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Democratisation and tax structure in the presence of home production: Evidence from the Kingdom of Greece

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Abstract: This paper examines the impact of democratisation on tax structure in an agrarian economy where goods can be produced at home for self-consumption. We first develop a model of optimal taxation with heterogeneous agents where the good produced in the market is subject to a consumption tax, whereas the homogeneous good produced at home is burdened by a direct tax (such as *land tithes*). Contrary to conventional theory, our model suggests that extension of the voting franchise to poorer segments of the population exerts a negative impact on the share of direct to indirect taxes. Using unique national and regional tax data for the Kingdom of Greece - a typical agrarian economy where universal male suffrage was established in 1864 - we provide consistent empirical evidence. Greek governments adjusted tax policy in order to meet the preferences of the newly enfranchised electorate that constituted mostly peasants and farmers. This group was harmed substantially by *direct taxes on land* but was able to avoid *indirect taxes* through self-consumption. We also analyse a sample of 12 European countries over the same period and provide evidence for a similar change in the tax structure when the agricultural sector dominates the economy.

JEL: P16, H2, H5; **Keywords:** democracy, tax structure, fiscal capacity

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1. Introduction

Conventional theory suggests that extending the voting franchise to poorer segments of society increases the demand for redistribution and fiscal expansion (see, e.g., Meltzer and Richard, 1981). This is attributed to competing political parties that are expected to shift their policy platforms to respond to the preferences of the hitherto disenfranchised voters.[1] A large number of studies employing historical data investigate whether the so-called "first wave of democratisation" that took place from 1828 to 1926 (Huntington, 1993), affected the level and the pattern of government spending and taxation (see Lindert, 1994; Lindert, 2004; Aidt et al., 2006; Aidt and Jensen, 2009a; Aidt and Jensen, 2013).[2]

Interestingly, some of these studies highlight the importance of various intermediating factors that make the relationship between democratisation and fiscal policy much more complex (see, e.g., Aidt et al., 2010; Aidt and Jensen, 2013). One significant factor seems to be the phase of economic development and consequently the structure of the domestic economy (see e.g., Aidt and Jensen, 2009b). In particular, economic history suggests that industrialised economies were in need of increased fiscal revenues that would ensure the provision of public goods, such as health and education. This is due to the accumulation of physical capital during the process of industrialisation that raised the importance of human capital in the growth process, reflecting the complementarity between capital and skills.[3] Since the pure laissez-faire policy failed to develop a proper education system, citizens demanded from the authorities the provision of this public good (see e.g., Galor, 2005). At the same time, domestic migration of the working population from the countryside to the urban centres generated severe problems of increased urban mortality and morbidity that should have been addressed by investments in health-related amenities (see e.g., Szreter, 1997; Szreter and Mooney, 1998).[4]

The resulting expansion of public education and the subsequent increase in the literacy rate of the domestic population facilitated the improvement of the tax collection capacity of the state and the reliance on efficient direct forms of taxation (see Aidt and Jensen, 2009b).[5] Therefore, when

[1] This poses the question, though, as to why powerful elites dilute power by offering voting rights to the poorer segments of society. Recent research has stressed income inequality (Justman & Gradstein, 1999; Acemoglu & Robinson, 2000; Boix, 2003) and conflicting interests within the elite (Lizzeri & Persico, 2004; Llavador and Oxby, 2005) as significant factors of enfranchisement in Western Europe during the 19th century. However, irrespective of the reason that triggered the reform, scholars share the prediction that full enfranchisement should increase the size of the government. For an excellent review of alternative theories of franchise extension, see Przeworski (2009).

[2] A parallel strand of this literature investigates this relationship by focusing on the second and third waves of democratisation, employing modern data for a large set of developed and developing countries (see Boix, 2003; Mulligan et al., 2004; Profeta et al., 2013; Acemoglu et al., 2015; Kammas and Sarantides, 2019).

[3] Evidence for the complementarity between technological progress (or capital) and skills is provided by Goldin and Katz (1998).

[4] The standards of living issue in the era of the industrial revolution has been investigated by a large number of scholars (see e.g., Hobsbawm, 1957). For instance, Szreter and Mooney (1998), focusing on the largest industrial British cities, show that life expectancy at birth was lower in 1871 than in 1821, despite rising real wages, attributing this decline to the deteriorating urban environment.

[5] Specifically, Aidt and Jensen (2009b) suggest that the cost of collecting income and other direct taxes relative to the cost of collecting indirect taxes fell as literacy and numerical skills of the potential taxpayers improve. Related to that, Besley and Persson (2011; 2013) show that developed countries rely to a greater extent on income taxes as opposed to indirect taxes (e.g., customs) than developing

democratisation takes place in the context of a developed, industrialized economy -characterized by high tax collection capacity- both total tax revenues (as a share of GDP) and the share of direct taxes, are expected to increase. However, this effect might not necessarily be the case for developing economies, and even more so for a newly democratised agrarian economy. This is because, in such a case, the tax collection capacity of the state is expected to be low, whereas public investment in human capital, which could help alleviate this problem over time, is not that urgent as in an industrialised economy.[6]

Moreover, in a less developed, agrarian economy a large number of the population work in the home production sector and consume a substantial portion of the household production. Even when the economy is not the typical *subsistence production* economy, self-consumption is expected to be substantially high -especially in the rural areas- and the potential home production surplus is usually exchanged through barter, rather than a market system. The presence of a large home production sector is expected to affect considerably the implemented tax policy (see e.g., Kleven et al., 2000; Olovsson, 2015), and as a consequence the effect of voting franchise extension on the size and the composition of tax revenues.

This paper is the first systematic study to establish a convincing relationship between democratisation and tax structure in an agrarian economy. In particular, we focus on the radical political reform of 1864 in the Kingdom of Greece that enfranchised all adult males enabling them to vote by casting a small lead ball into a ballot box (see Figure D1 in Appendix D). Given that the vast majority of the population during that period was illiterate, this method of voting transferred real power to the people who could participate in the electoral process without the intervention of third parties.[7]

To formalise our testable empirical hypotheses in such a context, we first develop a theoretical model of optimal taxation with heterogeneous agents that builds upon Persson and Tabellini (2000) adding the possibility that these agents work in home production. More precisely, the economy is populated by a continuum of agents that differ in terms of their private productivity. Individual consumption is composed of a good produced and purchased in the market -and therefore is subject to a consumption tax- and a good that is produced by work at home and is in turn self-consumed.[8] The

countries. A fundamental reason is that it is much harder for developing countries to collect direct taxes, which require major investments in fiscal capacity, namely in enforcement and compliance structures throughout the entire economy.

[6] Two reasons that can justify the lower level of public investment in human capital in a developing/agrarian economy are the following: (i) the complementarity between human capital and land is very low in the production process and much lower than in the case of an industrialised economy (see Galor, 2005 for more details on this). In addition to this, it should not be overlooked that the landed elites do not benefit from public investment in human capital, since universal public education will increase the cost of labour beyond the increase in average labour productivity in the agricultural sector, reducing in this way the return to land (Galor et al., 2009); (ii) the priorities of a government for internal stability at this early stage of development can significantly affect the allocation of the public budget in favour of security expenditures and against health and education expenditures (see, Aidt et al., 2006).

[7] In Section 3.1 we provide more details on the change in the political regime.

[8] Following the rationale of the relevant literature we assume the economy produces a single homogeneous good in the rural (home production) sector and in the market sector (see Ashraf and Galor, 2011 for more details on this).

good that is self-consumed is not subject to the consumption tax but the level of its production is reduced by specific forms of direct taxation (such as the *land tithes*) that burden home production. Differences in private productivity are reflected in the optimal choices of the agents concerning the allocation of their time between working in the market or at home. Specifically, individuals with higher productivity work in the market more than the average labor supply. Consequently, agents differ in their levels of home and market consumption and therefore have different preferences concerning the implemented tax policy.

Solving the model for the median voter political equilibrium, our results are as follows.[9] An extension of the voting rights to the poorer segments of the population -that inevitably implies lower levels of median productivity of the electorate- exerts a positive impact on consumption taxes and a negative impact on direct taxes that burden home production. As a result, democratisation causes the share of direct to indirect taxes to decrease. This is because the new political majority after the reform is mostly constituted by agents working at home and is in favor of lower direct taxes and higher indirect taxes since the latter can be avoided through self-consumption. Moreover, our analysis suggests that the negative impact of democratisation on the share of direct to indirect taxes is mitigated as the level of economic development increases.

In order to investigate the empirical validity of our central theoretical prediction we develop a unique tax dataset of the Greek state at the national and regional levels. The empirical findings obtained from our national level analysis suggest that the external shock of enfranchisement in 1864 did not affect the level of *total taxes* as a share of GDP but exerted a significant impact on tax composition (see also Dertilis 1993; 2015). More precisely, universal male suffrage was accompanied by a significant decrease in the share of *rural taxes* (i.e., *land* and *assessed taxes*) and increases in specific categories of *indirect taxes* –mostly *custom duties* and *excises taxes*. Political economy motives were behind the observed shifts in the implemented tax policy. Specifically, Greek governments decreased taxes on agriculture and livestock production in order to satisfy the large majority of the electorate -mostly constituted by peasants and farmers- and at the same time increased indirect taxes that did not harm the rural population, since the latter were able to avoid them through self-consumption.[10]

To further reinforce this argument, building on a dataset of 43 tax administrative units (i.e., public cashiers) from 1853 to 1879, our analysis investigates whether the negative effect after

[9] We base our theoretical analysis on a median voter model since the Kingdom of Greece was characterized by a large number of small farmers and a noteworthy equal distribution of land (see Petmezas, 2003). Please see Section 2.3 for more details.

[10] The policy decision to increase indirect taxes harmed significantly the population living in urban regions, since local or imported basic goods (wheat, textiles, and energy producing raw materials) were burdened by indirect taxes (see Dertilis, 2015, pp.794-799; pp.806-808).

democratisation on *rural taxes* was more intensive in provinces characterized by a higher share of the population employed in agriculture. This Difference-in-Difference (DD) specification directly relates to the idea of using the "dosage" of suffrage in examining its effect on political and economic outcomes (see, e.g., Berlinski and Dewan, 2011). Consistent with our expectations, the empirical findings suggest that there is a statistically significant negative relationship between agriculture workforce and *rural taxes* per capita at the regional level after democratisation.

Finally, we explore the effect of democratisation on the size and composition of taxation for a sample of 12 Western European countries for the period 1841-1933. Our empirical findings suggest that democratisation is negatively correlated with the share of *direct* to *indirect taxes* when the percent of the workforce occupied in agriculture is substantially high (above 60 percent) as in the case of Greece. This effect is reversed gradually and becomes positive and statistically significant when the percent of the workforce in agricultural sector drops below a certain threshold (~38 percent), which at high levels of development leads to an increase in *total taxes* as a share of GDP. These results for Europe are compatible with previous empirical studies investigating similar issues (see e.g., Aidt and Jensen, 2009b) as well as with our theoretical priors.

The rest of the paper is organised as follows. In Section 2, we provide some stylized facts about the tax structure in the Kingdom of Greece and we develop the theoretical framework. In Sections 3 and 4 we discuss the data, our empirical strategy and the empirical results obtained from the national and regional empirical analysis in Greece. In Section 5 we present the corresponding empirical findings from the European sample. Finally, in Section 6 we conclude.

2. Stylized facts and the theoretical framework

2.1 Country-level tax data

In this section, we present some initial descriptive evidence for the structure of tax policy in the Kingdom of Greece before and after the democratisation episode in 1864. Our country-level tax data contain information from the final fiscal accounts (i.e., *Apologismoi*) of the Greek state between 1833-1933. This database was developed mainly due to the heroic efforts of Dertilis (1993) who tracked a significant number of historical fiscal accounts of the Greek state, and the subsequent significant contribution of Prontzas et al. (2011).

The Dertilis (1993) classification is based on the methodology of Flora et al. (1983) that divides taxes into 13 broad tax categories: (1) *land taxes*, (2) *assessed taxes*, (3) *trade taxes*, (4) *corporation taxes*, (5) *income tax*, (6) *property taxes*, (7) *inheritance taxes*, (8) *extraordinary taxes*, (9) *other direct*

taxes, (10) *customs taxes*, (11) *excise taxes*, (12) *turnover taxes*, and (13) *other indirect taxes*.[11] All fiscal data are based on central government accounts. This is not a major shortcoming, since during that period local government finances in Greece were not significantly developed. Based on this classification, we construct two variables to measure the size and composition of taxation. First, we develop the variable *total taxes* as a share of GDP that is the sum of all tax categories (i.e., (1) to (13)). Data for GDP are taken from Kostelenos et al. (2007), who managed to create reliable estimates of the magnitude of the Greek economy for the period of 1830-1939. Second, we develop the variable *direct/indirect* that is defined as the ratio of *direct taxes* (i.e., categories (1) to (9)) to *indirect taxes* (i.e., categories (10) to (13)).

