institutions ended in two civil wars (1824, 1832). In addition, revolutionary governments had already defaulted on two British loans (floated in 1824 and 1825), abandoning any hope for international borrowing. Convinced that the Greeks were unable to govern themselves, the three Powers maintained close oversight over the country.

### 2.3. Absolute monarchy, 1833-43

The international settlement that established the Kingdom of Greece took effect in early 1833 with the arrival of the 17-year-old Bavarian prince Otto along with three vice-regents, 3,500 Bavarian troops and a loan of 60 million francs (about 2.3 million pounds), guaranteed by the three Powers.

Upon Otto's arrival, domestic politics in Greece was dominated by three parties, each one affiliated to a foreign embassy, the British, the Russian and the French. National party leaders were persons who rose to political and military power during the war of independence and their constituencies were mostly regional, strongly connected to the local primates of the Ottoman times. Alongside political patrons, each party had a military branch composed of captains of irregular militias, some of them fully dependent upon the party leaders and some others already established as local warlords living at the expense of peasant populations.

Evidently, the first priority of the regime was to monopolize violence and restore law and order. A new standing army was formed, almost exclusively from Bavarian troops while existing regular and irregular

forces were disbanded<sup>3</sup>. In addition, the regime set up a basic state machinery with the introduction of legal codes, courts, civil service, regional administrations, primary education and a national currency, along with a Treasury and a Court of Audit.

Bavarian policy went a long way towards the establishment of centralization but failed miserably in political and economic terms. Perhaps the most noted indication was the 1843 default which coincided with a political crisis that ended absolutism and introduced constitutional monarchy.

The fiscal burden of building a state from scratch was too heavy and public revenue could not sustain it alone. That was already known in advance and the loan was supposed to cover the deficit but, concurrently, generated large debt servicing costs. In 1836 Greece avoided default thanks to additional loans by Bavaria and France. In early 1843, the Greek government had realized that it could not afford the annual debt charges of the guaranteed loan. The three Powers demanded substantial spending cuts and claimed the receipts of certain revenues to be channeled directly to bond holders, under the direct control of an international commission. The government made a desperate adjustment effort of wage cuts and dismissals in the public sector, but to no avail. In fact, it was the worst of both worlds. It infuriated the domestic audience, mostly the affected public servants and army officers, without convincing the foreign Powers who insisted that the government plan was falling short of their demands. When, by September, the government decided to yield, it was no longer in office.

The financial crisis of 1843 concurred with the political crisis of the same year. While it evidently contributed to it, it was not the only reason. By 1841, despite their bitter rivalries, all three parties came to agree on two issues that became the essence of opposition: the dismissal of remaining Bavarians from public offices and the call of a national assembly to prepare a constitution. Ironically, it was the regular army, the very creature and instrument of Bavarian rule, that mobilized in September 1843 and forced Otto to accept a constitution. Fortunately, that was mostly a show rather than an exercise of force. After a brief siege to the palace, a special purpose assembly was summoned and six months later submitted a constitution that was immediately ratified by Otto.

#### 2.4. First constitutional monarchy, 1844-62

Since 1844 Greece entered a new political regime. A bicameral body was established, with a parliament and a senate that shared legislative power with the king. Executive power, however, remained exclusively to the king who could appoint cabinets and dissolve the parliament at will. Yet, the most important change was not the imposition of legislative or otherwise constraints to the exercise of royal executive power, but rather the introduction of quasi-universal male suffrage, not directly by the constitution but by the electoral law of March 1844<sup>4</sup>. With a stroke of a pen, Greece became one of the first countries to introduce such a system.

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<sup>3</sup> Soon, however, the Bavarians realized that regular troops were not suitable for the mountainous Greek terrain and sought the occasional assistance of irregular groups to secure the countryside against banditry and rebellions, in a mode similar to the Ottoman tradition. Many irregulars were gradually absorbed into special regiments, such as the Gendarmerie or the National guard. When unemployed, they would resume their familiar bandit activities.

<sup>4</sup> Men above the age of 25, owing some property, or paying taxes, or exercising a profession ([FEK/7/1843](#)). The transformation from absolute monarchy was indeed radical but should not be overstated. To begin with, voters had to write the full names of their preferred candidates on the ballot papers, something unfitting for a largely illiterate population. Moreover, elections were organized by local authorities, appointed by the central government. Finally,

Constitutional rule brought substantial fiscal implications. First, the three Powers took a more accommodating stance concerning the default and did not press for further measures. Instead, they agreed to advance the amounts for debt payments to the Greek state, effectively refinancing their previous loan, so as to avoid the call of their guarantees. Second, public financial management was improved. The constitution required that budgets had to be approved by the parliament and annual fiscal reports had to be published, including a retrospective report for the period 1833-43. In addition, a basic Public Accounting System was introduced in 1852 and local tax offices were established in 1854. Third, public revenues dropped substantially. This was the outcome of a series of tax reductions<sup>5</sup> as delegates realized that the shortest road to popular support was to promise and deliver lower taxes. Interestingly, that did not lead to any fiscal deterioration because, at the same time, public expenditure fell substantially, especially military spending.

The debt issue remained shelved for about a decade until it resurfaced in the mid-1850s. During the Crimean War (1853-56) Greece sided with Russia and sent irregular troops into adjacent Ottoman provinces to incite revolts. In May 1854, Britain and France blockaded the port of Piraeus and occupied Athens. The occupation lasted for almost three years (until February 1857) and ended only after the establishment of an international financial commission to look into Greek public finances. The commission operated for two years and submitted a report in May 1859 with rather vague findings and recommendations, including the inefficiency of the tax-farming system, the weakness of state land property rights and the lack of transparency in fiscal accounts. The only specific conclusion was the annual amount (900,000 francs) that Greece should pay for its debt (Laskaridis and Syrmaloglou, 2019). The government accepted this arrangement and made the first payment in 1861 but not in 1862 since, in the meantime, the regime was falling apart.

Otto survived the occupation, nevertheless it was a serious blow to his relations with Britain and France while his popularity was waning and the new generation of political personnel was less submissive to his micro-management practices. In 1862 a series of rebellions broke out, starting from Nafplio in February and ending at the garrison of Athens in October. The government collapsed, Otto was expelled and a National Assembly was summoned to invite a new king.

## 2.5. Second constitutional monarchy, 1863-74

With Otto's departure, the Kingdom of Greece was left without a king. The interregnum lasted for about a year and executive power was exercised by a National Assembly. That was a period of political instability, an important implication of which was the substantial reduction of tax rates that resulted in fiscal

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electoral results were verified by a parliamentary committee, also appointed by the government. There is no doubt that incumbent governments had certain advantages to manipulate elections. Bribery, fraud and intimidation were common practices (Economopoulou, 1984: 80-81).

<sup>5</sup> Taxes on livestock were the first to be reduced in February 1844 ([FEK/3/1844](#)) and again in March 1845 ([FEK/6/1845](#)). The rent on encroached state land, i.e. cultivated without official permission, was also reduced in May 1845 ([FEK 12/May/1845](#)), as well as the tax on beehives in June ([FEK/14/1845](#)). In June 1846 the land-rent for vineries was virtually abolished ([FEK/17/1846](#)). In addition, wage cuts on public servants, implemented since the austerity measures of 1843, were rolled back, starting from the army officers in 1849 ([FEK/31/1849](#)).

deterioration<sup>6</sup>. Political conditions stabilized after the appointment of a new king, the 18-year-old Danish prince who was crowned George I in October 1863, but tax rates did not recover. Nevertheless, the young king brought a respectable dowry of a more liberal constitution (ratified in 1864), the annexation of the (hitherto British) Ionian islands and an annual stipend to himself provided by the three Powers. Otto's reign was long but George's was even longer. He remained on the throne of Greece for half century, until his assassination in 1913.

In domestic politics, the crucial institutional change of the new constitution was the explicit reference to the sovereignty of the Greek people over the king whose power derived from the constitution and the laws. In this spirit, the senate was abolished (as it was considered an instrument of the king) and universal male suffrage was constitutionally guaranteed with the additional provision of voting with lead balls instead of ballot papers<sup>7</sup>. However, the king retained the prerogative to appoint and dismiss cabinets regardless of parliamentary majority.

That became an issue in March 1875, resulting in the royal acknowledgement of the principle of "declared majority" according to which the appointment of the prime minister and the cabinet would require a confidence vote by the parliament, waiving the royal privilege to appoint and dismiss cabinets at will (Gardikas, 1988: 60, 81). It was only after this substantial, albeit informal, institutional reform that elected delegates acquired a dominant role in domestic politics and party affiliations attained some stability.

## 2.6. Military mobilizations and external borrowing, 1875-97

Two major challenges arose since the late 1870s that defined the following years and eventually led to the default of 1893 and the imposition of International Financial Commission (IFC) in 1898. The first challenge was the Balkan crisis and the Russian-Ottoman war of 1877-78 that resulted in the Berlin Treaty of 1878, giving rise to independent and autonomous Balkan states with nationalistic attitudes, all of them with equally legitimate claims over the Ottoman provinces. Therefore, Greece had to strengthen her bargaining position in the forthcoming territorial re-arrangement. The obvious way was military preparation that was expressed in a series of mobilizations between 1877 and 1885. The strategy paid-off in 1881, when Thessaly and Arta were annexed to Greece but not in 1885, when Greece was blockaded by the Great Powers.

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<sup>6</sup> During the interregnum, the provisional government reduced taxes on cereals (from 9% to 5%) and olive oil (from 10% to 7%) ([FEK/24/1863](#)). At the same time, public sector wages were reduced between 5% and 15% ([FEK/10/1863](#)) but the reductions were halved next year ([FEK/8/1864](#)).

<sup>7</sup> The system was included in the constitution (art. 66) and elaborated with the electoral law ([FEK/51/1864](#)). Each candidate had his own ballot box, split in two parts. The right-hand part was colored in white and balls found inside were in favor of the candidate (yes). The left-hand part was colored in black and balls inside did not count for the candidate (no). Voters would cast a lead ball into each ballot box, putting their hand into a single pipe attached to the box, so that the choice would not be visible, and placing the ball into the right or left side of the box. Evidently, the system was time-consuming but it was also a huge improvement compared to previous one, as it protected the freedom and secrecy of the elections for the illiterate voters who, according to the [1870](#) census, were 77% of male population.



The second challenge was financial and began with the settlement<sup>8</sup> of the independence loans of 1824-25 (in arrears for half-century) which allowed external borrowing to commence. After that, the doors of international capital markets opened widely. Greek government bonds were rather attractive assets for the abundant foreign capital of the period. On top of higher interest rates, they were offered at discount, denominated in foreign currency, guaranteed by designated revenue and were tax exempt (Levandis, 1944: 56). Indeed, Greece made the most out of her debut in international capital markets. Between 1879 and 1892, she borrowed some 115% of GDP and paid about the same amounts.

In short, geopolitical instability offered the incentive to advance Greek military standing, whereas access to international capital markets offered the financial opportunity to do so. External borrowing relaxed the fiscal constraints, military spending skyrocketed and so did debt servicing costs. Eventually, it was proven unsustainable, especially when international conditions deteriorated after the 1890 Baring crisis (Mitchener and Weidenmier, 2008). As foreign capitals were drying out, Greece was finding it increasingly hard to rollover her debt. In December 1893, the government stopped principal payments completely and capped interest payments at 30% for external loans. From 1894 until 1896, negotiations were held for a compromise with the bondholders, without finding a solution.

Things were already bad but they were about to get worse. While in default, Greece engaged in her first large scale war against the Ottomans. In April 1897, after a series of confrontations during the Cretan rebellion, the Ottomans declared war and completely overran the Greek army occupying the whole province of Thessaly. The Great Powers intervened and negotiated a peace treaty with the sultan that was rather beneficial for Greece, all things considered, as she was spared from any substantial territorial loss and, in addition, Crete became an autonomous principality. The flipside was that Greece was burdened with a huge war indemnity to the Ottomans.

## 2.7. International Financial Commission, 1898-1911

In 1898, Greece received a new guaranteed loan (some 40% of GDP) to pay for the indemnity and the defaulted loans. That came along with an International Financial Commission (IFC) that settled the payment of foreign and domestic loans and took direct control over specific revenue sources<sup>9</sup>. Some of the safest and easiest to collect revenue, such as state monopolies, stamp and tobacco taxes and custom duties (of the port of Piraeus) were directly transferred to the Commission and from there to bondholders.