In turn, in order to further investigate the distributional implications of taxation, we develop the following variables - all expressed as a percentage of total taxes. The first variable is defined as *rural taxes* and is comprised by the summation of *land* and *assessed taxes* (i.e., categories (1) and (2)). This variable covers taxes that are levied on land and/or earnings from agriculture and livestock production. Second, we construct the variable *urban taxes* that include the remaining tax categories (i.e., categories (3) to (9)). This includes taxes that are levied on the earnings of small firms and profits of corporations, real estate property and inheritance taxes and, after 1911, the newly established (personal) income tax. As can be understood, *urban taxes* were mostly a burden to citizens who were living in more urbanised areas. Focusing on indirect taxation, we construct the variable *customs taxes* (i.e., category (10)) consisting of customs duties on the basis of the value of the imported commodities passing through custom houses.[12] Finally, we develop the variable *market taxes* that is comprised by the summation of *excise taxes*, *turnover taxes*, and *other indirect taxes* (i.e., categories (11) to (13)). In Section A1 of Appendix A, we provide additional details on the national tax dataset employed in the analysis.

2.2 Stylized facts and empirical motivation

Table 1 and Figure 1 record quantitative information on the tax structure in the Kingdom of Greece from 1833 to 1933. Table 1 presents the average values of the above-described variables for five selected periods, two before and three after the radical reform of enfranchisement in 1864. According to the new constitution, voters could cast a small lead ball into one of the ballot boxes allocated to each one of the candidates standing for elections (see Figure D1 in Appendix D). This is of paramount

[11] All variables are expressed in Drachmas, the currency of Greece during the 19th and 20th centuries.
[12] For exported commodities, the vast majority of which are agricultural goods, the duties form part of rural taxation. See Section A3 in Appendix A for more details on this.

importance since it allowed illiterate men to participate in the electoral process without intervention of third parties, transferring therefore real power to the people. [13]

The first interesting stylized fact observed in Table 1 is that the level of total taxes remains relatively constant between the sub-periods (1845-1864) and (1865-1879). In other words, the reform of enfranchisement in 1864 did not lead to fiscal expansion as suggested by the relevant theoretical literature (see e.g., Meltzer and Richard, 1981) and previous historical empirical studies (see e.g., Aidt and Jensen, 2009b). The second interesting finding is that between the same sub-periods, *rural taxes* exhibit a stark decrease from 56.7 to 38.5 percent of total taxes. During the 19th century the most basic component of *rural taxes* was the so-called *dekati* - a 10 percent tax on gross *agricultural* and *livestock* production. However, for specific types of agricultural goods (such as cotton, tobacco, and vines) Greek governments replaced *dekati* with the so-called *stremmatiki forologia*, which was based on the extent of the cultivated land (see Dertilis, 1993; Petmezas, 2003). On top of *dekati*, an additional 15 percent of the gross production went to rents if the land was granted by the Greek state (the so-called *epikarpia*). Moreover, if public lands were used without the permission of the Greek state, peasants were obliged to pay an additional 15 percent of their gross production as *epikarpia*. Thus, the overall tax burden of the peasantry ranged roughly between 25 to 40 percent. After 1864, the tax rates of *dekati* and *stremmatiki forologia* fell significantly, whereas it must be noted that during the same period there were also significant efforts from the Greek governments to fully abolish *dekati*, which finally took place in 1880. These changes in tax rates and the implementation of tax policy are clearly reflected in the overall evolution of *rural taxes* (as a percentage of tax revenues) as can be seen in column (3).[14]

These changes in *rural taxes*, were accompanied by remarkable increases in indirect taxes. Until 1884, most of these indirect taxes were basically *custom duties* on imported goods and *other indirect taxes* (e.g., stamp duty on legal documents). Then, in 1884, Prime Minister Charilaos Trikoupis implemented a tax reform that introduced a large number of excises duties - first introduced in 1880 - increasing at the same time revenues from state monopolies (see Kostis, 2006). As can be verified in columns (5) and (6) of Table 1, the summation of *custom taxes* and *market taxes* increased significantly in the years after the first major political reform in 1844, and even more rapidly after 1864. In particular, between the sub-periods (1845-1864) and (1865-1879) total indirect taxes increased from 40.9 to 56.5. Changes in *rural taxes* and *indirect taxation* are also reflected in the

[13] In Section 3.1 we provide a more detailed description of the historical events that led to the gradual transformation of the political regime from an *absolute monarchy* (1833-1844) to a *constitutional monarchy* (1845-1864) and then to a *crowned democracy* (from 1865).

[14] In the years just before democratisation (1861-1863), decreases in *rural taxes* as depicted in Figure 1 are mainly attributed to incidents of political instability after the expulsion of King Otto from Greece, which precluded the collection or submission of locally collected taxes to the Greek state (see Petrakis, 1985).

evolution of the ratio *direct* to *indirect taxes* that decreases constantly during the whole period (see column (2) of Table 1).

These changes in the tax system become apparent in Figure 1 where, for the years before 1864, the evolution of *total taxes* follows closely the evolution of *rural taxes* -which constituted the main source of tax revenues during that period- whereas from 1864 to 1920 *total taxes* co-move with *indirect taxes*. A large strand of the relevant literature (see e.g. Besley and Persson, 2011; 2013) suggests that governments rely more heavily on indirect taxes in countries characterized by a less developed tax collection capacity. Specifically, in countries with weak fiscal institutions, increased fiscal needs are usually covered to a greater extent by indirect taxes since they can be collected more easily. This stylized fact is not what we observe in the Kingdom of Greece. This is because the tax collection technology argument fails to explain why a government -even in a low tax collection capacity economy- may decide to increase indirect taxes in order to replace direct taxes and at the same time to keep total tax revenues relatively intact.

[Insert Table 1 and Figure 1 here]

After 1920, the co-movement of *total taxes* with *indirect taxes* seems to be disrupted due to the sharp increase in *urban taxes* took place from 1920 to 1933. That resulted from fiscal innovations -aimed to increase tax revenue- undertaken by the Kingdom of Greece during the previous years (i.e., before the Balkan Wars and WWI) mostly in order to deal with a series of military challenges.[15] This is in line with the argument that military competition promoted investments in fiscal capacity that enabled states to raise tax revenues (see e.g., Hintze, 1906; Tilly 1975, 1985; Dincecco and Prado, 2012). In Appendix A2 we provide a brief history of the evolution of the Greek tax system during the period 1833-1933, whereas in Appendix A3 we describe in more detail the fiscal practices followed by the Kingdom of Greece to collect *rural taxes* from 1853 to 1879.

2.3 Theoretical framework: Tax structure in the presence of home production

Motivated by the stylized facts described above, this section explores the theoretical link between democratisation and the composition of taxes in the presence of home production. We develop a theoretical model of optimal taxation with heterogeneous agents that builds upon Persson and Tabellini (2000) but takes also into account the possibility of the agents working in home production (as in Gronau, 1977; 1986). Thus, individual consumption is composed by a good produced and purchased

[15] Although in 1911 Eleftherios Venizelos introduced the first modern personal income tax, the tax revenues from personal income taxation were insignificant until 1918 and exceeded 5 percent as a share of total taxes only in 1919.

in the market thereby subject to a consumption tax, and a homogeneous good that is produced by work at home and in turn is self-consumed. The home produced good is not subject to any indirect tax but the level of its consumption is reduced by taxes that burden home production (such as the *land tithes*). Private agents differ in their productivity and therefore they also differ in their supply of labor in the market. Specifically, the higher productivity individuals work in the market more than the average labor supply. As a consequence, agents differ in their levels of home and market consumption and consequently have different preferences concerning the implemented tax policy. We solve the model for the median voter political equilibrium and then investigate the effects of changes in median productivity on the structure of taxation.[16]

We have to note that our theoretical analysis is based on a median voter model since the Kingdom of Greece was characterized by a noteworthy equal distribution of land (see Petmezas, 2003). This resulted from the decision of the Greek authorities to nationalize the great bulk of lands that belonged to Ottoman landowners after Independence in 1833. These lands were in turn rented for cultivation by the State to small peasants and landless sharecroppers (see Petmezas, 2003 and Section 3.1 for more details on this). The overall result of this policy concerning the so-called *"Public Lands"* was the formation of an agrarian economy characterized by significantly equal distribution of land and a substantial amount of home production (and self-consumption) especially in the rural areas (see Dertilis, 1993; Petmezas, 2003). In turn, with the Law of Sotiropoulos in 1871 the Greek authorities distributed officially these lands to the peasantry (see Dertilis, 2015). The absence of significant concentration of land ownership in the hands of a small landed aristocracy makes the well-established theoretical models of intra-elite competition between the landholding autocratic elite and the industrial bourgeoisie (see, e.g., Ansell and Samuels, 2014; Beramendi et al., 2018) not suitable for the case of the Kingdom of Greece.

2.3.1 Behaviour of Private Agents

The Households

The economy is populated by a continuum of agents indexed by *i*. The preferences of individual *i* are quasi-linear, namely:

$$u^i = c^i + V(x^i) + g \tag{1}$$

where c^i and x^i represent individual consumption and individual leisure, respectively, whereas g represents a public good common to all agents. Moreover, $V(.)$ is increasing and concave in x^i.

[16] This is because franchise extension to the poorer segments of the population inevitably implies a reduction in the median productivity of those with the right to vote.

Individual consumption c^i is composed of goods produced and purchased in the market c_M^i, and of goods produced at home that in turn are self-consumed c_H^i. Overall, total individual consumption equals:

$$c^i = c_M^i + c_H^i \tag{2}$$

The market budget constraint for each agent is:

$$c_M^i (1+q_C) = wl^i \tag{3a}$$

where q_C is the consumption tax, w is the real wage rate and l^i is the individual labor supply in the market.[17]

Home goods are produced by work at home, h^i, according to a Cobb-Douglas production function $A_H (h^i)^a$ $(0<\alpha<1)$, subject to a proportional tax q_H.[18] So, the consumption of goods produced at home for each agent is:

$$c_H^i = (1-q_H) A_H (h^i)^a \tag{3b}$$

Substituting (3a) and (3b) into (2) we get the total private budget constraint:

$$c^i = \frac{wl^i}{1+q_C} + (1-q_H) A_H (h^i)^a \tag{4}$$

Individual productivity differs, such that individuals have different amounts of "effective time" available. That is, individuals are subject to the following "time constraint":

$$1+e^i = l^i + x^i + h^i \tag{5}$$

where e^i is individual productivity which we assume is distributed in the population with mean $\bar{e}$ and median e^m (as in Persson and Tabellini, 2000, p.24).The government raises tax revenues using tax rates $Q=(q_C, q_H)$, in order to finance the public good g.

[17] Since the main focus of the paper lies in agrarian economies with limited tax capacity, as in the case of Greece, we solve our model without the income/labour tax that could have burdened market production. It must be noted that most of the 19th century fiscal states of Western Europe relied heavily on indirect taxes (*custom taxes, excise duties* etc.) as well as taxes on land (i.e. *land tithes*) (see e.g. Aidt and Jensen, 2009b). A permanent income tax was first introduced during the mid-19th century in a small number of economies (e.g., United Kingdom (1842), Austrian Empire (1849), Italy (1864)), and during the early 20th century in most of the current developed economies (e.g., Sweden (1902), France (1911), United States (1913), Germany (1920)). Moreover, in most of these economies tax revenues from income taxes stayed below 5 percent as a share of total tax revenues until 1905 (see Aidt and Jensen, 2009a for more details on this).

[18] Before the emergence of solid fiscal states -characterized by increased capacity to levy income taxes- a usual practice to raise tax revenues was the so-called *land tithes* that were compulsory taxes imposed on home production (which was mostly constituted by agricultural crops) (see e.g., Aidt and Jensen, 2009b and Booney, 1999 for more details on this). In the case of Greece, taxes on gross home production consisted of *dekati* (that was a special form of *land tithe*) and *epikarpia*. For more details on the tax system in case of Greece during the 19th century, see Appendices A2 and A3.

Households act competitively by taking the real wage rate *w* and the policy variables q_C, q_H as given. Substituting equations (4) and (5) into (1), the first-order conditions with respect to l^i and h^i give, respectively[19]:

$$l^i = 1 + e^i - h^i - V_x^{-1}\left[\frac{w}{1+q_C}\right] \tag{6}$$

$$h^i = \left[\frac{\alpha A_H (1-q_H)(1+q_C)}{w}\right]^{\frac{1}{1-\alpha}} \tag{7}$$

Then, by substituting (6) and (7) into (5) and solving for x^i we get:

$$x^i = V_x^{-1}\left[\frac{w}{1+q_C}\right] \tag{8}$$

The Firms

The market economy is populated by *j* identical firms. We assume that the output produced in the market is governed by a linear production technology $y^j = A_M l^j$.[20] Firms act competitively by taking the real wage rate *w* as given, and maximize their profits defined as:

$$\pi^j = A_M l^j - w l^j \tag{9}$$

where A_M is the level of productivity in the market and l^j is the amount of labor employed by each identical firm *j*. It must be noted that A_M captures the level of economic development since it reflects how economically viable is the market sector compared to the rural sector (see Ashraf and Galor (2011) for more details on this). The first order condition implies that:

$$w = A_M \tag{10}$$

so that $\pi^j = 0$ in equilibrium. Equation (10) suggests that the real wage rate always equals A_M in the market.

2.3.2 Average economic outcomes (labor supply, work at home, market and home consumption).

Let $L(q_C, q_H)$ denote the average labor supply in the market. By definition of the productivity distribution:

[19] Equations (7) and (8) ensure that $x^i > 0$ and $h^i > 0$. So, by assuming a distribution of e^i that ensures $1 + e^i > x^i + h^i$ for all individuals, we arrive at an interior solution characterized by positive values for x^i, h^i and l^i. In Section B1 in Appendix B we provide a detailed discussion of the second-order conditions.

[20] Our analysis follows a similar rationale to that developed by Ashraf and Galor (2011) according to which the output produced in the rural sector is governed by a Cobb Douglas production technology and the output produced in the manufacturing sector is determined by a linear production technology.

$$L(q_C, q_H) = 1 + \bar{e} - \left[\frac{\alpha A_H (1 - q_H)(1 + q_C)}{A_M} \right]^{\frac{1}{1-\alpha}} - V_x^{-1} \left[\frac{A_M}{1 + q_C} \right] \tag{11}$$

which is decreasing in q_C and increasing in q_H.

Similarly, let $C_M(q_C, q_H)$ be the average market consumption, we can conclude that:

$$C_M(q_C, q_H) = \frac{A_M L(q_C, q_H)}{(1 + q_C)} \tag{12}$$

Let $H(q_C, q_H)$ denote the average work at home. It can be verified that:

$$H(q_C, q_H) = \left[\frac{\alpha A_H (1 - q_H)(1 + q_C)}{A_M} \right]^{\frac{1}{1-\alpha}} \tag{13}$$

which is increasing in q_C and decreasing in q_H.

Similarly, let $C_H(q_C, q_H)$ be the average consumption of home-produced goods, we can conclude that:

$$C_H(q_C, q_H) = (1 - q_H) A_H \left[\frac{\alpha A_H (1 - q_H)(1 + q_C)}{A_M} \right]^{\frac{a}{1-\alpha}} \tag{14}$$

It can be established from equations (6), (7) and (11) that:

$$l^i = L(q_C, q_H) + (e^i - \bar{e}) \tag{15}$$

So, for each agent with private productivity $e^i > \bar{e}$ we have $l^i > L(q_C, q_H)$ and consequently (from equations (3a) and (12)) we find that $c_M^i > C_M(q_C, q_H)$. Similarly, equations (7) and (13) suggest that all agents decide the same amount of work at home $h^i = H(q_C, q_H)$ and consequently (from equations (3b) and (14)) the same amount of self-consumption $c_H^i = C_H(q_C, q_H)$ irrespective of their private productivity e^i.[21]

2.3.3 National government budget constraint

Having defined the average economic outcomes in the economy, we can now describe the budget constraint of the government. Tax revenues are raised through market consumption taxes (q_C) and taxes on home production (q_H) in order to finance the public good g which is common to all agents. So, the budget constraint is as follows:

[21] Similarly we conclude that all agents choose the same amount of leisure irrespective of their private productivity, $x^i = X(q_C) = V_x^{-1} \left[\frac{A_M}{1 + q_C} \right]$.

$$g = q_C C_M(q_C, q_H) + q_H A_H(H(q_C, q_H))^a \quad (16)$$

where $C_M(q_C, q_H)$ is the average market consumption [given by equation (12)] and $H(q_C, q_H)$ is the average work at home [given by equation (13)].

2.3.4 Determination of national tax policies

Substituting equations (4), (6)-(8), (10)-(14) and (16) into (1) we find that the policy preferences of agent *i* are as follows:

$$W^i(q_C, q_H) = \frac{A_M}{1+q_C}(e^i - \bar{e}) + A_M L(q_C, q_H) + V(X(q_C)) + A_H(H(q_C, q_H))^a \quad (17a)$$

As can be verified, the policy preferences of agent *i* can be rewritten as:

$$W^i(q_C, q_H) = K(e^i)S(q_C) + J(q_C, q_H) \quad (17b)$$

where $K(e^i)$ is monotonic in e^i and $S(q_C)$, $J(q_C, q_H)$ are common to all agents. Therefore, agents have intermediate preferences and consequently a Condorcet winner always exists and is given by the bliss point of the median voter (i.e., the agent with the median productivity e^m) (see e.g., Grandmont, 1978 for more details on this).

So, the political equilibrium is the policy preferred by the voter with the median productivity e^m and is given by the following equation:

$$\frac{\partial W^m}{\partial q_C} = \frac{\partial W^m}{\partial q_H} = 0 \quad (18)$$

where W^m denotes the indirect utility function of the median voter. Then, Section B2 in Appendix B shows:

Proposition 1. *For given levels of g, a decrease in the productivity of the median voter* e^m*, increases* q_C *and decreases* q_H*. Therefore, the extension of the voting franchise to the poorer segments of the population -that implies lower productivity of the median voter* e^m *- exerts a negative impact on the share of direct to indirect taxes (*$\frac{q_H}{q_C}$*).*

It should be noted that our theoretical analysis suggests that optimal tax rates q_C and q_H are located on a range which is characterized by a positive relationship between tax rates and the corresponding tax revenues (i.e. they lie on the upward slopping segment of the Laffer curve). Therefore, *tax revenues from consumption* increase when consumption tax rate (q_C) increases, and *tax revenues from home production* decrease when the tax rate on home production (q_H) decreases [see

Section B3 in Appendix B for more details on this].[22] This positive relationship between tax rates and the corresponding tax revenues becomes also clear by combining the descriptive evidence (concerning the tax rates) that we provide in Section 2.2. with the stylized facts (concerning the tax revenues) that we present in Table 1 and Figure 1 for the case of Greece.

Moreover, Section B4 in Appendix B shows:

Proposition 2. *The positive effect of a change in median productivity* e^m *on the share of direct to indirect taxes (*$\frac{q_H}{q_C}$*) is conditional on the level of economic development. In particular, for lower levels of economic development the positive effect of the change in median productivity on the share of direct to indirect taxes is stronger.*

In the following sections we seek to investigate the empirical validity of *Propositions 1* and *2*. It is important to acknowledge that our empirical analysis builds on *tax revenues* data that can be endogenous to a number of parameters (as is clear from Equations (6)-(8)). To address this shortcoming, we would ideally like to employ more sophisticated tax measures that take into account changes in the corresponding tax bases (e.g., effective tax ratios based on the methodology developed by Mendoza et al., 1994). Unfortunately, such tax measures cannot be constructed for historical data. Taking into account this limitation, in Sections 3 and 4 we explore whether the political economy story of *Proposition 1* holds in the case of the Kingdom of Greece that was a typical agrarian economy (characterized by substantial levels of home production). In turn, in Section 5, we investigate the empirical validity of *Proposition 2*, using a sample of 12 Western European countries during the period 1841-1933.

3. National analysis for the Kingdom of Greece

3.1 Change of the political regime

The main explanatory variable in our national level analysis is a dichotomous variable developed by Boix et al. (2013) that takes the value of 1 if a country is categorized as democratic and 0 otherwise. The key political factors that Boix et al. (2013) considered in order to codify a period as democratic are: (1) popular elections of the executive and legislature; (2) multiple parties competing in the election; (3) unconsolidated incumbent advantage; and (4) at least half of the male electorate is

[22] In addition, by taking into account that -at the same time- total tax revenues remain constant ($dg=0$) these theoretical findings also suggest that *tax revenues from consumption (as a share of total tax revenues)* increase when consumption tax rate (q_C), increases and *tax revenues from home production (as a share of total tax revenues)* decrease when the tax rate on home production (q_H) decreases.

enfranchised. According to these criteria, Greece is classified as democratic over the periods 1865-1914 and 1926-1933, and as autocratic in the remaining years, namely 1833-1864 and 1915-1925.

During the first decade after independence (1833-1843), the political regime was an *absolute monarchy* under the reign of King Otto.[23] Only after the insurrection of 1843, the ruler compelled to adopt a constitution establishing a regime of *constitutional monarchy*. Remarkably, Greece was among the first three countries of the world that granted voting rights to almost all adult males aged 25 years old and over.[24] However, the new constitution was monarchical, with all executive and legislative powers vested in the King. Moreover, this massive reform was mainly the result of the absence of a dominant, cohesive elite faction that have been able to impose a clear-cut authoritarian solution. In particular, the political environment consisted of evenly balanced elite factions that viewed enfranchisement of the illiterate rural population (~90 percent) as a good system for adjudicating their conflicts, while restricting the power of the King (see Alivizatos, 2011, pp. 93-94; Kalyvas, 2015, pp.50-52).[25]

In 1862, King Otto was overthrown by a rising of the guard and people of Athens. A series of events led to the appointment of a new monarch, George I, and after long debate the new constitution of 1864 established a *crowned democracy* with universal suffrage for all males aged 21 years old and over. According to the new constitution, instead of a ballot, voters could cast a small lead ball into one of the ballot boxes allocated to each one of the candidates standing for elections (see Figure D1 in Appendix D). Interestingly, this reform was not part of the constitution when it was drafted initially and came as a result of a random and exogenous historical event. More precisely, it was proposed by the delegates of the Ionian Islands in their first participation in the National Assembly after the union of this region with Greece in 1864 (see Alivizatos, 2011 pp.118-119 and Sotirelis, 1991 for more details on this issue). Actually, the Ionian Islands had a long tradition of applying this voting method, even from the period when they were under the Venetian rule – i.e., between the 14th and the 18th

[23] Actually, until King Otto reached the age of majority (June 1, 1835), his sovereign rights in Greece were exercised by the so-called regency, which was made up of three councils appointed by the King of Bavaria Ludwig I.

[24] Only paying guests or apprentices were excluded from this right. The other two countries that adopted universal male suffrage before Greece were France and Liberia (see Przeworski, 2009). In France, it was introduced with the constitution of 1793, but it never came into effect and no elections were held under it. Liberia proceeded to universal male suffrage in 1839, but voting rights were restricted again in 1847.

[25] It is difficult to explain the sudden and smooth introduction of democratic institutions in the Kingdom of Greece. Especially, if someone takes into account that during that period it lacked a well-functioning state, a rising bourgeois class, an industrial working class and a vigorous urban culture - all factors associated with the rise of democracy in Europe in the 19th century (see e.g. Moore, 1966). However, the Kingdom of Greece did enjoy an important advantage that can be linked to the early rise in democratic institutions. Namely, a noteworthy equal distribution of land and consequently the absence of a powerful elite of landowners that would oppose the extension of the voting franchise due to threat of expropriation. According to Przeworski (2006), a political environment of evenly balanced elite factions appears to be a *sine qua non* for a stable, self-enforcing democratic regime. In other words, democracy survives only when all the political forces that could overthrow it, agree that democratic elections are a good system of adjudicating their conflicts or at least are preferable to the feasible alternatives. Therefore, the balance of political power between local elites and the rising expectations of local politicians that the democratic regime could be manipulated through clientelistic practices are the key explanatory factors of the franchise reform in the Kingdom of Greece during that period.

centuries (see e.g., Sotirelis, 1991). This external shock that facilitated voting without a ballot, is of paramount importance since it allowed illiterate men to participate in the electoral process without intervention of third parties, therefore transferring real power to the people.

Despite various incidents of political instability, parliamentary governments functioned regularly for many decades and until 1914. However, disagreements between King Constantine, who succeeded King George after his assassination in 1913, and the Prime Minister Eleftherios Venizelos initiated a prolonged period of political instability. According to the Boix et al. (2013) classification, Greece is categorized as autocratic during the period of 1915-1925. This categorization is based on Greece's experience of a deep *National Schism*, the start of the Greco-Turkish war, and two military coups in 1922 and 1925 - each lasting two years. From 1926 until 1933, the remaining years of our sample, political stability was restored and Greece once again is classified as democratic.

3.2 Empirical specification for the national analysis

To test the fiscal effects of the radical reform of 1864 in Greece at the national level we use annual data over the period 1833-1933 to estimate the following equation:

$$fiscal\ policy_t = \alpha_0 + \alpha_1 fiscal\ policy_{t-1} + \alpha_2 democracy_t + \beta X_t + \gamma_t + \varepsilon_t \quad (19)$$

where *fiscal policy*$_t$ denotes the fiscal indicators, as described in Section 2.1; *democracy*$_t$ takes value 1 if Greece is categorized as democratic in year *t*, and 0 otherwise; X_t is the vector of control discussed below; γ_t is a trend that measures the effect of time on the dependent variable; and ε_t is the error term. In all specifications, in line with many previous studies (e.g., Aidt et al., 2006), we include a lagged dependent variable on the right-hand side of our estimated equation to control for the fact that the evolution of tax policy exhibits a high degree of persistence.