Debt servicing was smoothed and primary balances were improved. Still, the impact of International Financial Commission should not be overstated. Most of the increased revenue came from customs duties and other non-tax sources while, on the other hand, the dramatic decrease in spending was solely due to lower military spending. In fact, Greece had already achieved similar primary balances since the 1880s, only to be destabilized by military mobilizations. It was the absence of such mobilizations, rather than the

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<sup>8</sup> The settlement was reached in London in September 1878 and was ratified by law in December of the same year ([FEK/82/1878](#)). The outstanding amount, estimated at 10 million pounds (or 97% of GDP) swapped for new bonds of 1.2 million pounds (or 11.6% of GDP) with an annual 5% interest and repayment in 33 years. The haircut on the original principal was of the order of 70% and of the interest almost 90%.

<sup>9</sup> The details of the settlement and the mandate of the International Financial Commission were ratified by law ([FEK/28/1898](#)).



competence of the International Commission, that improved Greece's fiscal performance at the dawn of the 20<sup>th</sup> century. The main contribution of the IFC was the normalization of debt service.

While public finances were more or less secure under the watchful eye of the IFC, domestic politics were grim. The humiliating defeat of 1897 had revealed the miserable condition of the army turning national enthusiasm into depression. As a response, in August 1909, a secret society of army officers assembled some 3,000 troops on the Goudi hill at the outskirts of Athens and threatened to attack the capital unless their demands were met. These demands ranged from general reforms on public administration, justice and finance to more specific measures for the army. The officers blamed the corrupted political personnel as a whole and held it accountable for the sad state of the nation and especially its armed forces but they did not seek to seize power directly. Instead, they remained in the background, constantly expressing their loyalty to the constitution and the king. Government and parliament were intimidated into intense lawmaking in accordance with the officers' agenda, without much debate or opposition as the constant threat of dictatorship hanged above the delegates. Seven months later, in March 1910, a new National Assembly was summoned to revise the constitution and the officers dissolved their group (Papacosma, 1977).

The new elections delivered many newcomers in the parliament who by the end of the year gathered under the Liberal Party, the new political power that brushed aside the traditional political personnel<sup>10</sup> and introduced a series of modernizing reforms, including the constitutional revision of 1911, most of which were originally proposed by the officers. That was perhaps the bright side of the military coup. On the other hand, the same coup legitimized military interventions as a means to solve political problems, setting a precedent that would be repeated all too often in the next decades.

## 2.8. Wars and national strife, 1912-22

Then came the wars and they did not come alone. Combined with extreme political conflicts and financial pressures, they initiated the most turbulent period in Greek political history. In contrast to the rest of Europe, the wars in the Balkans started in 1912 and, for Greece and Turkey in particular, lasted until 1922, with the Asia Minor campaign and defeat. In the First Balkan War (October 1912 – May 1913) an alliance of Greece, Bulgaria, Serbia and Montenegro fought against the Ottomans whose army collapsed in all fronts. Subsequently, the Bulgarians attacked their former allies in Macedonia, starting the Second Balkan war (June – August 1913) which ended in Bulgaria's defeat. For Greece, the victorious Balkan wars resulted in the acquisition of (southern) Epirus, southern Macedonia and Crete and the occupation of northern Aegean islands. In less than a year, Greece almost doubled her territory and the army regained its lost prestige.

But there was no time to celebrate as, one year later, the First World War broke out and the question of Greece's position between the Entente and the Central Powers became the focal point of domestic division. The liberal government insisted for the entrance at the side of Entente, hoping to secure and extend recent territorial gains, whereas the new king Constantine, who ascended to the throne after his father's George I assassination in 1913 and was brother-in-law to the German Kaiser Wilhelm II, supported neutrality. A political crisis ensued and escalated quickly in a major domestic conflict between liberals and

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<sup>10</sup> According to Mavrogordatos (1983: 68) "Out of the 362 members of the Chamber elected in November: 243 or 67 percent had never been elected to Parliament before, 74 or 20 percent had been elected in August for the first time, and only 45 or 13 percent had been members of Parliament before 1910. It was mostly out of these "new men" that the L. P. [Liberal Party] was formed".

royalists known as the “national schism”. The liberal government was forced to resign twice in 1915 after two consecutive attempts to actively support the Entente powers that were resisted by the king. When in August 1916 the royalist government conceded territory to Bulgaria without resistance, a group of liberal army officers established an insurgent government in Salonica and declared war to the Central Powers. In addition, the Entente fleet imposed a naval blockade to royalist Greece, eventually forcing king Constantine to leave the country and pass the throne to his second son, Alexander, in June 1917. The liberals returned to power, Greece joined the Entente alliance and contributed to the war effort in the spring and autumn of 1918.

After the end of hostilities, Greece had enough diplomatic leverage to push further her territorial claims and an army at her disposal. In May 1919, with the permission of the Entente powers, Greek forces landed in Smyrna starting the Asia Minor campaign. However, the treaties signed by the official Ottoman authorities were not accepted by the Turkish nationalists who subverted the sultan and started the “Turkish War of Independence” against foreign invaders, especially the Greeks. The successful counter-offensive of the Turks forced the Greek army and civilians to abandon Smyrna in a catastrophic defeat. With the Treaty of Lausanne in 1923, Eastern Thrace and the Smyrna region were returned to the new Turkish state and an exchange of populations was agreed. That was the endgame of Greek territorial expansion.

## 2.9. Adjustment and political unrest, 1923-39

Despite the dramatic ending, the overall balance was rather positive. Greece emerged with substantial territorial gains (Macedonia, Epirus, Western Thrace, Crete, North Aegean) reaching almost its modern day borders (with the exception of the Dodecanese islands) and doubling her population. In 1911 the population was 2.7 million and by 1923 it reached 6 million. On the other hand, this expansion came at a price as Greece had to deal with wartime debt and the settlement of refugees in a framework of serious political unrest.

It goes without saying that the cost of an almost uninterrupted war decade was substantial. The entire burden fell upon Greece’s weak shoulders as financial assistance by the Entente allies was too little and came too late.<sup>11</sup> Between 1910 and 1922 Greece borrowed some 185 percent of GDP and paid only 75 percent of GDP. The remaining amount had to be covered by emergency taxation, which started in 1917<sup>12</sup> and became a standard practice for all governments in the following years. In addition to wartime debt, Greece had to deal with the integration of new territories and, most importantly, with the reception,

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<sup>11</sup> A financial agreement was reached in December 1917 and signed in February 1918. It provided for the opening of “book credits” by the allies, up to 750 million drachmas, as collateral for the issuance of government loans by the National Bank of Greece. Activation of these credits was substantially delayed as it was subject to approval by another international commission established in Greece. The amounts would be effectively advanced as loans to Greece only after the end of hostilities, a commitment that was only partially fulfilled by the allies and eventually suspended after the political change in 1920.

<sup>12</sup> Law 1043 on the taxation of extraordinary profits ([FEK/253/1917](#)) was the first of its kind. It imposed a tax rate up to 30% on excess profits, retroactively since 1915 until one year after the end of hostilities. Excess profit was defined anything above the average of the three-year period before 1915.

support and settlement of about 1.5 million refugees,<sup>13</sup> mostly from Asia Minor. Against all odds, the Greek state made remarkable efforts to avoid the fiscal fallout and achieved an impressive adjustment with high primary balances.

But the interwar period was also the time of political reckoning. The deep cleavages inherited by the national schism generated persistent political turmoil. In only five years between 1922 and 1926 there would be four military coups, six high-profile executions, two expulsions of kings, the proclamation of Republic and a short-lived dictatorship. The new round of political crisis started immediately after the defeat. In September 1922, a group of liberal army officers seized the government from the royalists who held it since 1920. Two months later, six prominent royalists, including three former prime minister, two former ministers and the military chief of the campaign were found guilty by a court-martial and executed. King Constantine was deposed, this time for good, and his first son, George II, replaced him on the throne. But he did not remain there for long. After a failed royalist counter-coup in October 1923, a National Assembly was summoned, with the abstention of the royalist parties, and resolved to end monarchy and establish a republic. That was confirmed by a plebiscite in April 1924 but the implementation was rather messy. While drafting the republican constitution, a military general led another coup in June 1925, received a vote of confidence by the Assembly and dissolved it. About a year later, in August 1926, another coup brought him down and elections were held in November 1926. A brief period of relative stability ensued with the formation of a coalition government, followed by the electoral victory of the Liberal party in 1928 that remained four years in office.

About the time that Greece appeared to getting back on her feet, the Great depression hit. The effects were felt mostly after September 1931, when the Bank of England abandoned the gold standard. The Greek drachma devalued, after some vain attempts to maintain its exchange rate, resulting in the sudden increase of foreign debt servicing costs. In April 1932 Greece defaulted on her foreign debt.

The economic impact of the depression and the default was less serious than expected. Economic activity recovered rather quick, turning to import substitution. But the political consequences were far more severe. As the liberals were losing power, they attempted two failed coups, in 1933 and 1935. As a result, the royalists' return to power led to the restoration of Monarchy in 1935 and the reinstatement of Constantine's son, George II. While the short-lived Republic fell under the combined burden of political cleavages and economic depression, the restoration of Monarchy was even worse.

The new element that further complicated political balances was the growing influence of the labor movement. As it happened elsewhere, establishment parties found common ground against the alleged communist threat, eventually paving the way to fascism. After the parliamentary stalemate<sup>14</sup> that followed the early 1936 elections, the king appointed the royalist general Ioannis Metaxas, leader of a small party, as prime minister. He received a vote of confidence in April and a few months later, in August, under the pretext of massive labor unrest, he dismissed the parliament and declared a dictatorship with

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<sup>13</sup> The Refugee Settlement Commission was established in 1923 as a quasi-independent organization dealing with international humanitarian loans to Greece and received two loans, 10 million pounds in 1924 and 6.5 million pounds in 1927. It dissolved in 1930 (Campbell and Sherrard, 1968: 138-139).

<sup>14</sup> The January 1936 elections did not deliver parliamentary majority for either political camp. Out of 300 seats, the royalist parties won 143 and the republican parties 141, whereas the communist party won 15 seats and the agrarian party one seat (Mavrogordatos, 1983: 52).

the full support of King George II. Despite Metaxas' pro-German inclination and the fascist-corporatist ideology of his regime, he kept Greece closely allied to Britain into the Second World War. His authoritarian rule would last until his death in 1941, a few months before Greece was occupied by the Axis powers.

### 3. The new fiscal dataset for Greece 1833-1939

#### 3.1 The reports

The dataset comprises information from primary sources, the official fiscal reports (budget outruns or 'Apologismoi') prepared consistently by the Ministry of Finance according to the constitutional provision of 1844. The first of these reports was retrospective for the whole absolutist period (1833-43) and was submitted to the first legislative body after the constitutional change of 1844. A similar multi-year report was published for the period 1846-50 containing less detailed data. For all remaining years, the reports exist, except for 1857 that is missing. A few of the reports contained time series of previous years that helped to fill some gaps.

The annual accounts were reported in both cash and accrual terms. Typically, the accrual accounts included receipts and payments that were generated (i.e. assessed or ordered) in a given year and realized in that year and the next. Although the duration of the fiscal year did not remain constant, the general principle was maintained throughout the period. Receipts and payments realized beyond the fiscal year were recorded as arrears in the year of realization. The series here is compiled in accrual terms.

Finally, the reports concern the central government and omit the transactions of municipalities and other public entities and funds. Transfers (or receipts) from the central government to these entities were recorded as spending (or revenue).

#### 3.2 Main components

The structure and classification of the official fiscal reports changed many times during the period. In order to homogenize the aggregates, two levels of classification are imposed. The first level separates the primary from the financial part, i.e. borrowing and debt service are separated from revenue and (primary) expenditure. That is relatively straightforward as both loans and debt service were typically discrete entries. Loans consist of the amounts actually received and recorded each year, net of all withheld amounts and irrespective of the nominal amount or the time of contract signature. Debt service includes all kinds of repayments for principal, interest, commission fees and 'currency differences'<sup>15</sup> related to debt. There were some occasional minor inconsistencies with the same items recorded sometimes as primary spending and sometimes as debt service, that have been corrected. Note, finally, that debt payments were not generally separated between principal and interest, nor between domestic and external.

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<sup>15</sup> Transactions in foreign currency were recorded in two amounts/items. The first had the title of the original transaction and was calculated as if the exchange rate of the drachma was at par with the respective foreign currency and the second had the title "currency difference" and included the remaining amount in drachmas.