Regarding the additional covariates, first we consider the variable *GDP per capita*, the natural logarithm of real GDP per capita, to control for the effect of economic development on the level and composition of taxation (see Wagner, 1883). Also, we expect the structure of the economy to be a crucial determinant of the various tax bases and how taxes are levied. For this reason, we employ the percentage of population living in cities of less than two thousand people (denoted as *agricultural rate*), as a proxy for the relative magnitude of the agricultural sector.[26] Second, we employ the variable *old*, which is defined as the percentage of the population aged 65 or older. According to Lindert (1994),

[26] We use this variable, as provided by Dertilis (1993), to proxy for the size of the agricultural sector in Greece, since population statistics first became available in 1828 whereas occupational statistics became available in 1861. This allows us to avoid extrapolation of occupational data back to 1833 -the first year of our sample. However, when using the first occupational statistics from the census of 1861 the values of the two variables are very close.

the ageing of the population significantly increased the demand for intergenerational redistribution in Europe during the period of 1880-1930.

A number of dummy variables are also included in our empirical specification. We intended to use population size in order to control for the possibility that the public sector exhibits economies of scale (see, e.g., Mulligan et al., 2004; Aidt et al., 2006). However, we abstain from using this variable in our specification since it is highly correlated with the variable *agricultural rate*. Instead, we construct the dummy variable *population spikes*, which takes the value of 1 in the years that we observe significant increases in the population (e.g., annexation of regions), and 0 otherwise. Next, the variables *debt crisis* and *currency crisis* take the value of 1 if a debt (domestic or external) or a currency crisis, respectively, occurred during the year, and 0 otherwise. Finally, we include two dummy variables to control for the effect of *internal instability* and *wars* on the implementation of fiscal policy. Table D1 in Appendix D provides descriptions, data sources, and descriptive statistics for all variables included in our regressions analysis in Section 3.

3.3 Baseline results

Our baseline results are reported in Table 2. In column (1), the main variable of interest, *democracy*, has a non-significant effect on the variable *total taxes*. This empirical finding fits our theoretical priors since the Kingdom of Greece was an agrarian economy characterized by low tax collection capacity. Moreover, this result is in accordance with previous historical studies for Greece suggesting that total tax revenues remained relatively stable during the entire 19th century (see Dertilis and Kostis, 1995; Kostis, 2006, pp.307-316).

In contrast, in column (2) *democracy* enters with a negative and statistically significant coefficient at the 1% level. This result highlights the significant reduction in the share of *direct* to *indirect taxes* after democratisation. Moreover, when *direct taxes* are further decomposed between *rural taxes* and *urban taxes* [in columns (3) and (4), respectively] we see that *democracy* has a negative and highly significant coefficient for the former, whereas no effect is found for the latter. Finally, in columns (5) and (6), we investigate the impact of the franchise reform on *indirect taxes*. As can be seen, *democracy* has a positive and statistically significant coefficient when related to *customs taxes* at the 1% level.

[Insert Table 2 here]

These effects are consistent with our theoretical priors. As we have already noted, given the presence of a large home production sector, a decrease in median productivity after the franchise reform induces increases in *indirect taxes* and decreases in taxes that burden home production (i.e.,

rural taxes). Our analysis suggests that there were political economy incentives behind the observed shifts in the implemented tax policy. The Greek authorities decided on this composition of taxation in order to ensure a minimum level of social cohesion and moreover to satisfy the majority of their electorate, which was constituted of peasants and farmers living in rural areas (see Dertilis, 1993; Palairet, 1979).[27]

It should be noted that the empirical findings in Table 2 -especially those concerning the increases in *custom taxes*- cannot fully exclude alternative theoretical explanations. For instance, one may argue that countries characterized by poor fiscal capacity and low administrative capabilities inevitably rely more heavily on international trade taxes which are a relatively easy-to-collect-tax (see e.g., Besley and Persson, 2011, 2013), or that increases in *custom duties* act as a means to protect the domestic production from international competition. Both of these arguments may sound sensible but fail to provide satisfactory answers for the full set of stylized facts under consideration. In particular, they fail to provide a clear-cut explanation for the decision of the Greek authorities to keep *total taxes* relatively constant and to combine increases in *indirect taxes* with reductions in *rural taxes*. After all, even if we assumed that *rural taxes* were a more difficult-to-collect tax, there is no economic argument supporting their striking reduction and the fact that it took place after democratisation. Similarly, the protectionist argument fails to provide a sensible explanation for why trade policy should be combined with decreases in *land tithes* and increases in a series of domestic *market taxes.* It is clear from the above, that alternative arguments which do not highlight the distributional implications of the implemented tax policy, and the potential political economy incentives behind the policy shifts, are weak at best.[28]

We also estimate the long-run effect of democratisation on fiscal policy instruments. According to our estimates, the change in the composition of taxation in favour of indirect taxes is driven mainly by the long-run decrease in the share of *rural taxes* by 8.9 percent, and by the long-run increase in the share of *customs taxes* by 14.55 percent. Given that the mean value of the former is 32.48 percent and of the latter is 34.07 percent, it is clear that this effect is quantitatively sizable. In Section C1 in Appendix C, and Table D4 in Appendix D, we report the robustness checks of the country level analysis. On of this robustness checks is to reduce sample between 1853-1879 as in the regional analysis that follows.

[27] Along these lines, Brender and Drazen (2007) suggest that the attitude of the citizenry towards democracy is important in preventing democratic collapse, and fiscal manipulation can act as an instrument to convince them that "democracy works". In line with this argument, Kammas and Sarantides (2016) show that when the democratic regime is not fully consolidated (i.e., new democracy), incumbents implement pre-electoral redistributive policies in order to signal that "democracy works", thereby preventing a reversion to an autocratic status quo at a time of the regime's extreme vulnerability.

[28] For an alternative political economy argument that builds on a theoretical model of trade in vertically differentiated products and explains the heavy reliance of developing economies on revenues from tariffs, see Moutos (2001) and Adam et al., (2011).

4. Regional analysis for the Kingdom of Greece

In this section, we investigate whether the negative effect of democratisation on *rural taxes* was more intensive in provinces characterized by a higher share of the population employed in agriculture. We cannot apply a similar strategy to examine the distribution of *customs taxes* since we do not have regional information.

4.1 Rural taxes

Tax revenues in the Kingdom of Greece were collected in *public cashiers* within each municipality and in a limited number of custom houses across the Greek territory (see Section A3 in Appendix A). The administrative division of Greece during the 19th century consists of *regions* (*peripheries*), *provinces* (i.e., *eparxiai*), *municipalities* and *communities*. Our regional analysis uses province-level data for the years 1853-1879, since this is the lower level of aggregation for which tax data are available. All final regional fiscal accounts (i.e., *Apologismoi*) employed in the current study were tracked down in the HANBG. Unfortunately, regional accounts for years 1856 and 1857 were missing from the collection.

Figure D2 in Appendix D reports the fiscal revenues of the *land tax* for the year of 1863. Our sample for the regional analysis includes 43 tax administrative units. Figure D3 shows the borders of the 48 provincial units of the Greek state before the union with Ionian Islands - the so called *old Greece*- and the adjustments that need to be made for the final 43 tax administrative units of our sample.

To construct our variable *rural taxes* for the regional analysis, we use rural tax receipts -consistent with the national analysis- that are now expressed in real per capita terms. Population statistics are taken from the censuses of 1853, 1861, 1870 and 1879, which are interpolated between census years to fully populate the panel. To express our variables in real terms we use price level data from Lazaretou (2014), who gathered and constructed data from various sources (e.g., Kostelenos et al., 2007), with reliable estimates of the magnitude and the trends of the Greek economy for the period of 1830-1939.

4.2 Agricultural rate

To estimate the relationship between rural tax burdens and the agricultural rate we exploit the variation in the concentration of the peasantry across provinces. Our key independent variable*, farmers and peasants 1861*, refers to the percentage of peasants and farmers in the total population at the province level according to the occupational statistics of the 1861 census. We prefer this fixed measure of 1861 since it is less likely to be endogenous to taxation trends than a population share that changes over

time (see e.g., Cascio and Washington, 2013; Carruthers and Wanamaker, 2015). As can be seen in Table D2 in Appendix D, there is significant variation in the geographic distribution of the peasantry across provinces.

4.3 Empirical specification for regional analysis

To estimate the relationship between peasantry concentration and rural tax receipts after the reform of 1864 we employ the following Difference-in-Difference (DD) specification:

$$rural\ taxes_{it} = \alpha_0 + \alpha_1 democracy_t * farmers\ and\ peasants\ 1861_i + \theta_i + \theta_t + \\ + t * \theta_r + \beta X_{it} + \varepsilon_{it} \quad (20)$$

where *rural taxes*$_{it}$ denotes real per capita tax receipts from agricultural and livestock production in province i at time t (in 1860 Drachmas); *democracy*$_t$ is an indicator variable equalling one in years greater than or equal to 1865, and 0 otherwise; *farmers and peasants 1861*$_i$ represents the measure of peasantry concentration described above. The model also includes province, θ_i, and year fixed effects, θ_t, to control for all time-invariant province characteristics and shocks common to all provinces, respectively. Because *farmers and peasants 1861*$_i$ is constant within provinces and *democracy*$_t$ is constant within province-years, only the interaction between the two remains in the model and is captured by the parameter α_1. We also allow regions to diverge over time by including region-specific time trends, $t*\theta_r$. The matrix of province-level observable characteristics, X_{it}, includes (province) *population* and *population squared*, to account for differences between provinces with large and smaller concentrations of the population and their connected non-linearities; *population density*, a commonly used proxy of prosperity and urbanization; and the share of *delayed payments* of rural tax receivables. The latter variable is defined as the percentage of delayed rural tax payments to the total tax receivables expected by the state. We control for this variable in order to isolate our outcome variable (tax receipts) from any effect that stems from delayed payments. Finally, ε_{it} is an error term. To address serial correlation concerns and to allow for heteroscedasticity, the standard errors are clustered at the province level (Bertrand et al. 2004).

This empirical specification directly relates to the idea of using the `dosage' of suffrage in examining its effect on political and economic outcomes. It was first applied by Berlinski and Dewan (2011), and now is a widely employed technique in the relevant literature (Cascio and Washington, 2013; Vernby 2013; Larcinese 2014; Carruthers and Wanamaker 2015). The merit of this method is that it allows one to identify how local authorities, or the electorate at the local level, react to an exogenous shock imposed by the central/national government. In our case, though, the motivation

differs since we are interested in examining changes in the behaviour of the central government that affect directly the geographical distribution of a policy variable (see e.g., Jablonski, 2014; Kroth et al., 2016).

4.4 Results

Columns (1)-(3) in Table 3 present the coefficients from the DD specification in equation (20). Column (1) includes province and year fixed effects, whereas in columns (2) and (3) we add progressively regional time trends and the additional covariates. As can be seen, the DD coefficient (*democracy*farmers and peasants*) is negative and statistically significant, and the most moderate estimate in column (3) indicates that a percentage point increase in the agricultural population is associated with a decrease in *rural taxes* per capita after democratisation by 0.078 points. Evaluated at the mean value of the agricultural rate proxy this implies a 1.33 points decrease in *rural taxes*. Using the mean value of *rural taxes* before 1864, this effect accounts for a 17 percent decrease in *rural taxes* in the province with the average size of peasantry concentration. Therefore, consistent with Proposition 1, we obtain clear indications that in provinces characterized by more extensive home production -as proxied by the number of *peasants and farmers* in the population - the central government reacts more, leading to a more pronounced reduction in *rural taxes*.

[Insert Table 3 here]

However, it remains possible that heterogeneous trends are present and induced decreases in *rural taxes* in high-agricultural provinces, even in the absence of democratisation. To examine this possibility, we restrict our sample prior to 1864 and assess the importance of our key independent variable in determining trends in rural taxation. Specifically, we modify equation (20) to estimate the following for fiscal years 1853-1863:

$$rural\ taxes_{it} = \alpha_0 + \alpha_1 trend_t + \alpha_2 trend_t * farmers\ and\ peasants\ 1861_i + \beta X_{it} + \theta_i + \varepsilon_{it} \quad (21)$$

The main aim is to test whether high *farmers and peasants 1861* provinces had different trends before 1864 (i.e., $\alpha_2 \neq 0$). The results, reported in column (4), show a downward trend in *rural taxes*, but more importantly no evidence of a differential trend in rural taxation amongst provinces related to the size of the agricultural rate.

As a further test we estimate a regression adjustment model, which allows the impact of X_{it} covariates to change in the new regime (e.g., by letting the impact of population density, a proxy of

regional development to vary across pre-suffrage and post-suffrage years). In particular, this specification ensures that the post-treatment effect of *"agricultural intensity"* is not also incorporating the effects of control variables whose impact may have changed in 1864 (see e.g., Carruthers and Wanamaker, 2015). The regression adjustment estimating equation is as follows:

$$rural\ taxes_{it} = \alpha_0 + \alpha_1 democracy_t * farmers\ and\ peasants\ 1861_i + \theta_i + \theta_t + t * \theta_r + \beta X_{it} + \gamma democracy_t * (X_{it} - \bar{X}) + \varepsilon_{it} \quad (22)$$

where $\bar{X}$ is the vector of means of the controls. Column (5) in Table 3 presents estimates of α_1. As can be seen, the effect on *rural taxes* remains negative and statistically significant, pointing once again in the direction of a political economy story.

Finally, in order to provide further evidence of potential political economy motives behind observed shifts in the implemented tax policy, our analysis incorporates the variable *voter turnout* that captures the percentage of actual voters in the national elections of 1879 among those that were enfranchised. The choice of year is dictated by data availability, since this is the only year during 1853-1879 that turnout statistics were reported by Greek authorities. Our new Difference-in-Difference-in-Difference (DDD) specification that exploits variation also along the dimension of political participation has the following form:

$$rural\ taxes_{it} = \alpha_0 + \alpha_1 democracy_t * farmers\ and\ peasants\ 1861_i + \alpha_2 democracy_t * voter\ turnout_i + \alpha_3 democracy_t * farmers\ and\ peasants\ 1861_i * voter\ turnout_i + \theta_i + \theta_t + t * \theta_r + \beta X_{it} + \varepsilon_{it} \quad (23)$$

where *voter turnout* is our proxy for the propensity of the population at the province level to participate in the electoral process after democratisation. The rest of the variables are defined as earlier. It should be noted that the estimated α_1 in this specification captures the expected effect of *democracy*farmers and peasants 1861* when voter turnout is zero. The coefficient of interest here is α_3, which indicates how differences in peasantry concentration between provinces affect *rural taxes* as the size of *voter turnout* after the reform increases. Consistent with our hypothesis the DDD coefficient in column (6) is negative and statistically significant at the 1 percent level. Therefore, we obtain evidence that that the intensity of political participation of the peasantry at the province level matters for the size of reduction in rural tax burdens.

5. The conditional effect of suffrage extension in Europe

In this section, we explore the effect of democratisation on the size and the composition of taxation for a sample of 12 Western European countries for the period 1841-1933. This allows us to investigate the empirical validity of Proposition 2 and therefore to add generality to our results.[29] In contrast to Greece, most of these European countries were not typical agrarian economies during the period of their democratisation. In particular, their average value of the workforce occupied in the agriculture sector upon democratisation is half that of Greece, namely about 38 percent (see Figure 2).

[Insert Figure 2 here]

To test the effect of democratisation on fiscal outcomes for the European sample, we estimate the following equation for the period 1841-1933:[30]

$$fiscal\ policy_{it} = \alpha_0 + \alpha_1 fiscal\ policy_{it-1} + \alpha_2 democracy_{it} + \alpha_3 agricultural\ rate_{it} + \alpha_4 Democracy_{it} * agricultural\ rate_{it} + \beta X_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (24)$$

where *fiscal policy*$_{it}$ is a fiscal indicator in country *i* in year *t*; *fiscal policy*$_{it-1}$ is the respective lagged dependent variable; $democracy_{it}$ is a dummy variable that takes value 1 if country *i* in year *t* is categorized as democratic, and 0 otherwise; $agricultural\ rate_{it}$ is the percentage of the workforce in agriculture; X_{it} is the vector of additional control variables; γ_i and δ_t correspond to country and time fixed effects, respectively, and ε_{it} is the error term.[31] As can be seen, equation (19) has been augmented with the interaction term *democracy*$_{it}$**agricultural rate*$_{it}$, in order to test our second hypothesis.

The focus on these European countries is due to the fact that Flora et al. (1983) provide directly comparable fiscal data to that employed for the case of Greece. Moreover, although these European countries had significant differences in the rules and institutions that governed fiscal policy during that period, they share similar economic and political characteristics that make them an appealing sample

[29] The countries in our sample are Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland and United Kingdom.

[30] Although for some countries fiscal data are available from year 1833 onwards (e.g., UK, France), due to data limitations for other variables, our sample starts in 1841.

[31] The inclusion of a lagged dependent variable introduces a potential bias in the dynamic Fixed Effects model by not satisfying the strict exogeneity assumption of the error term ε_{it}. As shown in the literature, the estimated bias of this formulation is of order 1/T, where T is the time length of the panel, even as the number of countries becomes large (see, among others, Nickell, 1981). Since, the average length of our panel ranges from 41 to 60 years -in different specifications- in our case, the potential bias appears to be negligible.

for panel analysis.[32] The tax variables and the controls that we employ in this section are identical to those of Section 3.[33] Table D3 in Appendix D provides descriptions, data sources, and descriptive statistics for all variables included in our regression analysis in Section 5.

Table 4 reports our results for the European sample. As can be seen in panel A, the variable *democracy* is positively correlated with *total taxes* and the share of direct to indirect taxes. Moreover, these changes are driven by the increase in *urban taxes* and the decrease in both categories of indirect taxes, *customs taxes* and *market taxes*. However, and more importantly, these effects are conditional on the structure of the economy.

[Insert Table 4 here]

To further explore this, we calculate the partial derivative for each dependent variable in Table 4, with respect to the variable *democracy* at selected values of the *agricultural rate.* Specifically, these values are the mean of our sample (38.32), one standard deviation below the mean (23.22) and two standard deviations above the mean (68.52). The lower value corresponds to countries like the UK, the mean value of 38.32 captures cases like Norway, and finally the value 68.34 is close to cases like Finland or Italy. What we observe in panel B of Table 4 is that when the agricultural sector dominates the economy, as in the case of Greece, the size of the public sector remains unaffected after democratisation, whereas the composition of tax revenues changes in favour of indirect forms of taxation. Figure 3 plots how the regime change affects the variable *direct/indirect* at different values of the *agricultural rate*. As shown, consistent with our theoretical priors in Proposition 2, in the first half -that the agricultural sector dominates the economy - the negative effect of *democracy* on the share of direct to indirect taxes is stronger for higher values of the *agricultural rate*. Although it is not captured within our theoretical framework, in the second half of the diagram, where home production is reduced significantly and the capability of the state to impose more efficient forms of direct taxation rises, the effect on *direct/indirect* taxes becomes positive and statistically significant in the spirit of the Meltzer and Richard (1981) model. In Section C2 in Appendix C, and Table D5 in Appendix D, we report the robustness checks of the European level analysis.

[Insert Figure 3 here]

[32] An obvious example is the case of Germany, where the central government reserved the right to levy and collect a significant amount of direct taxes close to the beginning of WWI (Ritschl, 2003).
[33] The one exception is that in the case of the European countries we replace the variable *population spikes* with the variable population, which is defined as the natural logarithm of the population of the country.

6. Conclusions

During the first decades after independence, one of the priorities of the Greek governments -and the Crown- was the legitimization of their authority (see e.g., Dertilis, 2015; Kostis, 2018). Their rationale was that this could be achieved only by ensuring a minimum level of social cohesion and by convincing the citizens of the newly established Greek state that social demands for political equality were going to be satisfied. The constitution of 1864 that transformed radically the political regime by establishing a *crowned democracy* with universal male suffrage was the capstone of these policies aimed at securing this social cohesion. Given that a vast majority of the population was illiterate during that period, the political reform allowed them to vote by casting a small lead ball into a ballot box. This method of voting transferred real power to the people enabling them to participate in the electoral process without intervention of third parties (see, e.g., Alivizatos, 2011).

This paper is the first systematic study to explore empirically whether the extension of the voting franchise in an agrarian economy, was the ultimate driving force behind the shift in the implemented tax policy. The political reform of 1864 was accompanied by a radical restructuring of the tax system. Building on a unique tax dataset of the Kingdom of Greece at the national and the regional level, our analysis suggests that the Greek governments changed the structure of taxation in order to meet the preferences of the electorate, which mainly constituted of peasants and farmers. This new political majority was harmed significantly by *direct taxes on land* but -at the same time- it was able to escape *indirect taxes* through self-consumption. As a result the authorities reduced the share of direct to indirect taxes to satisfy the peasantry. In turn, our analysis employs a sample of 12 Western European countries over the same period and provides evidence that the phase of economic development induced a differentiated effect of democratisation on the size and the structure of taxation in Europe. Related to the case of Greece, we show that when the agricultural sector dominates the economy democracy exerts a negative impact on the share of direct to indirect taxes.

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Table 1. Tax revenues of the Greek state over 1833-1933

	total taxes (1)	*direct/indirect* (2)	*rural taxes* (3)	*urban taxes* (4)	*custom taxes* (5)	*market taxes* (6)
time range:						
1833-1844	14.98	2.13	65.87	1.74	24.54	7.85
1845-1864	11.29	1.48	56.69	2.33	27.21	13.77
1865-1879	10.89	0.78	38.51	5.04	41.19	15.26
1880-1915	13.99	0.31	16.77	6.76	38.83	37.64
1916-1933	17.70	0.41	9.74	18.66	32.63	38.97

Notes: Column titles refer to the tax variables as defined in Section 2.1; *time range* indicates the five sub-periods by which we split our sample. *Rural taxes*, *urban taxes*, *custom taxes* and *market taxes* are all expressed as a percentage of total taxes and therefore the summation of columns (3)-(6) equals 100.

Table 2. Fiscal effects of democratisation in Greece

	total taxes *(1)*	*direct/indirect* *(2)*	*rural taxes* *(3)*	*urban taxes* *(4)*	*customs taxes* *(5)*	*market taxes* *(6)*
democracy	0.181	-0.138***	-5.138***	-1.491	5.729***	1.405
	(0.652)	(0.050)	(1.667)	(1.039)	(1.698)	(1.106)
Observations	100	100	100	100	100	100
R2	0.897	0.921	0.976	0.926	0.789	0.975

Notes: Column titles refer to the dependent variable. The table reports OLS estimates of equation (19). All estimates include the lagged dependent variable, the variables GDP per capita, agricultural rate, old, population spikes, debt crisis, currency crisis, internal instability, wars, an intercept and a time trend, but these coefficients are not reported for brevity. Robust standard errors are reported in parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table 3: Estimated changes on rural taxes after the reform of 1864

Dependent variable:	*(real) rural taxes per capita*					
	(1)	(2)	(3)	(4)	(5)	(6)
$democracy * farmers\ and\ peasants\ 1861$	-0.198***	-0.151***	-0.078*		-0.105**	0.376**
	(0.033)	(0.035)	(0.039)		(0.045)	(0.153)
$trend$				-0.265***		
				(0.060)		
$trend * farmers\ and\ peasants\ 1861$				-0.002		
				(0.003)		
$democracy * voter\ turnout$						0.062*
						(0.032)
$democracy * farmers\ and\ peasants\ 1861 * voter\ turnout$						-0.007***
						(0.002)
Province FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓		✓	✓
Regional time trends		✓	✓		✓	✓
Controls (X_{it})			✓	✓	✓	✓
$Post_t * (X_{it} - \overline{X})$					✓	
R2	0.590	0.637	0.697	0.570	0.683	0.707
Observations	1075	1075	1075	387	1075	1075

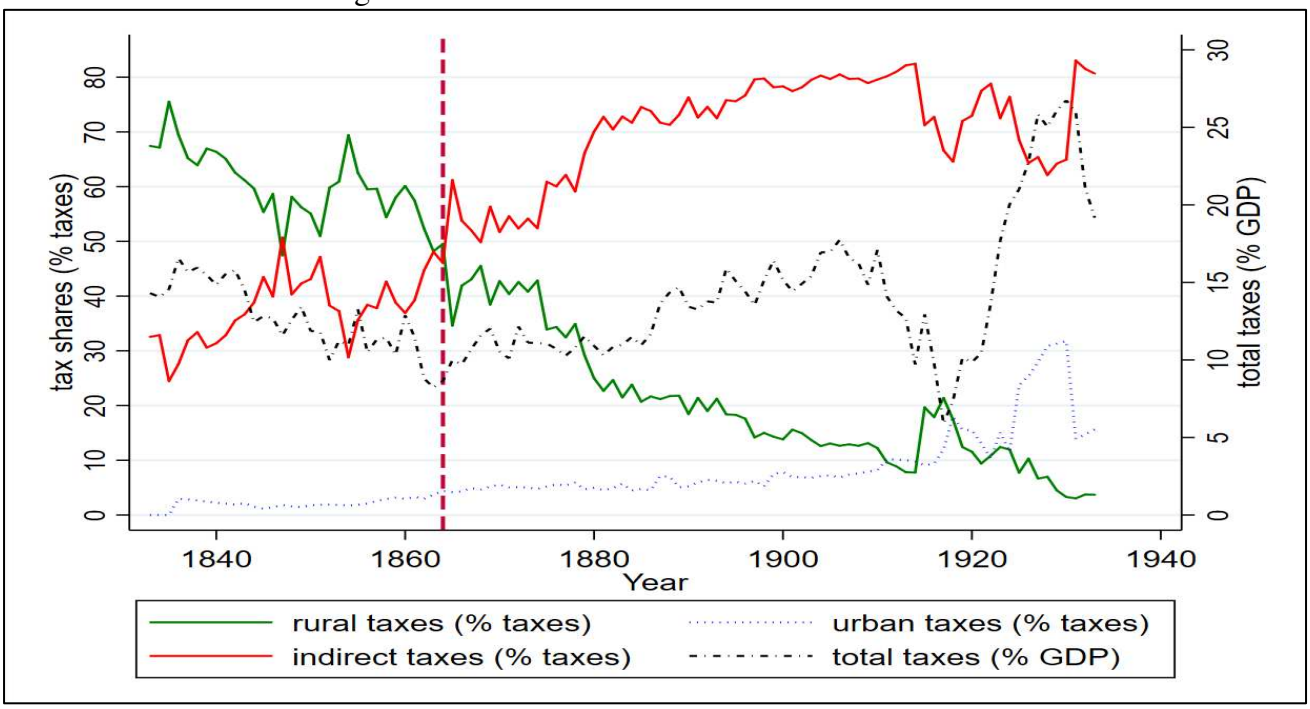
Notes: Columns (1)-(3) list the DD coefficient estimate of equation (20). Column (4) lists selected results from equation (21), a pre-suffrage model of *rural taxes* and *agricultural rate*. Column (6) lists the DD coefficient estimate of the regression adjustment model of equation (22). Column (7) lists the main results of the DDD empirical specification of equation (23). Controls include *population*, *population squared*, *population density* and the percentage of delayed payments of rural taxes, but these coefficients are not reported for brevity. Standard errors clustered at the province-level are provided in parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table 4. Fiscal effects of democratisation in Europe