The second (primary) level of classification splits revenue and expenditure further. The former is composed of four categories: direct taxes, indirect taxes, tariffs and other revenue. Primary expenditure is divided between two categories: military spending and civilian spending. The classification details and adjustments as well as differences from other similar studies on Greece are described in Appendix 1.

### 3.3. Average fiscal aggregates by period

The presentation of the derived fiscal aggregates begins with their average values by period (according to section 2) in order to highlight their variation under different institutional regimes and external conditions. Table 1 reports these average values while the following subsections present the annual evolution of each major fiscal variable, maintaining the periods in the background.

Period	Total revenue	Direct taxes	Indirect taxes	Tariffs	Other	Primary spending	Military spending	Civilian spending	Primary balance	Loans	Debt service
1833-43											
Absolute Monarchy	16.2	8.8	0.7	3.3	3.4	17.9	10.2	7.6	-1.7	9.7	4.6
1844-62											
First Constitutional Monarchy	13.5	6.3	1.2	2.8	3.2	13.5	5.6	7.9	-0.1	3.4	3.5
1863-76											
Second Constitutional Monarchy	12.7	4.4	1.2	3.7	3.4	12.3	4.3	8.0	0.4	3.0	3.4
1877-97											
Military mobilizations and external borrowing	16.2	3.5	2.7	5.0	5.0	16.7	8.0	8.7	-0.5	5.7	6.7
1898-1911											
International Financial Commission	19.2	3.3	4.0	6.0	5.9	14.1	5.0	9.1	5.1	5.6	6.5
1912-22											
Wars and national strife	14.9	2.8	3.5	3.8	4.9	23.6	14.0	9.6	-8.7	15.2	5.6
1923-39											
Adjustment and political unrest	26.0	4.8	7.9	7.6	5.7	23.9	7.2	16.7	2.1	4.2	6.7

*Table 1. Average fiscal aggregates to GDP by periods*

### 3.4 Revenue

The first observation on total revenue is its remarkable variability. From an average of 16.2 percent of GDP over 1833-43, it fell to 12.7 percent in the 1863-1876 period. For the next two decades (1877-97) it bounced back to the initial level (16.2 percent) exceeding 20 percent at the end of the century. Total revenue remained around this level during the first decade of the twentieth century (1898-1911 average of 19.2 percent) but experienced a notable drop around the middle of the second decade. Thereafter it followed an impressive recovery, peaked to the historical high of 33.8 percent in 1930 and fell back to below 25 percent for the remaining years.

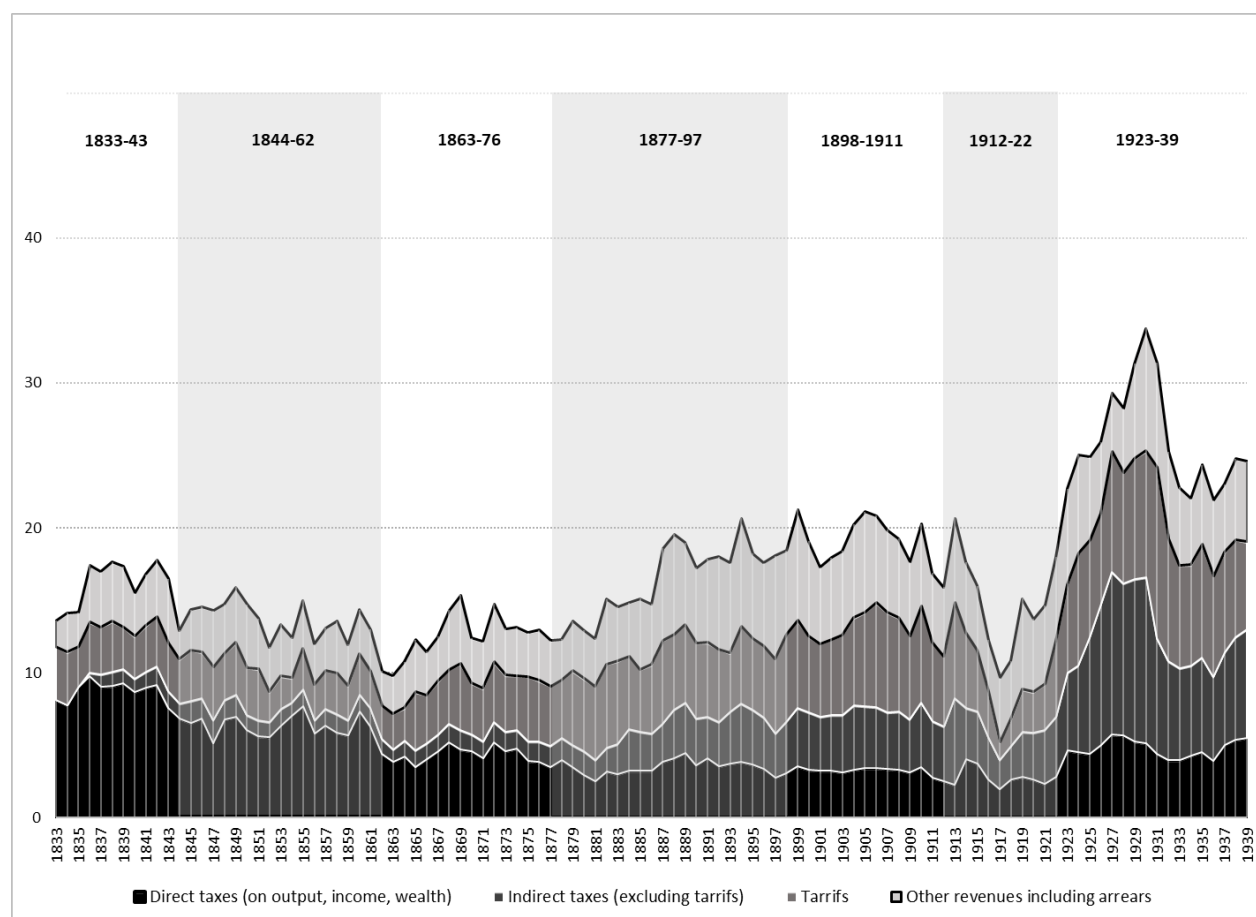


Figure 1. Revenue sources to GDP

The second observation is the changing composition of revenue and the constant decline of direct taxes. The latter recorded a historical high during the first decade and kept falling afterwards, at least until the second decade of the twentieth century. Up to the late 1870s, falling direct taxes was the critical factor behind the drop of total revenue. However, since the 1880s, tariffs, indirect taxes and monopolies more than compensated in aggregate terms, as they gradually replaced direct taxes as the key sources of primary revenue. For the post-1920s in particular, when direct taxes recovered, it was mostly indirect taxes and other sources that pulled total revenue upwards.



### 3.4.1 Comparison

It may be useful to get an idea of where Greek revenue stood in comparison with other contemporary states. Karaman and Pamuk (2010) have compiled historical series for public revenue for a series of European states in grams of gold per capita. These are reported in table 2 below alongside Greece.

	England	Dutch Republic	France	Spain	Austria	Russia	Prussia	Ottoman Empire	Greece
<b>1850-59</b>	16.7	11.3	12.0	7.8	4.6	3.6	6.3	2.5	4.4
<b>1880-89</b>	18.3	15.4	23.6	13.7	14.6	6.5	12.6	5.0	7.9
<b>1900-09</b>	26.1	14.8	28.9	12.3	20.6	7.5	22.8	5.6	10.4

Note: Data for other countries are taken from Karaman and Pamuk (2010) and 'the figures represent net monetary revenues of the central administrations exclusive of loan receipts'. The corresponding figures for Greece are calculated as the decade average of total public revenue (without loans) divided by total population.

*Table 2. Tax revenue per capita, annual averages in grams of gold*

There are two notable findings from the above table. The first is that, throughout the period, the Greek state collected more revenue per capita than the Ottoman or the Russian state. Given the size and level of development of the Greek state as opposed to the imperial status of the Ottoman and the Russian states, this is rather striking, either as an indication of Greek success or Ottoman and Russian failure. A second finding can be drawn from the comparison with Western Europe. While Greece consistently lagged well behind the high-performers, such as England, France, Austria and Prussia, there seems to be a converging trend with the low-performers of Western Europe, such as Spain and the Dutch Republic. Again, it is unclear whether this was a good thing for Greece or a bad thing for Spain and the Dutch Republic; after all, revenue per capita slowed-down in both countries at the turn of 20th century. In short, Greece showed significant progress in revenue collection and stood at a decent position relative to states with far more advanced institutions.

### 3.5 Spending

The big picture of spending is rather simpler than that of revenue. The first observation is the sluggish growth, almost stability, of civilian spending, up until the early twentieth century. From an initial 7.6 percent of GDP during the first decade (1833-43) it only rose to 9.6 percent in 1912-22, that is a mere two percentage points in almost a century. With the exception of a few short-lived increases (mostly associated with public investment) it did not fluctuate much. However, the outlook changed substantially since the 1920s with a notable increase of civilian spending, reaching 16.7 percent for the period 1923-1939.

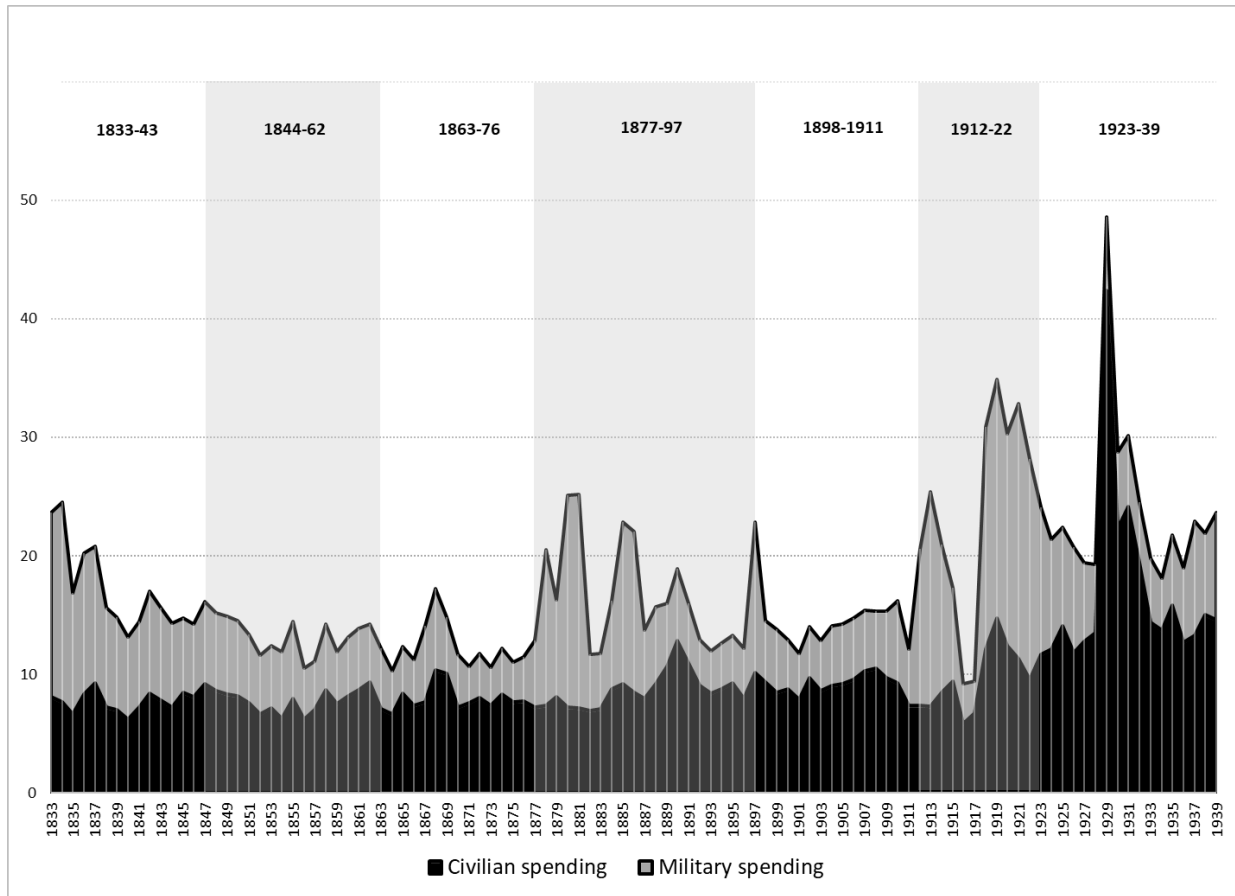


Figure 2. Civilian and military spending to GDP

The second remark is the importance of military spending, a standard feature of nineteenth century states that lacked extensive infrastructure, welfare provisions and sophisticated civil services. More importantly, the sizeable hikes of military spending during the first five years, the first half of the 1880s and 1897 and the decade 1912-22 were typically associated with conflict periods such as the enforcement of absolute monarchy, army mobilizations and war episodes. It is rather evident that military spending was the major driver behind fluctuations in total spending.