Panel A: *Estimated coefficients*	*total taxes*	*direct/indirect*	*rural taxes*	*urban taxes*	*customs taxes*	*market taxes*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
democracy	0.789***	0.533***	0.093	6.358***	-2.554***	-2.226*
	(0.187)	(0.148)	(0.390)	(1.273)	(0.578)	(1.106)
democracy agricultural rate*	-0.018***	-0.012***	-0.008	-0.104***	0.053***	0.036
	(0.005)	(0.003)	(0.013)	(0.025)	(0.015)	(0.026)
agricultural rate	0.018	0.019**	0.053	0.186**	-0.142***	-0.059
	(0.014)	(0.007)	(0.043)	(0.061)	(0.045)	(0.047)
Observations	413	654	657	660	654	654
R2	0.939	0.807	0.959	0.937	0.941	0.838
Panel B: *Estimated fiscal effects of democracy for different values of the agricultural rate*						
agricultural rate = 23.22	0.373*	0.261***	-0.103	3.934***	-1.331***	-1.394**
	(0.176)	(0.078)	(0.182)	(0.882)	(0.314)	(0.614)
agricultural rate = 38.32 (mean)	0.102	0.083*	-0.231	2.357***	-0.536*	-0.852*
	(0.211)	(0.045)	(0.226)	(0.752)	(0.281)	(0.460)
agricultural rate = 68.52	-0.440	-0.271**	-0.486	-0.797	1.054	0.231
	(0.334)	(0.096)	(0.563)	(0.993)	(0.605)	(0.912)

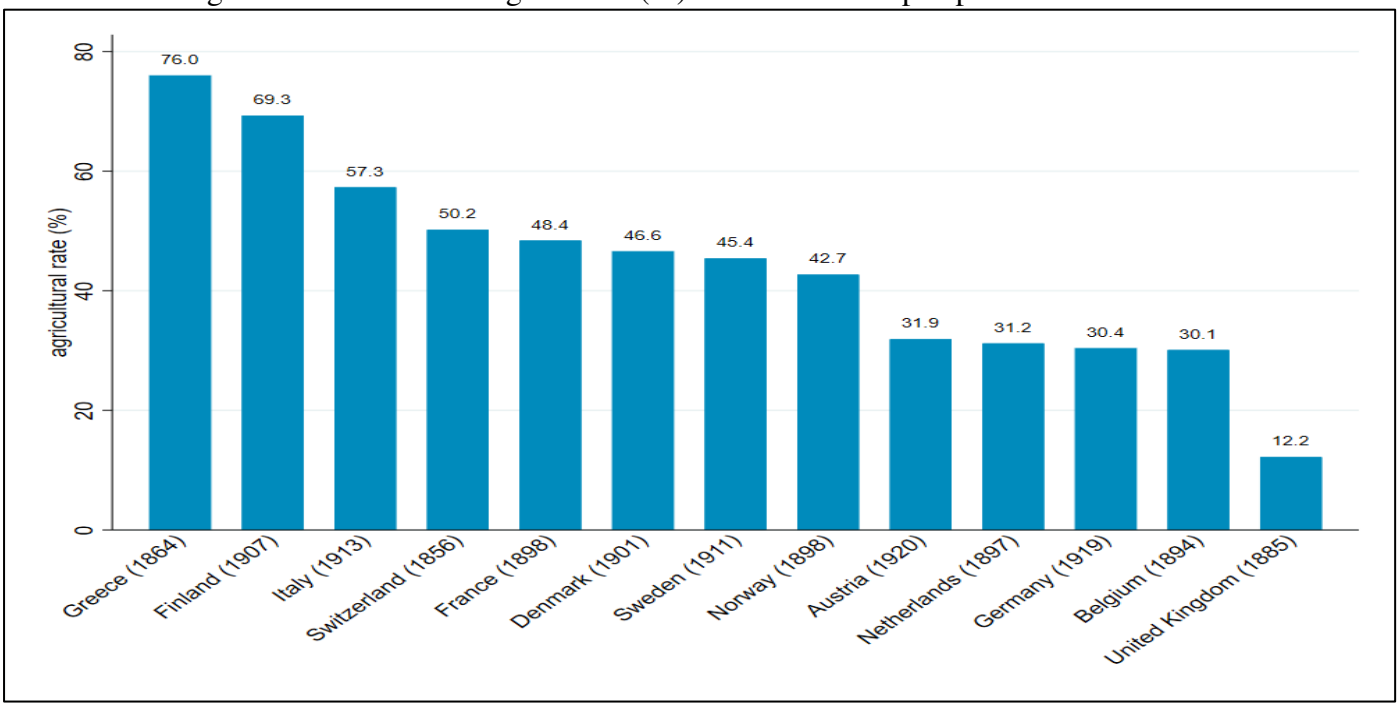
Notes: Panel A reports OLS estimates of equation (24). All estimates include a full set of country and year fixed effects, the lagged dependent variable, GDP per capita, agricultural rate, old, population, debt crisis, currency crisis, internal instability and wars, but these coefficients are not reported for brevity. Robust standard errors, clustered by country are reported in parentheses. Panel B reports estimates of the derivative of the variable *agriculture rate* with respect to the variable *democracy* with controls set at the mean. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Figure 1. Tax revenues of the Greek state over 1833-1933



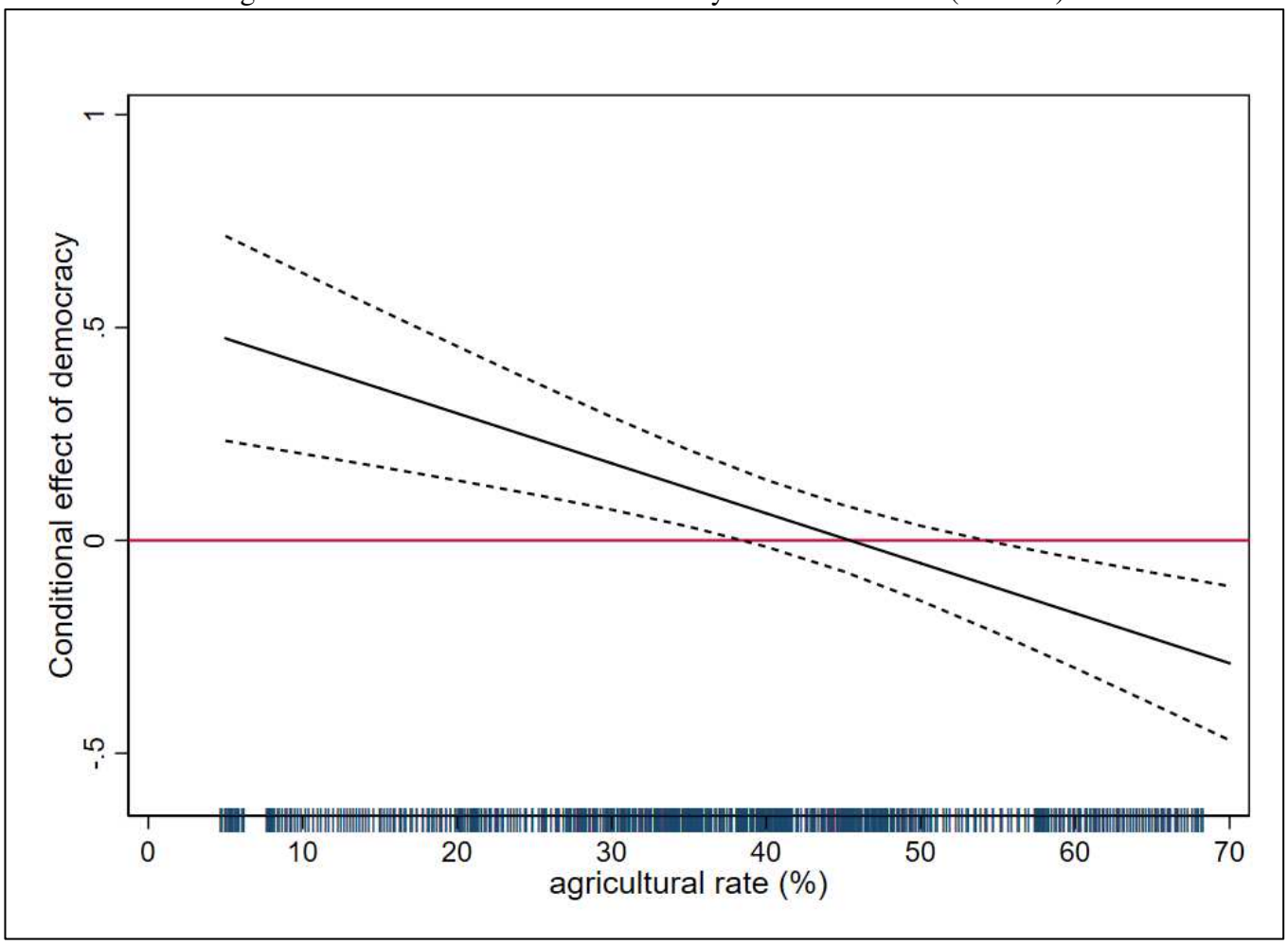
Notes: The graph shows the evolution of the level and composition of taxation in the Greek state over the period 1833-1933. The red dashed line indicates the year of the radical enfranchisement reform of 1864.

Figure 2. Workforce in Agriculture (%): Greece vs Europe upon democratisation



Notes: In the parenthesis, next to the country name, the year of democratisation is reported. Source, Boix et al. (2013). For Greece, the variable workforce in agriculture (%) is obtained by Dertilis (1993). For all other European countries it is from Banks and Wilson (2015).

Figure 3. Conditional effect of democracy on direct/indirect (taxation)



Notes: This graph shows the conditional effects of *democracy* on the change in the share of *direct/indirect* taxation at different values of the *agricultural rate*; The conditional effects are calculated based on specification (2) of Table 4; All other covariates are held constant at their means; Dashed lines signify 90% confidence intervals; Rug plot at the horizontal axis illustrates the percentage of the agricultural rate in the sample; The red horizontal line marks a marginal effect of 0.

Appendix A. Tax Data for Greece

A1. National tax database

Dertilis (1993, pp.105-297) was the first who attempted the development of a detailed historical tax database for Greece. After 10 years of personal research, he managed to track 89 fiscal accounts of the Greek state for the period 1833-1933. His research concluded with 12 missing accounts for the following years: 1850, 1851, 1856, 1857, 1863, 1907, and 1914-1919. Moreover, it should be noted that for the years 1845-1849, 1860, and 1867, Dertilis (1993, pp.105-297) employed data from provisional fiscal accounts (i.e., *Genikoi Logarismoi*), instead of final fiscal accounts (i.e., *Apologismoi*), since the latter were missing.

In a subsequent period, Prontzas et al. (2011) managed to track all the remaining final fiscal accounts of the Greek state for the period under consideration, except for the year 1860. We tracked down this account in the HANBG, where we also obtained regional fiscal statistics for the fiscal years 1853-1879. The newly tracked final fiscal accounts, were merged with those from the database of Dertilis (1993), who based on the methodology of Flora et al. (1983) divided taxes into 13 broad tax categories: (1) land tax, (2) assessed tax, (3) trade tax, (4) corporation tax, (5) income tax, (6) property tax, (7) inheritance tax, (8) extraordinary tax, (9) other direct tax, (10) customs tax, (11) excise tax, (12) turnover tax, and (13) other indirect tax. For more details about the classification of different types of taxes into the 13 broad tax categories, see Dertilis (1993), pp. 189-203.

A2. A brief history of the evolution of taxation in Greece

Following the successful revolution against the Ottoman rule between 1821-1829, Greece won its independence in 1830. After the war the tax system of the new-born Greek state was modified, but some basic characteristics remained similar to those established by the Ottoman empire (see e.g., Shaw, 1975; McGowan, 1981).[34] The most basic component of *rural taxation*, the so-called *dekati,* which was a 10 percent tax on gross *agricultural* and *livestock* production, remained untouched. However, for specific types of agricultural goods (such as cotton, tobacco, and vines) Greek governments replaced *dekati* with the so-called *stremmatiki forologia*, which was based on the extent of the cultivated land (see Dertilis, 1993; Petmezas, 2003). On top of *dekati*, an additional 15 percent of the gross production went to rents if the land was granted by the Greek state (the so-called *epikarpia*).[35] Moreover, if public lands were used without the permission of the Greek state, peasants were obliged to pay an additional 15 percent of their gross production as *epikarpia*. Thus, the overall tax burden of the peasantry ranged roughly between 25 to

[34] For instance, a large number of Ottoman lump sum taxes on peasants and farmers (such as *ispence* and *avariz*) were abolished.

[35] After independence, in practice, the Greek authorities nationalized the great bulk of the lands that belonged to Ottoman landowners. More precisely, although the Treaty of Constantinople had protected the land property rights of Ottoman individuals and institutions, in practice, Greek governments tolerated transactions and practices that were detrimental to these rights. Eventually, the Greek authorities nationalized these lands as a temporary measure, but it took almost half century since independence before the official distribution of lands to the peasantry in 1871.

40 percent. After the adoption of the constitution of 1844, a new tax law was voted in 1845. According to the new legislation, land rent paid for public lands (*epikarpia*) was reduced to a level of 10 percent, irrespective of whether public lands were used with or without permission. Therefore, the overall tax burden on land was decreased to a maximum of 20 percent of gross production. For this reason, as can be seen in Table 1, *total taxes* are reduced, whereas the percentage of *rural taxes* also drop from 65.87 percent the period 1833-1844, to 56.7 the years after the reform- and before the new constitution of 1864 was voted in.

After 1864, the tax rates of *dekati* and *stremmatiki forologia* fell significantly. It must be noted that during the same period there were also significant efforts from the Greek governments to fully abolish *dekati*, which finally took place in 1880.[36] Following similar political rationale, from 1880 until the first two decades of the 20th century, most of the Greek governments implemented tax reforms that were based on reductions of several direct taxes paid by the agricultural population (see e.g., Sideris, 1931), decreasing dramatically the level of *rural taxation* below 17 percent of total taxation.

The changes that took place between 1843 and 1880 were accompanied by remarkable increases in indirect taxes. Until 1884, most of these indirect taxes were basically *custom duties* on imported goods and *other indirect taxes* (e.g., stamp duty on legal documents). Then, in 1884, Prime Minister Charilaos Trikoupis implemented a tax reform that introduced a large number of excises duties - first introduced in 1880 - increasing at the same time revenues from state monopolies (see Kostis, 2006). As can be seen in columns (5) and (6) of Table 1, the summation of *custom taxes* and *market taxes* increased significantly in the years after the first major political reform in 1844, and even more rapidly after 1864. Changes in *rural taxes* and *indirect taxation* are also reflected in the evolution of the ratio *direct* to *indirect taxes* that decreases constantly during the whole period (see column (2) of Table 1).

Another basic characteristic of the Greek tax system was the full absence of personal income taxation until 1910. Investigating the composition of direct taxes from 1833 to 1910, several scholars have concluded that the amazing drop in *rural taxes* was accompanied by moderate increases, or introduction, of other forms of direct taxation that fell within the categories of *trade* or *corporate taxation* (see e.g., Dertilis, 1993). A good example is the introduction of the corporate tax in 1877, which contributed, on average, less than 0.5 percent of annual tax revenues. In 1911, Prime Minister Eleftherios Venizelos introduced the first modern personal income tax. However, the tax rate was flat and small and tax evasion so large that tax revenues from personal income taxation were insignificant until 1918. Its share exceeded 5 percent of tax revenues in 1919, and increased gradually thereafter. This is one of the reasons that *urban*

[36] In 1860, Koumoundouros, the minister of finance of the Greek state, proposed a tax law, according to which *dekati* would be fully replaced by *stremmatiki forologia*. A similar reform was proposed by Sotiropoulos, a subsequent finance minister, in 1867. Both proposals failed to become laws of the Greek state (see Sideris, 1931), since they were blocked mainly by the politically powerful group of *tax farmers* (Kostis, 2006).

taxes increased from 6.76 percent during the period of 1864-1915, to 18.66 percent the remaining years of our sample. As already mentioned, another important reason was the increase in *extraordinary and other direct taxes* due to the involvement of Greece in two wars between 1916-1933. This change also affected the overall level of *total taxes* that increased (on average) by almost by 4 percent of GDP after 1916 relative to the period 1880-1915.

A3. Collection of rural taxes between 1853-1879

For each category of *rural taxes* the central government was budgeting the amount of taxes expected by each municipality. This amount was determined by the production capability of each municipality the tax rates set by the state, but also, by the willingness of the state to collect taxes consistently within the Greek territory. The *land tax* in the Kingdom of Greece during 1853-1879 was collected in three different ways. The first and most important way of collecting the vast majority of the *land tax* (i.e., *dekati* and *epikarpia*), was through outsourcing its imposition and monitoring to private agents. According to this practice, rich members of notables were competing in public auctions - organised by the local authorities of each municipality in the capital city of the province - to impose and monitor the collection of taxes by the local population. Specifically, the winner of the auction had the right to impose tax burdens set by the state, subject to the production capability of each producer, and verify that taxpayers submit the agreed payment on time in the public cashier of the municipality. The profit of the "tax farmer" from this process was to keep the residual tax revenues collected -above the determined *tax receivables* at the auction.[37] The "tax renter" was not allowed to collect revenues in cash or in-kind directly from the taxpayer. Only after the agreed amount of taxes was gathered in the public cashier the authorities were compensating the "tax renter" with the residual tax collections.[38] Second, for some agricultural products (e.g., tobacco) taxes were levied according to the extent of the cultivated land (i.e., *stremmatiki forologia*). In particular, the producer had the duty to declare in the mayor the extent of his cultivated land. After that, employees of the local government had to verify the accuracy of this declaration, and inform the producer for the tax payment according to the tax rates set by the state. Third, for specific types of agricultural goods that were exported to international markets (mainly currants), taxes were collected in custom houses around Greece -not in the *public cashier* of each province. This component of the *land tax* (~10 percent) cannot be

[37] This is a variation of the so called "tax farming", a tax collection scheme that was a global phenomenon until the 19th century, due to the absence of a fully developed tax bureaucracy (see, Webber and Wildavsky 1986). It can be tracked back in Ancient Greece and the Roman Republic and Empire (see, Adams, 1999). It reappeared in Byzantium and was reborn in many European countries such as England and France in the Middle Ages as the dominant tax collection method (see, e.g., White, 2004; Johnson and Koyama, 2014). Tax farmers were financial intermediary for governments in the Ottoman Empire (see, Cizakca 1993; Salzmann 1993), an institution inherited to the modern Greek state after its independence.

[38] The last two years of our sample a new law compelled the participants to submit an initial advance deposit after the auction followed by two more instalments during the fiscal year to cover the agreed payment. Tax farmers though had the right to collect the physical tax revenues and in turn to merchandise them with the aim of making a profit. This is the *rental contract* of tax farming, under which the tax collectors would pay a fixed rent to the government for the right to collect a tax and keep the remaining revenue (see, e.g., Azabou and Nugent 1988; Stella 1993).

included in the regional empirical analysis, since custom receipts of exported agricultural goods are reported only at the national level. The system of collection of *assessed taxes* on livestock production (the second component of *rural taxes*) is similar to the second method of collection of the *land tax* (i.e., *stremmatiki forologia*) meaning that local authorities were responsible to impose the tax burdens of the state to livestock production, and monitor the tax collection process.[39]

[39] The authorities were publishing every year in the Government Gazzete, among others, laws about the tax policy (e.g., changes in tax rates) and the rules for the collection of taxes. With respect to the *land tax* important information for its collection can be found on issues published on April 25, 1848 (vol. 13), April 15, 1855 (vol. 13), June 26, 1863 (vol. 24) and January 3, 1878 (vol. 1) all available in the following link: http://www.et.gr/index.php/anazitisi-fek

Appendix B: Second-order conditions and comparative statics

B1. Discussion concerning the second-order conditions

In this Section, we present analytically the second partial derivatives as well as the determinant of the Hessian matrix.

$$\frac{\partial^2 U}{\partial l^{i2}} = V_{xx}(1+e^i-h^i-l^i) < 0 \tag{A.1}$$

$$\frac{\partial^2 U}{\partial h^{i2}} = (1-q_H)A_H a(a-1)(h^i)^{a-2} + V_{xx}(1+e^i-h^i-l^i) < 0 \tag{A.2}$$

$$\frac{\partial^2 U}{\partial h^i \partial l^i} = \frac{\partial^2 U}{\partial l^i \partial h^i} = V_{xx}(1+e^i-h^i-l^i) < 0 \tag{A.3}$$

From (A.1)- (A.3) we get the determinant of the Hessian matrix as follows:

$$D = \left\{(1-q_H)A_H a(a-1)(h^i)^{a-2} + V_{xx}(1+e^i-h^i-l^i)\right\} \cdot V_{xx}(1+e^i-h^i-l^i) - (V_{xx}(1+e^i-h^i-l^i))^2 \tag{A.4}$$

and so we conclude that

$$D = \left\{(1-q_H)A_H a(a-1)(h^i)^{a-2}\right\} \cdot V_{xx}(1+e^i-h^i-l^i) > 0 \tag{A.5}$$

Since $\partial^2 U/\partial l^{i2} < 0$ and $D>0$ everywhere in the domain of U, the Hessian matrix is negative definite everywhere in the domain of *U* and therefore the interior point identified by the first order conditions is a global maximum.

B2. Proof of Proposition 1

Proposition 1. *For given levels of g, a decrease in the productivity of the median voter* e^m*, increases* q_C *and decreases* q_H*. Therefore, the extension of the voting franchise to the poorer segments of the population -that implies lower productivity of the median voter* e^m *- exerts a negative impact on the share of direct to indirect taxes (*$\frac{q_H}{q_C}$*).*

Agents have intermediate preferences and consequently a Condorcet winner always exists and is given by the bliss point of the median voter (i.e., the agent with the median productivity e^m) (see e.g., Grandmont, 1978 for more details on this). The indirect utility function of the median voter is as follows:

$$W^m(q_C, q_H) = \frac{A_M}{1+q_C}(e^m - \bar{e}) + A_M L(q_C, q_H) + V(X(q_C)) + A_H(H(q_C, q_H))^a$$

So, the political equilibrium is given by the following optimality conditions:

$$\frac{\partial W^m}{\partial q_C} = \frac{-A_M(e^m - \bar{e})}{(1+q_C)^2} + A_M \frac{\partial L(q_C, q_H)}{\partial q_C} + \frac{\partial V}{\partial X}\frac{\partial X(q_C)}{\partial q_C} + A_H a H(q_C, q_H)^{a-1}\frac{\partial H(q_C, q_H)}{\partial q_C} = 0 \quad \text{(A.6)}$$

$$\frac{\partial W^m}{\partial q_H} = A_M \frac{\partial L(q_C, q_H)}{\partial q_H} + A_H a H(q_C, q_H)^{a-1}\frac{\partial H(q_C, q_H)}{\partial q_H} = 0 \Leftrightarrow \frac{\partial L(q_C, q_H)}{\partial q_H}\left[A_M - A_H a H(q_C, q_H)^{a-1}\right] = 0 \quad \text{(A.7)}$$

Equation (A.7) implies that optimal q_C and q_H ensure $A_M = A_H a H(q_C, q_H)^{a-1}$. In order to employ the implicit function theorem we define $\frac{\partial W^m}{\partial q_C}$ as F_1 and $\frac{\partial W^m}{\partial q_H}$ as F_2 and we proceed along the following lines:

$$F_1 = 0 \Leftrightarrow dF_1 = 0 \Leftrightarrow \frac{\partial F_1}{\partial q_C}dq_C + \frac{\partial F_1}{\partial q_H}dq_H + \frac{\partial F_1}{\partial e^m}de^m = 0 \Leftrightarrow \frac{\partial F_1}{\partial q_C} + \frac{\partial F_1}{\partial q_H}\frac{dq_H}{dq_C} + \frac{\partial F_1}{\partial e^m}\frac{de^m}{dq_C} = 0 \quad \text{(A.8)}$$

$$F_2 = 0 \Leftrightarrow dF_2 = 0 \Leftrightarrow \frac{\partial F_2}{\partial q_C}dq_C + \frac{\partial F_2}{\partial q_H}dq_H = 0 \Leftrightarrow \frac{dq_H}{dq_C} = -\frac{\partial F_2/\partial q_C}{\partial F_2/\partial q_H} < 0 \quad \text{(A.9)}$$

Combining (A.8) and (A.9) we conclude that:

$$\frac{dq_C}{de^m} = \frac{\partial F_1/\partial e^m \cdot \partial F_2/\partial q_H}{\partial F_1/\partial q_H \cdot \partial F_2/\partial q_C - \partial F_1/\partial q_C \cdot \partial F_2/\partial q_H} < 0 \quad \text{(A.10)}$$

which is negative for any typical right skewed productivity distribution (i.e. for $e^m < \bar{e}$).[40]

[40] We note that $\partial F_1/\partial e^m < 0$, $\partial F_1/\partial q_C < 0$ for $e^m < e$, $\partial F_1/\partial q_H > 0$, $\partial F_2/\partial q_C > 0$, $\partial F_2/\partial q_H > 0$. More detailed results are available upon request.

$$\frac{dq_H}{de^m} = \frac{dq_H}{dq_C}\frac{dq_C}{de^m} = \left[-\frac{\partial F_2/\partial q_C}{\partial F_2/\partial q_H}\right]\left[\frac{\partial F_1/\partial e^m \cdot \partial F_2/\partial q_H}{\partial F_1/\partial q_H \cdot \partial F_2/\partial q_C - \partial F_1/\partial q_C \cdot \partial F_2/\partial q_H}\right] > 0 \quad \text{(A.11)}$$

which is positive for any typical right skewed productivity distribution (i.e. for $e^m < \bar{e}$).