### 3.6 Primary balance

Overall, Greece recorded more years in primary surplus than deficit. Out of 107 years, the budget was in surplus in 61 of them and in deficit in only 34, while it was more or less balanced (surplus or deficit less than 0.5 percent of GDP) in the remaining 12 years. Still, the average deficit (6.7 percent) was much higher than the average surplus (3.4 percent) resulting in an almost balanced average outcome for the whole period (-0.14 percent).

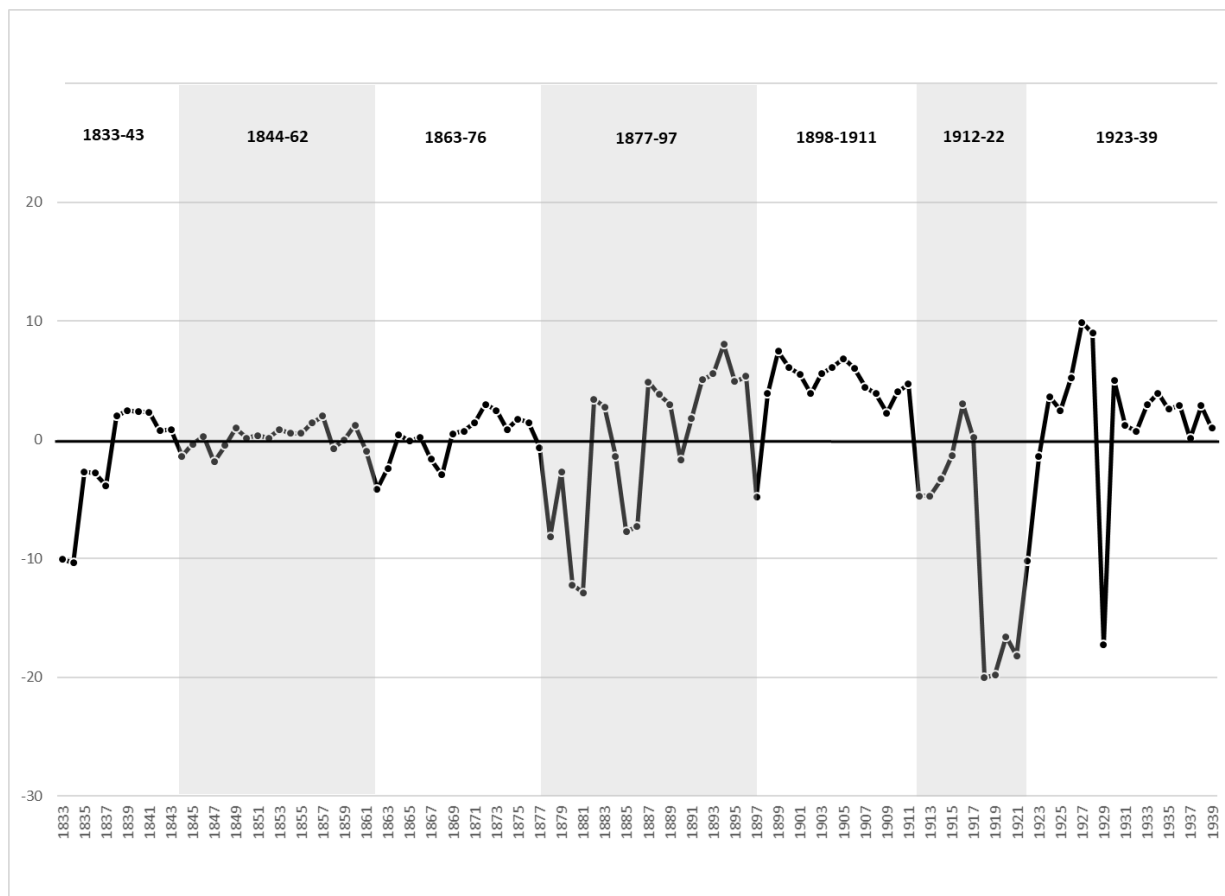


Figure 3. Primary balance to GDP

Two things worth noting here. First, major deficits coincided with military spending hikes such as in 1833-37, 1878-1886 and 1912-1922 and second, they were followed by adjustments resulting in persistent surpluses with only minor interruptions such as in 1838-42, 1886-1911 and 1924-1939.

### 3.7 Finance

Sovereign borrowing began with the disbursements of the massive guaranteed loan of 1833 and continued with the advances for its servicing after the 1843. Greece took the first steps in domestic borrowing in the 1860s and continued with the large external loans after 1878. Those stopped suddenly after the 1893 default and settled with the guaranteed loan of 1898 (along with the indemnity to the Ottomans). Borrowing slowed down in the first decade of the 20<sup>th</sup> century (under the IFC) but recovered again in the second (to finance the war effort). Borrowing continued in the 1920s at a slower pace and stopped again after the 1932 default.

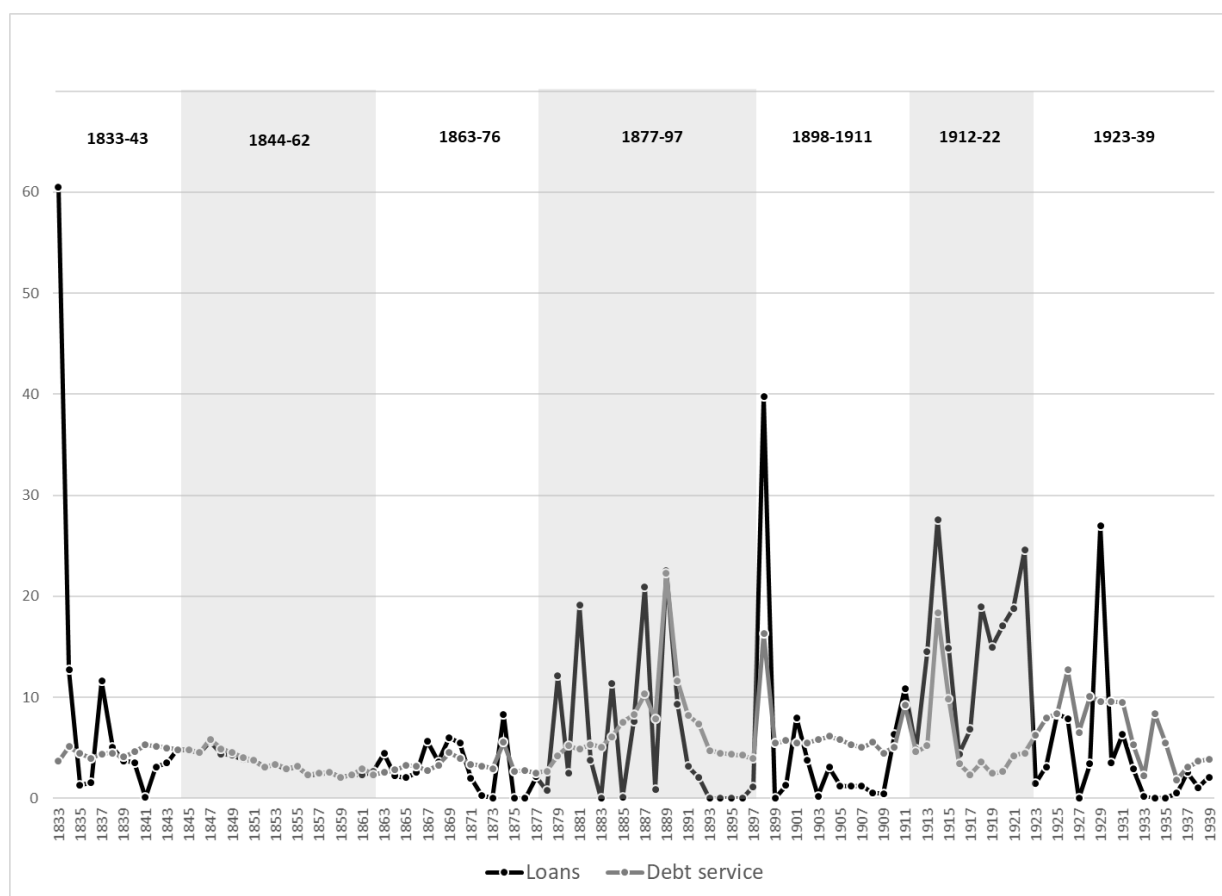


Figure 4. Loans and debt service to GDP

Debt service, on the other hand, was relatively smoother. It stood at an average of around 4.5 percent during the first decade and dropped to 3.4 percent in the next couple of decades, when the advances matched debt repayments. It remained at the same average level for the next period but rose substantially in the 1877-1897 period of external borrowing, until the default of 1893. Interestingly, the average debt burden remained the same during the IFC period but without the large fluctuations of the previous period. Subsequently, debt service dropped lower, especially after 1915, only to rise again since the 1920s, resulting in the 1932 default.

## 4. Empirical analysis

An appropriate empirical strategy to account for the various interactions between economic and institutional variables is graphical network analysis. Compared to standard regression analysis, it carries certain advantages. The first is that it does not assume causality relationships in advance, variables are not assigned as dependent/endogenous or independent/exogenous. This seems appropriate when studying variables that potentially interact with each other. The second is the graphical representation that offers an intuitive visualization of causal relations. Variables are nodes and their interactions are edges with the arrows denoting causality. Green edges indicate positive and red edges negative impact, solid edges indicate contemporaneous and dashed edges lagged impact.

Graphical models are also superior to structural auto-regressive models (SVAR) of multivariate time series. As will be shown in the next subsection, they avoid the identification and over-parametrization problems altogether while, most importantly, they provide better representations of the causality structure among variables, overcoming the problem of spurious causality which is widespread in VAR-based models (Eichler, 2007).

The following subsection briefly describes the theoretical framework. Then I present the variables and finally report the estimation results.

### 4.1 Theory

To simplify notation, the exposition below presents the case applied here, namely five variables and one lag without constant term.

Multi-variate time-series are generally described by a structural or primitive VAR with the form

$$V_t = B_0 V_t + B_1 V_{t-1} + E_t \quad (1)$$

where  $V_t, V_{t-1}$  are  $5 \times 1$  vectors of five variables  $V^i$  with  $i \in \{1,2,3,4,5\}$  at time  $t$  and  $t-1$ , respectively,  $B_0, B_1$  are the  $5 \times 5$  vectors of contemporary and lagged coefficients and  $E_t$  is the vector of white noise residuals.

The primitive system cannot be solved directly due to the simultaneous effects between variables (i.e.  $V_t^i$  affects  $V_t^j$  while  $V_t^j$  affects  $V_t^i$ ) hence OLS estimates would suffer from simultaneous equation bias since the regressors and the error terms would be correlated.

To address this problem, we can examine the reduced or standard form VAR

$$V_t = A V_{t-1} + U_t \quad (2)$$

where  $A$  is a  $5 \times 5$  matrix of coefficients measuring the effect of  $V_{t-1}^j$  on  $V_t^i$  and  $U_t$  is the vector of independent and identically normally distributed (iid) residuals

While the reduced model can be estimated, it suffers from two major problems, namely identification and over-parametrization. The former refers to the inability of the reduced model to reveal all parameters of the primitive model and requires to impose restrictions, which may or may not stem from economic theory. The latter refers to the loss of degrees of freedom when we increase the number of variables or lags that could compromise the validity of the results.

To deal with these problems, Ahelegbey et al. (2016) suggest the Bayesian Graphical Vector Autoregressive (BGVAR) approach. An important feature of the BGVAR approach is that it introduces restrictions directly on the structural model. In particular, it imposes acyclic constraints on the contemporaneous relationships considering structural dynamics as a causal dependence among variables.

The primitive equation (1) can be represented in the form of a graphical model with a one-to-one correspondence between the coefficient matrices and a directed acyclic graph (DAG):

$$V_t^j \rightarrow V_t^i \Leftrightarrow B_0^{ij} \neq 0$$

$$V_{t-1}^j \rightarrow V_t^i \Leftrightarrow B_1^{ij} \neq 0$$

where the arrow symbols indicate the direction of causality and  $B_0^{ij}, B_1^{ij}$  are elements of the original coefficient matrices  $B_0, B_1$  respectively. The latter matrices are derived as the element-by-element Hadamard's products of the binary matrices  $G_0, G_1$  and the coefficient matrices  $\Phi_0, \Phi_1$  such that

$$B_0 = (G_0 \circ \Phi_0)$$

$$B_1 = (G_1 \circ \Phi_1)$$

Elements in  $G_0, G_1$  are indicators of the causality structure, i.e. the presence or absence of causal relationships between variables, such that  $G_0^{ij} = 1 \Leftrightarrow V_t^i \rightarrow V_t^j$  and  $G_1^{ij} = 1 \Leftrightarrow V_{t-1}^i \rightarrow V_t^j$  and 0 otherwise. Elements in  $\Phi_0, \Phi_1$  are regression coefficients measuring the magnitude of the effect from one variable to another.

Hence

$$B_0^{ij} = \begin{cases} 0 & \text{if } G_0^{ij} = 0 \Rightarrow V_t^i \nrightarrow V_t^j \\ \Phi_0^{ij} & \text{if } G_0^{ij} = 1 \Rightarrow V_t^i \rightarrow V_t^j \end{cases}$$

and

$$B_1^{ij} = \begin{cases} 0 & \text{if } G_1^{ij} = 0 \Rightarrow V_{t-1}^i \nrightarrow V_t^j \\ \Phi_1^{ij} & \text{if } G_1^{ij} = 1 \Rightarrow V_{t-1}^i \rightarrow V_t^j \end{cases}$$

Therefore, the primitive system (1) can be written as

$$V_t = (G_0 \circ \Phi_0)V_t + (G_1 \circ \Phi_1)V_{t-1} + E_t \quad (3)$$

The actual estimation of the coefficient matrices  $B_0 = G_0 \circ \Phi_0$  and  $B_1 = G_1 \circ \Phi_1$  is carried through in R using the package "pompom" (person-oriented method and perturbation on the model) developed by Yang et al (2018) and described in Yang et al (2019). While the package was originally developed for psychology research, it is suitable for economics research too (for a recent application in financial economics see Kanas et al, 2023).

## 4.2 Baseline specification and results

The graphical network model includes five variables, namely fiscal capacity, army size, representation, economic performance and debt service. Fiscal capacity is measured by tax revenue to GDP, army size by military personnel as percentage of population, representation by the index of legislative constraints to executive, economic performance by real GDP per capita and debt service by principal, interest and commission payments for domestic and foreign loans. In the baseline specification presented in this section, tax revenue includes the sum of direct and indirect taxes (excluding tariffs and other sources, e.g. monopolies) and is labeled here as ‘tax’ and the representation index is taken from the Polity-5 database and labeled as ‘rep\_p’. More details on the variables and the associated sources can be found in Appendix 2.

The estimated graphical network of the variables is shown in Figure 5 below. Recall that nodes are variables and arrows indicate the direction of causality. Green (red) edges denote positive (negative) causal relations, while solid (dashed) lines denote contemporary (lagged) causal relations.

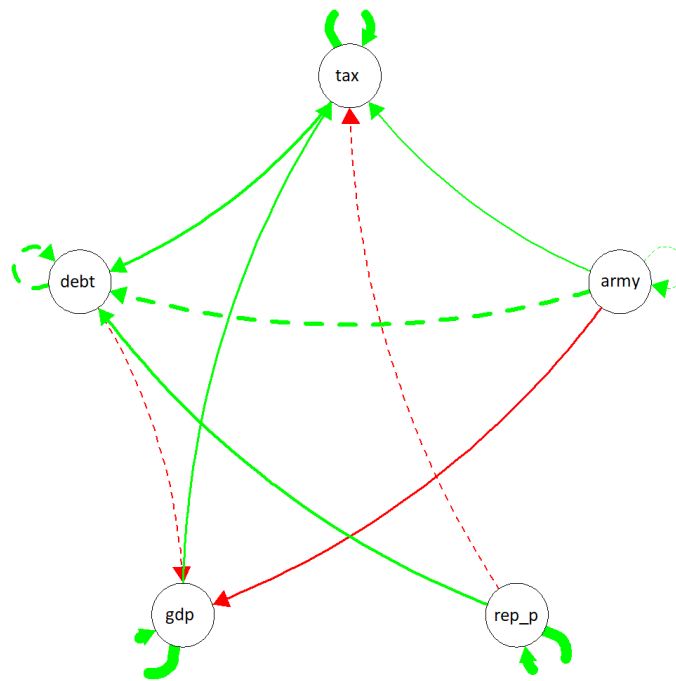


Figure 5. Graphical network of baseline specification

Table 3 below reports the exact values of the coefficients and the standard errors (autoregressive elements in grey).

Baseline specification										
beta coefficients										
	tax (-1)	army (-1)	rep_p (-1)	gdp (-1)	debt (-1)	tax	army	rep_p	gdp	debt
tax	0.809	0	-0.113	0	0	0	0.075	0	0.186	0
army	0	0.030	0	0	0	0	0	0	0	0
rep_p	0	0	0.920	0	0	0	0	0	0	0
gdp	0	0.087	0	0.994	-0.073	0	-0.136	0	0	0
debt	0	0.359	0	0	0.346	0.232	0	0.229	0	0



	standard errors					tax	army	rep_p	gdp	debt
	tax (-1)	army (-1)	rep_p (-1)	gdp (-1)	debt (-1)					
tax	0.044	0	0.035	0	0	0	0.033	0	0.043	0
army	0	0.097	0	0	0	0	0	0	0	0
rep_p	0	0	0.038	0	0	0	0	0	0	0
gdp	0	0.032	0	0.035	0.033	0	0.032	0	0	0
debt	0	0.073	0	0	0.079	0.079	0	0.080	0	0

*Table 3. Beta coefficients and standard errors of baseline specification*

The estimated graphical network model reveals, formally and intuitively, a rich set of lagged and contemporaneous causal links. Both institutional variables, army and representation, are fully exogenous, i.e. they do not receive any causal effect from other variables (there are not any arrows directed towards their nodes). Instead, they are both pure ‘exporters’ of causal effects onto economic variables. Army is the originator of three causal effects: a positive contemporaneous effect on fiscal capacity (the green solid arrow), a positive lagged effect on debt service (the green dashed arrow) and a negative contemporaneous effect on economic performance (the red solid arrow). Representation has two causal effects, a negative lagged effect on fiscal capacity (the red dashed arrow) and a positive contemporaneous effect on debt service (the green solid arrow).

The main findings concern the institutional determinants of fiscal capacity, which is the primary objective of this study. The model shows that the size of the army exerted a positive causal effect on fiscal capacity while representation exercised a negative causal impact. The former result implies that military preparations offered sufficient incentives to the Greek state to improve tax collection and develop fiscal capacity. This is in line with relevant literature and verifies the ‘war made the state’ hypothesis. The latter result, however, is more intriguing as it implies that improvements in representation (strictly speaking, more legislative constraints to executive power) led to reduced fiscal capacity. This is in contrast to other findings (Dincecco, 2019) and could be interpreted as evidence that when elected politicians get more representative power, they follow the incentive of trading votes for tax privileges as an instrument for political success

Some additional effects from institutional to economic variables are worth noting. The positive lagged effect of the army on debt service is clearly associated with the repayment of previous loans floated to cover military expenditures. Moreover, the negative effect on economic performance indicates that the army absorbed public resources away from productive investment. Finally, the positive effect of representation on debt service offers further support to its negative impact on fiscal capacity.

The estimated model also reveals causal interactions between the three economic variables. It reveals a positive causal effect from economic performance to fiscal capacity, which is a standard tax buoyancy effect. The more interesting aspect, however, is the absence of the opposite effect, namely from fiscal capacity to economic performance. Fiscal capacity is considered an element of broader state capacity which, in turn, is expected to produce positive economic outcomes (Besley and Persson, 2011). Such a relationship is not verified by the model. Next, fiscal performance positively affects debt payments. This seems rather natural since higher tax revenue improves the ability to fulfil debt obligations (recall that the variable measures debt payments, not the debt stock). Again, the more interesting part is the absence of the opposite effect, a causal link from debt service to fiscal capacity. Presumably, one would expect a

causality structure from army to debt and from debt to fiscal capacity. Typically, states issue debt to finance military costs and then raise taxes to repay this debt, improving fiscal capacity in the process. However, the model here captures the first link but not the second. Instead, it finds a direct causal link from army to fiscal capacity. That could be interpreted as a rapid response of the Greek state to military costs, before the pressure from debt payments kicked in. Finally, debt payments carry a negative impact on economic performance, which can be interpreted as a debt overhang effect.

A final point is the positive autocorrelation for all five network variables shown by the green self-loops. Unsurprisingly, the strongest autocorrelations are for tax revenue, representation and GDP per capita.

### 4.3 Robustness and goodness of fit

This subsection examines three alternative specifications employing different measures for two model variables, representation and fiscal capacity. As already noted, representation in the baseline specification is measured by the Polity-5 variable (xconst) capturing legislative constraints to executive. A similar variable (v2xlg\_legcon) has been coded in the V-dem database and is labeled here as 'rep\_v' (see Appendix 2). Figure 6 below shows the resulting network graph.

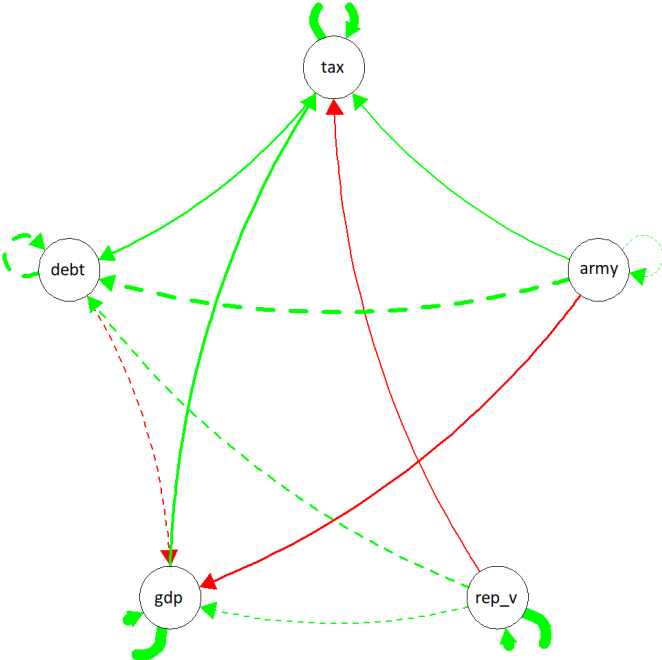


Figure 6. Network graph for specification 1 (V-dem representation index)

It is evident that the graph is almost identical with the baseline specification (coefficient values and standard errors can be found in the appendix). The most important difference is the additional positive lagged causal link from representation to economic performance (the green dashed arrow). Another difference, rather marginal, is that the effect of representation on fiscal capacity is contemporaneous (instead of lagged in the baseline) and the effect of representation on debt is now lagged (instead of contemporaneous). Importantly though, the main interactions as well as the directions of causality remain unaltered.

We can further explore robustness employing a different variable for fiscal capacity. In the baseline specification I used the sum of direct and direct taxes as percentage to GDP, but it may worth examining a different measure, direct taxes to GDP, labeled as 'dir'. The latter can be conceived as 'narrow' fiscal capacity as opposed to 'broad' fiscal capacity in the baseline specification (see Appendix 2). Specification 2 below shows the resulting causal links (with the Polity-5 representation index).

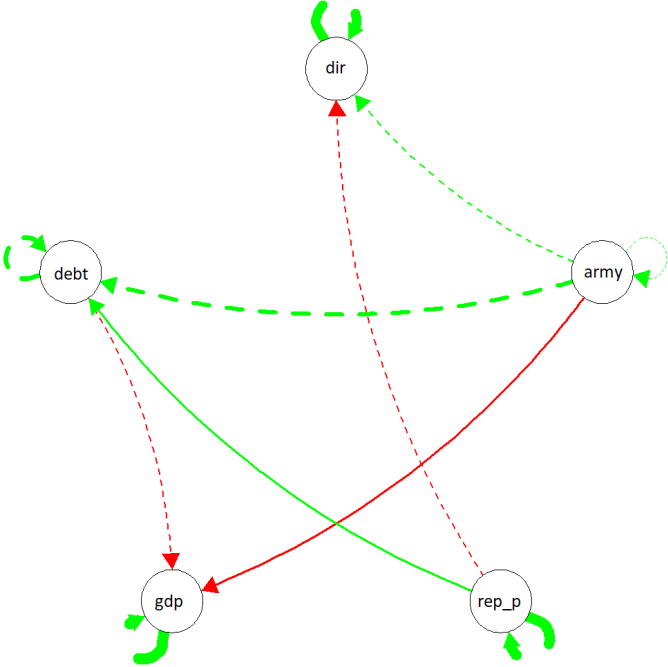


Figure 7. Network graph for specification 2 (Direct taxes with Polity-5 index)

Compared with the baseline specification, two secondary relationships disappear, the tax buoyancy (no arrow from gdp to dir) and the positive impact from fiscal capacity to debt service (no arrow from dir to debt). Moreover, the positive effect from the army to fiscal capacity is lagged instead of contemporary. Still, the main causal interactions are maintained.

We can explore one more specification combining both narrow fiscal capacity, i.e. direct tax revenue and the V-dem representation index. The resulting graphical network is portrayed in figure 8 below.

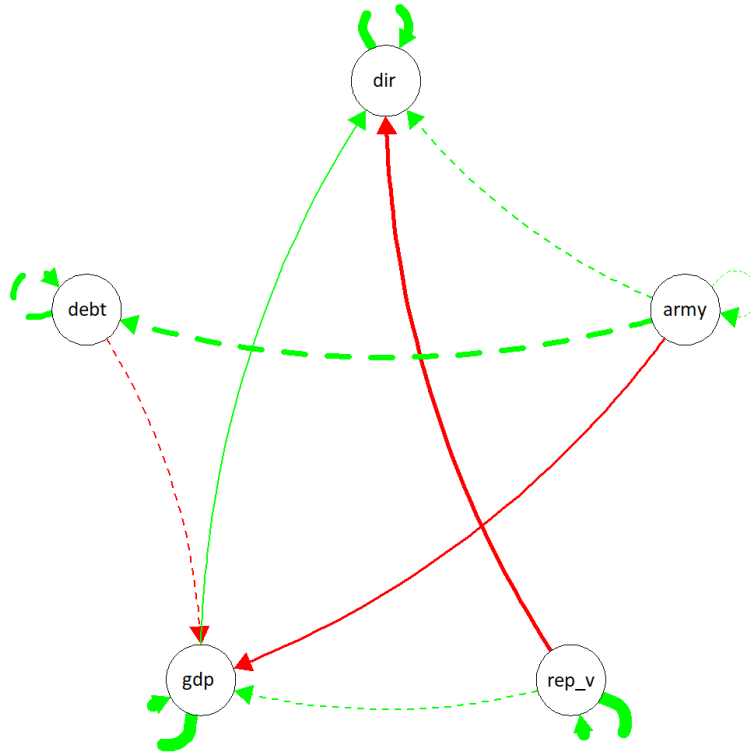


Figure 8. Network graph for specification 3 (Direct taxes and V-dem index)

Again, robustness of the main causal relationships is verified with minor differences. Debt service is not affected by (narrow) fiscal capacity nor by representation and the positive impact of representation to economic performance emerges (apparently associated only with the V-dem index).

Overall, alternative specifications support the validity of the baseline results. The primary questions regarding the determinants of fiscal capacity, namely the positive causal impact from the army and the negative causal impact from representation emerge in all specifications. Moreover, some secondary causal relations from the baseline model are also confirmed. These include the positive effect of the army on debt service, the negative effect of the army on economic performance and the negative effect of debt service on economic performance (debt overhang).

Finally, to assess the reliability of the network results, goodness of fit statistics is reported in Table 4. According to Hooper et al (2008), the relevant measures include the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Standardized Root Mean Square Residual (SRMR). In particular, a network model is deemed as a good fit based on a 'three out of four' rule, namely to satisfy at least three of the following criteria: CFI and TLI should be at least 0.95, and RMSEA and SRMR should be no greater than 0.08. Based on Table 4, all estimated network specifications satisfy all four of these criteria; hence, their goodness of fit is confirmed.

	Chi-square	Degrees of freedom	p-value (chi-square)	Comparative fit index (CFI)	Non Normed Fit Index (NNFI) aka Tucker-Lewis index (TLI)	Root mean square error of approximation (RMSEA)	Standardized root mean residual (SRMR)
Baseline specification	20.827	31	0.916	1	1.018	0	0.036
Specification 1	24.997	30	0.725	1	1.007	0	0.047
Specification 2	27.117	33	0.755	1	1.010	0	0.049
Specification 3	21.088	32	0.93	1	1.014	0	0.060

Critical values: CFI>0.95, TLI>0.95, RMSEA<0.08, SRMR<0.08 (Hopper et al, 2008)

*Table 4. Goodness of fit statistics for all specifications*

## 5. Conclusions

The paper presented a new historical dataset of Greek public finances and explored the dynamic interactions between economic and institutional variables for about a century. The broader message which arose from the empirical analysis is that institutional factors appear to exercise important causal effects on to the economy, whilst economic and fiscal variables seem to adjust to those institutional conditions. Indeed, the size of the army (measured by the percentage of military personnel in population) and the level of political representation (measured by legislative constraints to executive) were key determinants for tax revenue, economic performance and debt. Acknowledging that actual history is much more complicated than that, I suggest below some broader interpretations of the empirical results.

Starting with the army, it is important to note that it served a dual role, to maintain domestic order and support territorial expansion, both of which were critical for the survival of the Greek state. The army was the instrument for the initial establishment of Bavarian monarchy in the 1830s, served as a bargaining chip for international settlements during the Balkan crises of the 1870s and engaged in intense actual fighting in the decade 1912-22. Hence, its size depended on political priorities and external events, therefore appeared as purely exogenous to the variables of the empirical analysis. Nevertheless, all those sudden increases in the size of the army resulted in substantial fiscal pressures the Greek state had to cope with, improving its fiscal capacity in the process. This positive relationship between the size of the army and the collection of tax revenue emerged in a robust way in the empirical analysis. Hence the paper confirms the ‘war made the state’ hypothesis for the Greek case.

Still, the improvement in fiscal capacity was not enough to avoid defaults. In light of this failure, one may wonder whether defaults were the outcome of inadequate fiscal efforts due to the unwillingness of the authorities to tax their constituencies harder, especially when the default option was available (Queralt, 2019). While there is not any straightforward answer, such a claim seems rather unlikely for Greece. For one, the fiscal efforts were indeed substantial and generated political crises but successive governments were resolute in maintaining tax measures. Moreover, the empirical analysis established a direct causal link from the army size to tax revenue implying that the Greek state responded immediately to the fiscal pressure generated by military exigencies. In addition, given that fiscal performance was substantially improved in the years immediately before the defaults, it cannot be argued that default was perceived as an easy way out. Finally, we cannot ignore the deteriorations of international financial conditions that implied sudden increases in the debt burden and raised the cost of additional borrowing to roll-over

existing debt. The Baring crisis of 1890 and the Great Recession of 1929 were not irrelevant to the defaults of 1893 and 1932.

On the issue of democracy, the model showed that representation had detrimental effects on fiscal capacity. Indeed, steps towards extension of franchise and advancements in constitutional rule marked substantial drops in tax revenue and especially direct taxes. This finding is broadly consistent with the argument originally raised by Dertilis (1993) and extended by Kammas and Sarantides (2020), according to which, democracy gave rise to a restructuring of the Greek tax system reflected in the drop of direct taxes and the concurrent increase of consumption taxes and tariffs. The restructuring was the outcome of political calculations in favor of small land owners, the overwhelming majority of the electorate, as they could easily escape indirect taxes thanks to home production and at the expense of urban populations due to their limited political power. In this context, an additional finding of this paper is a more elaborate version of revenue reallocation: Both direct and total taxes were undermined by improvements in representation, leaving tariffs and other revenue to compensate for the losses.

Like the army, democratic representation appeared also exogenous, unaffected by other variables. In essence this was expected as democracy could hardly arrive as an outcome of the selected variables. Instead, according to Boix (2003), the emergence of democracy depends on inequality, asset specificity and repression costs, neither of which can be quantitatively measured for Greece. In a qualitative sense though, it can be acknowledged that Greece was an agricultural country with many small farm-owners and without a landed aristocracy, that is low inequality, and rich Greeks were predominantly engaged in commerce and shipping, that is low asset specificity, or, equivalently, high capital mobility. In addition, the mountainous terrain combined with widespread banditry implied high repression costs. Therefore, democracy did not represent a major redistribution risk for the elites and even if it did, the cost to avoid it would be significant.

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## Appendices

### Appendix 1. Data classification details and adjustments

Loans include the amounts advanced by the protective Powers (1843-1871) for repayment of the guaranteed loan after the 1843 default as well as the “currency difference” of the 170 million francs’ loan of 1898 that was reported as non-ordinary revenue (but was, in fact, part of the loan).

Debt service does not include the indemnities paid to the Ottoman Empire. There were two major payments, the first in 1834 (for the annexation of parts of Central Greece) and the second in 1898 (for the war of 1897) and two minor payments, in 1850 and 1852. In the original reports they were all recorded as debt service but, strictly speaking, they were not. In modern accounting terms they should be considered primary spending but due to their extra-ordinary and irregular nature they are reported separately.

Direct taxes include those imposed on output, income and (ownership and transfer of) wealth. Initially that was mostly tax on gross agricultural output (tithe) inclusive of the rent for the cultivation of state-owned land<sup>16</sup> as well as taxes on the ownership of livestock. For urban populations, the first direct taxes were introduced in 1836, on rent incomes (from buildings) and professional incomes. Corporate income taxes on shareholder companies were introduced in 1877 and inheritance taxes<sup>17</sup> in 1909. Apart from numerous minor changes in classification and substance, two major direct tax reforms should be noted. The first was the “Tax on plow animals” that replaced the tithe taxation on cereals (legislated in 1880 but first appeared in the 1889 report) and the second reform was the introduction of the “Tax on net incomes” in 1919, the first modern income tax in Greece.

Adjustments for direct taxes concern some re-classifications in the original reports that transferred specific items previously reported as direct taxes to other categories. In particular, taxes on mines and shareholder companies (SAs) were recorded as state royalties for the years 1914-18 and taxes on slaughtered livestock were recorded as indirect taxes for the years 1935-39. For consistency, both items are maintained in the category of direct taxes.

Indirect taxes were initially limited to the stamp tax introduced in 1836 and subsequently broken down to additional categories. Consumption taxes were first introduced in 1883 with a series of excises on tobacco, alcohol and transport tickets that later broadened to include other products, such as gas and electricity in 1910 and luxury items in 1920. Note that the category does not include tariffs nor monopolies and both direct and indirect taxes include the extra-ordinary taxes imposed in the years 1885-86 and 1918-39.

Tariffs are straightforward, starting from those on imports introduced since 1833 and extended to exports in 1889 and some ad-hoc tariffs, such as on cigarettes carried from old to new territories in 1915. Note

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<sup>16</sup> The reason for treating land-rents as equivalent to direct taxes is primarily because they were not reported separately in the original accounts but as a single item. While, strictly speaking, rents are not taxes, their collection required and employed the same administrative machinery as direct tax collection (i.e. via tax farming).

<sup>17</sup> Inheritance taxes were already included in the original stamp tax of 1836 and became progressive in 1885, reverted to flat in 1888 and turned progressive again in 1909. In any case, the receipts were not reported separately before 1909.

that some taxes on output were assessed and collected upon delivery in the customs offices, for example for agricultural goods produced in the Ionian islands, but they were (and originally recorded as) direct taxes and not export tariffs.

Other revenue includes everything else that does not belong to the above categories, nor loans. The category includes sales of goods and services, such as communications services (telegraph and postal), harbor and lighthouse charges, court charges, fines, concessions and sales of state assets and several other items of minor importance. It also includes state monopolies, introduced since 1880 for card decks and extended to cigarette paper (1884), petroleum and matches (1885), salt (1889), sugar (1911), kinin (1919), drugs (1926), correspondence paper (1930) and emery from Naxos (1935).

Finally, it includes arrears from all sources, that required some special accounting treatment. The standard practice was to include in any given year the amount assessed in this year and received in this year and the next. However, in the first retrospective report of the period 1833-43, payments and receipts realized throughout the period were accrued to the year of their assessment (even beyond the fiscal year). This has been corrected by re-allocating the amounts with more than one-year delay. Subsequently, the reporting of arrears remained more or less stable, until in 1919 a new sub-account of "Asset and liability balances" appeared recording receipts and payment from previous years and was separate from the original report, i.e. the amounts were not included in total revenue and spending. This is also corrected by adding these amounts to the sums. Finally, for the period 1935-39 tax revenues were separated between current and previous years' obligations. The latter have been reclassified here as arrears.

Two further adjustments for revenue worth noting. For the years 1889-92 some revenue categories were recorded separately for the part that accrued to the central government and the parts accrued to municipalities and the Roadworks Fund. Here the sums are reported in the respective revenue categories. Moreover, in 1914 the fiscal reports were separate for the "Old Greece" and the "New countries", i.e. the territories acquired after the Balkan wars of 1912-13, whereas in 1917, a year with two concurrent governments, there were two reports. In both cases, total revenue and expenditure are derived as sums. Finally, in the years 1911-13 a rather bizarre item labeled "Surpluses from previous years" was included in the revenue side but is removed here as it is evidently not a revenue but a cash balance carried forward.

Military spending generally includes the spending of the Army Ministry, the Naval Ministry and (since 1930) the Air Force Ministry. One major adjustment is for the year 1879 when a large spending amount appeared under the title "Extra-ordinary expenditure due to military and naval needs" which is cumulative spending for three years 1877-79. Here, the total amount is re-allocated to each year in proportion to the respective budget allocations. The second adjustment is for the years 1901-1918 when there were significant transfers from the Ministry of Finance to two military funds, the National Defense Fund and the National Fleet Fund, that have been re-classified as military spending.

Finally, civilian spending is a residual from total expenditure after removing military spending (and debt service). It includes all kinds of operational costs, wages and transfers.

#### Differences from other studies

To the best of my knowledge, this is the first comprehensive and consistent historical fiscal dataset for Greece. Admittedly, this is not the first attempt. Dertilis (1993) was the first to produce historical series for public revenue with a distinction between direct and indirect taxes, which, compared with this study, are both consistently underestimated. Prontzas et al (2011) also published long term revenue series but

without any effort to re-classify the original accounts and even separate revenue from loans. IMF's 'Public Finances in Modern History Database' (Mauro et al, 2013) report broad categories (aggregate revenue, spending and primary balance) as percentage of GDP for the years 1880-1913 and 1927-1939.

The most recent and comprehensive series are those by Lazaretou (2014) and the revised series of Dertilis (2015). The former dataset provides three revenue categories (total revenue, direct taxes and indirect taxes) and three expenditure categories (total expenditure, interest payments and military expenditure). Total revenue is rather close to the sum of revenue and loans of this dataset, with the exemption of the first decade when, apparently, loans were not included. Direct taxes are broadly similar with the present series for most years but differ substantially in certain periods (especially in the years 1923-30 when they are about 20% lower on average). Indirect taxes are also close until 1888 but they fall well behind for the later years. Total expenditure is much more similar with the sum of primary spending and debt service whereas military spending (includes the war indemnities of 1834 and 1898) is well above the present dataset (some 27% for the whole period without the indemnities).

Dertilis' new dataset (2015) has dropped his earlier (1993) distinction between direct and indirect taxes and includes two revenue categories (total revenue and tax revenue) and three expenditure categories (total expenditure, military expenditure and debt service). Compared with the present series, total revenue is broadly equal with the sum of revenue and loans, tax revenue is close to the sum of taxes, tariffs and monopolies while total expenditure is almost equivalent with the sum of primary spending and debt service. Military expenditure includes the war indemnities of 1834 and 1898 but is on average below the present series, especially in the twentieth century. Debt service seems to include the war indemnity of 1834 again (but not the one of 1898) while on average is rather close to the present series, yet with substantial differences after 1924.

While I cannot account for every single difference with the above datasets, it is important to stress certain advantages of the present one. To begin with, none of the above datasets reports total revenue properly, as they both include loans. Evidently, loans differ fundamentally from revenue and their confusion compromises the understanding of the extractive capacity of the state. Moreover, the present dataset includes a more detailed classification of crucial fiscal aggregates that are missing from other studies, such as primary revenue, expenditure and balance, as well as other separate items including loans, tariffs, monopolies and arrears. Finally, I tried to explain the conventions and adjustments followed in the classifications – at least for the major items – in order to provide transparency. Therefore, I believe that the present series, despite inevitable shortcomings, offers a more reliable and comprehensive account of Greece's historical fiscal outlook.

#### Auxiliary variables

To report fiscal variables as percent to GDP, I use the nominal GDP series of Kostelenos et al (2007). A simple modification concerns currency conversion as the original series is reported in 'new' drachmas, i.e. the currency introduced in 1882, after the Latin Monetary Union. For consistency with the currency of fiscal reports, nominal GDP for 1833-1881 is converted to 'old' drachmas (1 old drachma=0.895 new drachmas).

## Appendix 2. Model variables

The network includes five variables: fiscal capacity, warfare, representation, economic performance and debt service.

### 1. Fiscal capacity

Fiscal capacity is a rather abstract concept and its correspondence to observable variables poses some challenges. Typically, it is captured by revenue to GDP, however, there are certain issues when dealing with a 19<sup>th</sup> and early 20<sup>th</sup> century agricultural economy. To begin with the denominator, GDP is susceptible to possible mismeasurements, due to the extent of non-market production and informal employment, in addition to the lack of reliable and consistent data. Moreover, the issue of choosing the correct revenue item as numerator remains. A promising candidate is direct taxes as they require more advanced and sophisticated systems of assessment and collection, as opposed to the simpler excise or stamp taxes and the more archaic custom duties and revenue from state properties (such as monopolies). That may be the case for modern-day economies but was much less so in the past. For example, O'Brien (1988: 26) has stressed the importance of indirect taxes in 18<sup>th</sup> century Britain as 'the most important source of taxation available to successive administrations preoccupied with the task of funding military expenditure and a national debt'. Given that 19<sup>th</sup> century Greece had to deal with similar challenges, it may not be wise to omit the importance of indirect taxes. To deal with the problem I will use both, labeling direct taxes to GDP as 'narrow' fiscal capacity and total taxes to GDP as 'broad' fiscal capacity. Note that broad fiscal capacity does not include tariffs and state monopolies.

### 2. Warfare

Greece fought large scale wars in the period 1912-22. Strictly speaking, these were four different wars: The First Balkan War (1912-13), the Second Balkan War (1913), participation in World war I (1917-18) and the Asia Minor campaign (1919-22). The previous war occurred in 1897 and lasted for a month. Other conflicts include invasions and irregular skirmishes into Ottoman provinces during the Crimean War (1854), the Cretan Revolution (1866-69) and the Russian-Ottoman war (1878). Furthermore, there were episodes of army mobilizations that did not lead to war, such as in 1877-81 and 1885-86. Finally, the role of the army in securing internal order and suppressing local rebellions should be taken into account, most notably the Bavarian troops who escorted Otto on his arrival in Greece (1833-36).

Given the differences between conflicts and the role of the army it would be highly problematic to represent warfare with dummies which do not account for these differences. An alternative way to look into warfare is to resort to military readiness. Military spending is not appropriate because it includes equipment procurement with varying payment schedules that do not reflect the time dimension correctly. A more reliable measure is the size of the army captured by military personnel as a percentage of population. This is given by the National Material Capabilities of the Correlates of War database, version 6.0<sup>18</sup> and looks like the graph below. Note that they do not represent personnel in actual service but the officially determined numbers.

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<sup>18</sup> See Singer et al (1972) and Singer (1987) for the methodology. Data can be found on the [online database](#).

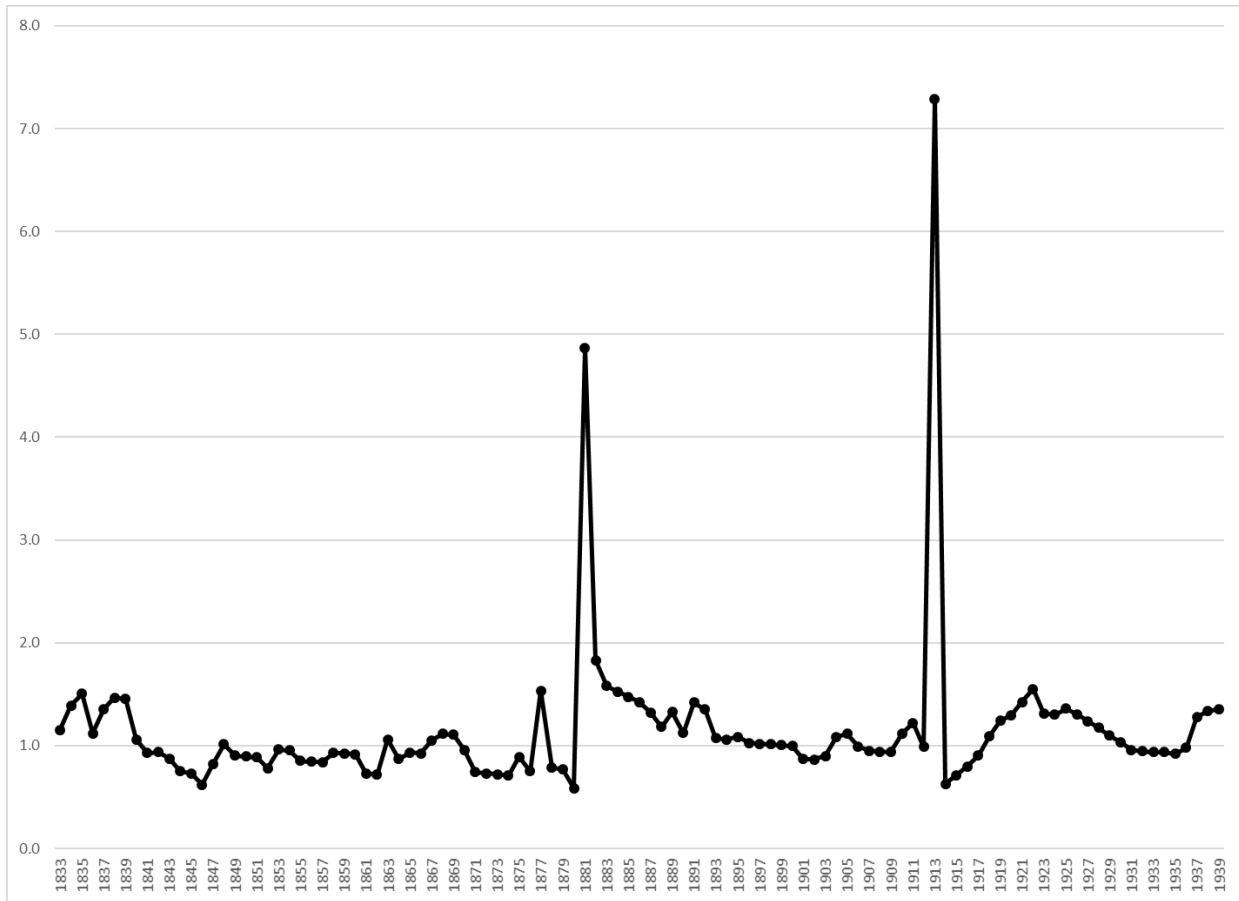


Figure A.1 Military personnel per capita

### 3. Representation

To capture representation I employ the indices measuring legislative constraints to executive as reported in two major international databases, the Polity 5 and the Varieties of Democracy (V-Dem)<sup>19</sup>. Overall, the two indices are rather similar, albeit with some crucial differences. Both capture the introduction of the constitution in 1844 as an improvement, although V-Dem reports the summoning of the national assembly (1843) as the starting point. An important difference is found in the next phase. Polity 5 considers the constitutional reform of 1864 as the turning point whereas V-Dem chooses the parliamentary empowerment of 1875. For the next four decades both indices are similar, until 1915 (the “National schism”) when Polity 5 identifies a major deterioration, which V-Dem ignores. Both indices capture the deterioration in 1925-26 (a short-lived dictatorship) but differ with respect to the next dictatorship (1936-39), which V-Dem surprisingly sees as an increase in legislative constraints to executive, despite the fact

<sup>19</sup> For the [Polity 5 index](#) see Marshall and Gurr (2020) and for the [V-Dem index](#) see Coppedge et al (2022). Note that the original figures are slightly modified here to complete missing values. The Polity 5 index (xconst) is not coded for the years 1862-63 (the interregnum), 1916-19 (the “National schism” and civil strife) and 1922-23 (the coup and the revolutionary government after the Asia Minor defeat). All these missing values are interpolated here. The V-Dem index (v2xlg\_legcon) is not coded for the years 1836-42 (the end of regency and assumption of governance by Otto) therefore I maintain the same value as for 1833-35.



that the parliament was dissolved. Polity 5, on the other hand, intuitively applies to both dictatorships the same index value with absolute monarchy. Both are shown in the figure below.

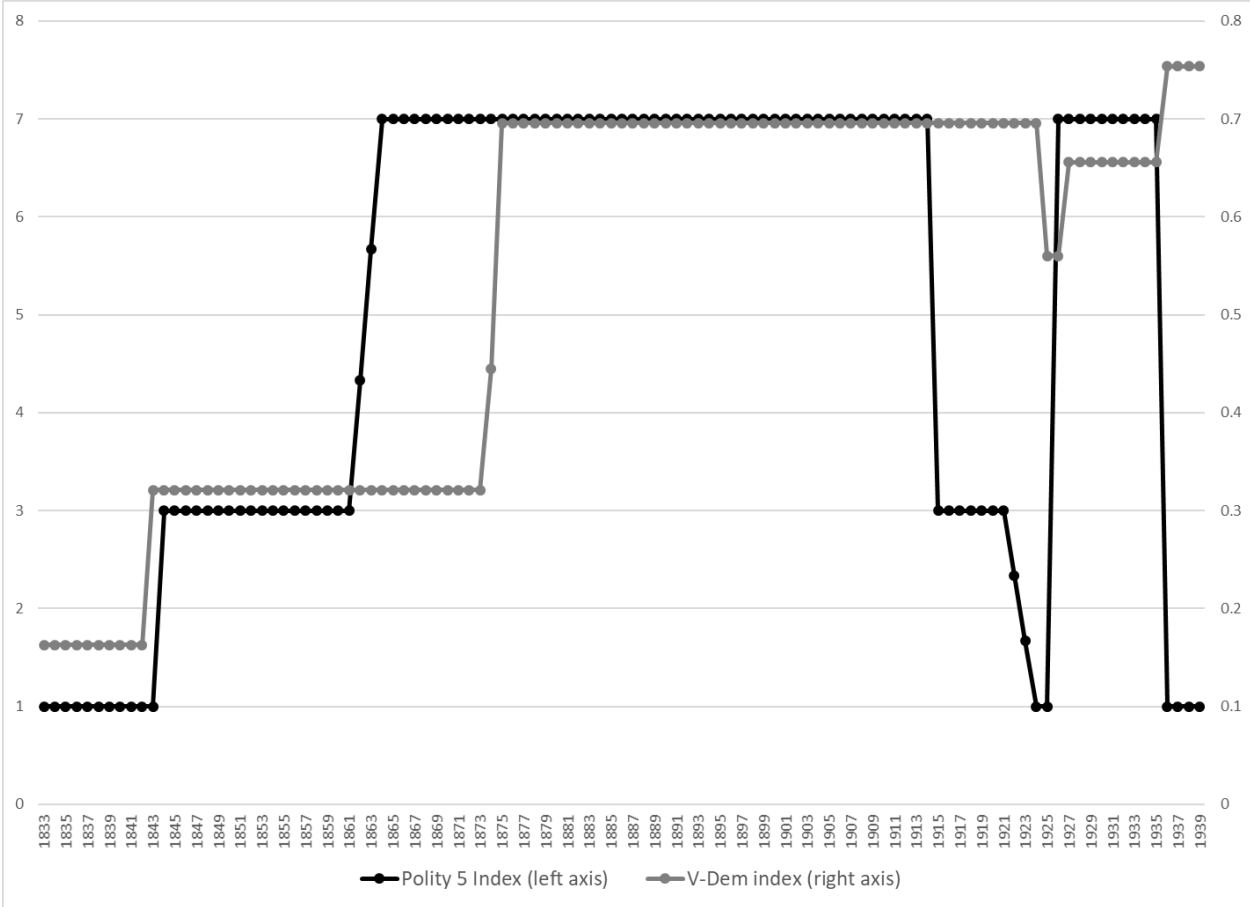


Figure A.2. Representation indices (constraints to executive)

#### 4. Economic performance

The standard measure for economic performance is real GDP per capita and is taken from the Maddison database<sup>20</sup> measured in 2011 US dollars. That looks like the figure below.

<sup>20</sup> The [Maddison database](#) is maintained by the University of Groningen Growth and Development Centre (Bolt and van Zanden, 2020). Source data for Greece were taken by Kostelenos et al (2007) which is the same source for the nominal GDP data used here to express fiscal aggregates as percentage of GDP.

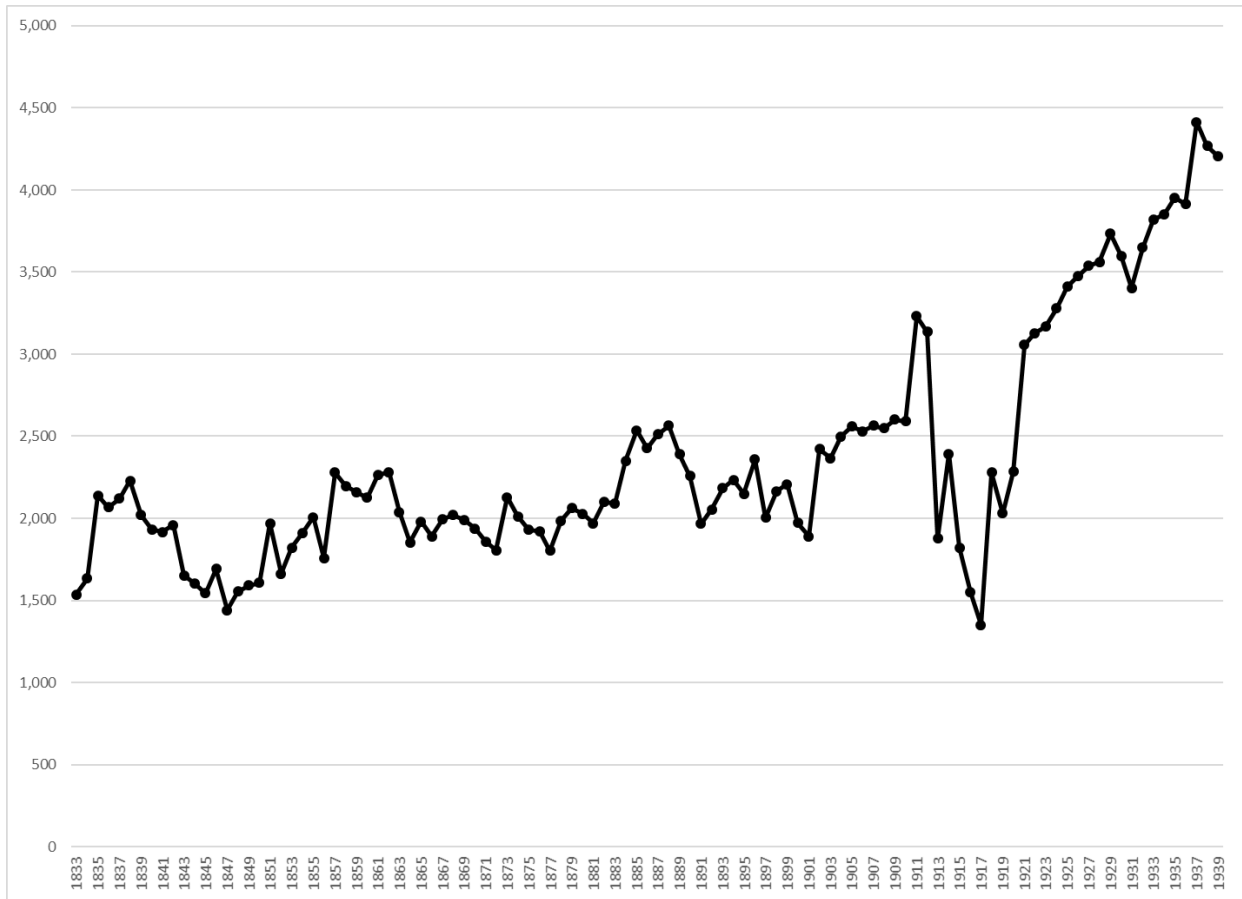


Figure 9 Real GDP per capita, 2011 dollars

## 5. Debt

The debt burden is measured in terms of flows rather than stocks. Therefore, it does not denote the outstanding amount but the servicing cost, i.e. the sum of annual principal and interest payments related to debt, internal or external. As in the case of revenue, it is calculated as percentage of GDP.

### Appendix 3. Model coefficients

The exact values of the coefficients, as well as the standard errors for the three alternative specifications are reported in the tables below.

specification 1 (broad, v-dem)										
beta coefficients										
	tax (-1)	army (-1)	rep_p (-1)	gdp (-1)	debt (-1)	tax	army	rep_v	gdp	debt
tax	0.801	0	0	0	0	0	0.086	-0.114	0.237	0
army	0	0.030	0	0	0	0	0	0	0	0
rep_v	0	0	0.974	0	0	0	0	0	0	0
gdp	0	0.075	0.080	0.961	-0.091	0	-0.145	0	0	0
debt	0	0.353	0.161	0	0.361	0.175	0	0	0	0
standard errors										
	tax (-1)	army (-1)	rep_p (-1)	gdp (-1)	debt (-1)	tax	army	rep_v	gdp	debt
tax	0.047	0	0	0	0	0	0.034	0.043	0.053	0
army	0	0.097	0	0	0	0	0	0	0	0
rep_v	0	0	0.017	0	0	0	0	0	0	0
gdp	0	0.032	0.038	0.037	0.034	0	0.032	0	0	0
debt	0	0.075	0.080	0	0.082	0.077	0	0	0	0

Table A.1. Specification 1 (broad, v-dem)

specification 2 (narrow, polity5)										
beta coefficients										
	tax (-1)	army (-1)	rep_p (-1)	gdp (-1)	debt (-1)	tax	army	rep_p	gdp	debt
dir	0.873	0.113	-0.100	0	0	0	0	0	0	0
army	0	0.030	0	0	0	0	0	0	0	0
rep_p	0	0	0.920	0	0	0	0	0	0	0
gdp	0	0.087	0	0.994	-0.073	0	-0.136	0	0	0
debt	0	0.369	0	0	0.427	0	0	0.156	0	0
standard errors										
	tax (-1)	army (-1)	rep_p (-1)	gdp (-1)	debt (-1)	tax	army	rep_p	gdp	debt
dir	0.043	0.032	0.043	0	0	0	0	0	0	0
army	0	0.097	0	0	0	0	0	0	0	0
rep_p	0	0	0.038	0	0	0	0	0	0	0
gdp	0	0.032	0	0.035	0.033	0	0.032	0	0	0
debt	0	0.076	0	0	0.077	0	0	0.079	0	0

Table A.2. Specification 2 (narrow, polity5)

specification 3 (narrow, v-dem)

	beta coefficients					dir	army	rep_v	gdp	debt
	dir (-1)	army (-1)	rep_v (-1)	gdp (-1)	debt (-1)					
dir	0.760	0.115	0	0	0	0	0	-0.255	0.120	0
army	0	0.030	0	0	0	0	0	0	0	0
rep_v	0	0	0.974	0	0	0	0	0	0	0
gdp	0	0.075	0.080	0.961	-0.091	0	-0.145	0	0	0
debt	0	0.381	0	0	0.462	0	0	0	0	0
	standard errors					dir	army	rep_v	gdp	debt
	dir (-1)	army (-1)	rep_v (-1)	gdp (-1)	debt (-1)					
dir	0.055	0.031	0	0	0	0	0	0.061	0.036	0
army	0	0.097	0	0	0	0	0	0	0	0
rep_v	0	0	0.017	0	0	0	0	0	0	0
gdp	0	0.032	0.038	0.037	0.034	0	0.032	0	0	0
debt	0	0.077	0	0	0.077	0	0	0	0	0

Table A.3. Specification 3 (narrow, v-dem)