Combining equations (A.10) and (A.11), we conclude that a decrease in the median productivity (e^m) increases the optimal consumption tax rate (q_C) and decreases the optimal home production tax rate (q_H).

B3. The effect of changing tax rates on the tax revenues

In order to investigate whether there is a positive relationship between the tax rates q_C and q_H and the tax revenues, we proceed along the following lines:

According to Equation (16) the budget constraint of the national government is as follows:

$$g = q_C C_M(q_C, q_H) + q_H A_H (H(q_C, q_H))^a$$

We take the total derivative of g and we have:

$$dg = \left[C_M(q_C, q_H) + q_C \frac{\partial C_M(q_C, q_H)}{\partial q_C} + q_H A_H a H(q_C, q_H)^{a-1} \frac{\partial H(q_C, q_H)}{\partial q_C}\right] dq_C + \\ + \left[q_C \frac{\partial C_M(q_C, q_H)}{\partial q_H} + A_H H(q_C, q_H)^a + q_H A_H a H(q_C, q_H)^{a-1} \frac{\partial H(q_C, q_H)}{\partial q_H}\right] dq_H \quad \text{(A.12)}$$

where the first term on the right hand side of (A.12) express the change in total tax revenues due to change in consumption tax rate (dq_C) and the second term express the change in total tax revenues due to change in home production tax rate (dq_H).

Since we solve the model for given level of g, $dg=0$ and therefore Equation (A.12) can be written as follows:

$$\frac{dq_C}{dq_H} = -\frac{C_M(q_C, q_H) + q_C \frac{\partial C_M(q_C, q_H)}{\partial q_C} + q_H A_H a H(q_C, q_H)^{a-1} \frac{\partial H(q_C, q_H)}{\partial q_C}}{q_C \frac{\partial C_M(q_C, q_H)}{\partial q_H} + A_H H(q_C, q_H)^a + q_H A_H a H(q_C, q_H)^{a-1} \frac{\partial H(q_C, q_H)}{\partial q_H}} \quad \text{(A.13)}$$

We know from Equation (A.9) that for optimal values of q_C and q_H, the ratio dq_C/dq_H is negative. Therefore, we must show that either the numerator or the denominator in (A.13) is positive in order to establish a positive relationship between tax rates and tax revenues for both q_C and q_H.

By taking into account that $\frac{\partial L(q_C, q_H)}{\partial q_C} = -\frac{\partial H(q_C, q_H)}{\partial q_C}$ and by employing the optimality condition $A_M = A_H a H(q_C, q_H)^{a-1}$ (see Equation (A.7) for more details on this) it can be verified that, for optimal q_C and q_H, the numerator in Equation (A.13) (which is the expression within the brackets in the first term of the right hand side of A.12) is positive and therefore tax revenues from consumption tax increase when consumption tax rate (q_C) increases (i.e. when $dq_C>0$). Consequently, the denominator in Equation (A.13) (which is the expression within the brackets in the second term of the right hand side of A.12) is also positive and therefore tax revenues from home production decrease when the tax rate on home production (q_H) decreases.

In other words, optimal tax rates q_C and q_H are located on a range which is characterized by a positive relationship between tax rates and the corresponding tax revenues (i.e. they lie on the upward slopping segment of the Laffer curve). It must be noted that since -at the same time- total tax revenues remain constant ($dg=0$) the above theoretical findings ensure that *tax revenues from consumption (as a share of total tax revenues)* increase when consumption tax rate (q_C) increases and *tax revenues from home production (as a share of total tax revenues)* when the tax rate on home production (q_H) decreases.

B4. Proof of Proposition 2

Proposition 2. *The positive effect of changing median productivity* e^m *on the share of direct to indirect taxes (*$\frac{q_H}{q_C}$*) is conditional on the level of economic development. In particular, for lower levels of economic development the positive effect of changing median productivity on the share of direct to indirect taxes is stronger.*

Equation (A.10) suggests that:

$$\frac{dq_C}{de^m} = \frac{\partial F_1/\partial e^m \cdot \partial F_2/\partial q_H}{\partial F_1/\partial q_H \cdot \partial F_2/\partial q_C - \partial F_1/\partial q_C \cdot \partial F_2/\partial q_H} < 0$$

and Equation (A.11) suggests that:

$$\frac{dq_H}{de^m} = \frac{dq_H}{dq_C}\frac{dq_C}{de^m} = \left[-\frac{\partial F_2/\partial q_C}{\partial F_2/\partial q_H} \right] \left[\frac{\partial F_1/\partial e^m \cdot \partial F_2/\partial q_H}{\partial F_1/\partial q_H \cdot \partial F_2/\partial q_C - \partial F_1/\partial q_C \cdot \partial F_2/\partial q_H} \right] > 0$$

In order to investigate the effect of economic development (i.e. of changes in parameter A_M) on the negative relationship between e^m and q_C and the positive relationship between e^m and q_H we proceed by calculating $\partial\left(\frac{dq_C}{de^m}\right)\Big/\partial A_M$ and $\partial\left(\frac{dq_H}{de^m}\right)\Big/\partial A_M$.

It can be shown that for any typical right skewed productivity distribution (i.e. for $e^m < \bar{e}$) $\partial\left(\frac{dq_C}{de^m}\right)\Big/\partial A_M > 0$ and so the negative relationship between e^m and q_C mitigates as A_M increases (or alternatively it gets stronger as A_M decreases). Similarly, $\partial\left(\frac{dq_H}{de^m}\right)\Big/\partial A_M < 0$ and so the positive relationship between e^m and q_H mitigates as A_M increases (or alternatively it gets stronger as A_M decreases).[41]

[41] More detailed results are available upon request.

Appendix C. Robustness checks

C1. Robustness checks of national analysis for Greece

In this section, we provide the robustness checks of the results obtained in Table 2. First, we check the sensitivity of our results to the set of covariates included in the analysis. Including a fairly large set of covariates, limits the degrees of freedom, in addition coefficients could be unstable in the presence of collinearity. For this reason, we choose to exclude from the analysis controls *debt crisis*, *currency crisis*, *internal instability* and *wars*, since some of these covariates are likely, at least in part, to be effects of the regime type - for instance the occurrence of debt and currency crises. Such crises are endogenous to political decisions that may, in turn, differ systematically between democratic and non-democratic periods. Hence, the estimated effect of *democracy* may suffer from post-treatment bias. However, the qualitative results presented in panel A of Table D4, remain essentially the same as those depicted in Table 2.

Next, we check whether our results remain qualitatively similar when the time period of our sample is restricted from 1845 to 1915. Our motivation to employ this restricted sample is twofold: First, as already mentioned, the initial significant political reform that increased the political power of the agricultural population took place in 1844. Therefore, if our results in the restricted sample continue to hold, we demonstrate that the second more radical constitution of 1864 is indeed a significant determinant of our results. Second, we choose to limit our sample prior to 1915 since after that year, and for a decade, the Kingdom of Greece faced a prolonged period of instability with internal and external conflicts - with important incidents such as the *Great Division* of Greece (the so-called *National Schism*) and the *Greco-Turkish war of 1919-1922*.[42] These events seem to have affected significantly the size and composition of taxation - see Table 1 and Figure 1- so we restrict our sample before their start. As can be seen in panel B, our results for the restricted sample continue to hold. A notable difference though is that the effect of the franchise reform on the share of *direct* to *indirect taxes* appears to be significantly higher.

[42] The *National Schism* that split Greece into two entities was the result of a series of disagreements between King Constantine I and Prime Minister Eleftherios Venizelos regarding the foreign policy of Greece.

In panel C of Table D4 we restrict the time period of our sample even further and in particular from 1853 to 1879. This time period is identical to the time period of our sample when we proceed to the regional analysis for the Kingdom of Greece in the next section. The starting time period of our sample in the regional analysis is dictated by data availability and is the first year for which tax data at the province level became available. The final time period of our sample in 1879 guarantees a consistent set of instruments through which tax revenues are collected, and at the same time territorial stability regarding the provinces in which these taxes are levied. Regarding tax instruments, during 1853-1879 the only tax innovation we observe is corporate tax, which was established in 1876 but contributed only up to 0.5 per cent of annual tax revenues until 1879. It was only in 1880 that the *excise tax* was introduced, the second most fruitful indirect tax of the Greek state after *custom duties on imported goods*. With respect to territorial stability, during 1853-1879 only the Ionian Islands are annexed in Greece in 1864, covering around 5 per cent of the total land area of the Kingdom of Greece.[43] Due to the limited size of our sample in this specification we employ the limited set of controls applied in panel A. As can be seen in panel C, the results once more indicate the replacement between *rural taxes* and *customs taxes* after the democratisation episode in 1864.

Moreover, in panels D-G of Table D4 we report some additional robustness checks. First, in panel D we report estimates of the long-run effect of democratisation using an Error Correction Model (ECM). Second, in Panel E we substitute Boix et al.'s (2013) measure of democracy, with the variable *polity2* from the Polity IV Project (Marshall and Jaggers, 2010). This index has been applied as a tool to classify political regimes (democracy versus autocracy) in a large number of studies (see e.g., Haber and Menaldo, 2011; Harrison and Wolf, 2012), though a closer look at it suggests that it mainly focuses on the institutional side of political competition (see, Vanhanen, 2000). However, it offers the advantage of

[43] In 1881, the Convention of Constantinople was signed between the Kingdom of Greece and the Ottoman Empire, resulting in the cession of the region of Thessaly and a part of southern Epirus (i.e., Arta) to Greece - of total area 13.395 square kilometres, or 21 per cent of the Greek territory at that time.

varying from -10 (extreme autocracy) to +10 (perfect democracy), thus allowing for larger variation in the sample. Third, in panel F we proceed by re-estimating the empirical model presented in Table 2 by omitting observations with a standardized residual above 1.96 or below -1.96. Finally, as it is possible that the errors in Table 2 are correlated between the estimated equations, in panel G we re-estimate our baseline specification by the Seemingly Unrelated Regression Equations (SURE) model. As can be seen, in all alternative cases, the empirical findings are qualitatively identical to those presented in Table 2.

C2. Robustness checks of European sample analysis

In Table D5 in Appendix D we report some additional robustness checks. First, panel A provides estimates of the long-run effect of democratisation using an ECM. Second, we rerun the estimates from Table 4 including additional control variables that have been proposed by the relevant literature (see, e.g., Aidt and Jensen, 2006; Aidt and Jensen, 2009b). Third, we re-estimate our baseline specification by the SURE model. Finally, we apply the Tobit estimator, since four of our dependent variables- *direct/indirect*, *urban taxes, rural taxes* and *market taxes* - are coded zero for some years of our sample. In all cases, our results are in line with those reported in Table 4. For instance, the turning point for a positive effect of *democracy* on *direct/indirect taxation* is an *agricultural rate* of 44 percent, whereas in Table D5 this value is very close ranging between 42.2 and 47 percent. Overall, these results are consistent with our hypothesis that the impact of franchise extension on the tax structure is conditional on the phase of economic development.

Appendix D. Additional Tables and Figures

Table D1: Summary statistics of Greek national data

Variable	Description	Obs.	Mean	SD	Min	Max	Source
democracy	Dummy variable that takes the value of one whenever the political regime in Greece is categorised as democratic, and 0 otherwise	101	0.574	0.497	0.000	1.000	1
polity2	Index variable that ranges -10 (extreme autocracy) to +10 (perfect democracy)	101	4.515	6.162	-6.000	10.000	2
total taxes	Total tax revenues as a share of GDP (%)	101	13.773	4.072	5.900	26.743	3
rural taxes	Sum of land and assessed taxes as a share of total tax revenues (%)	101	32.485	21.501	3.035	75.518	4
urban taxes	Sum of income, trade, corporation, property, inheritance, extraordinary and other direct taxes as a share of total tax revenues (%)	101	7.151	6.631	0.000	31.769	4
customs taxes	Customs duties on imported goods as a share of total tax revenues (%)	101	34.078	7.766	17.618	55.150	4
market taxes	Sum of excise, turnover, and other indirect taxes as a share of total tax revenues (%)	101	26.286	13.895	2.495	47.000	4
direct/indirect	Ratio of direct taxes -rural and urban taxes- to indirect taxes -customs and market taxes.	101	0.846	0.680	0.204	3.085	4
GDP per capita	Log of GDP per capita	101	5.435	0.164	5.040	5.847	5
agricultural rate	Population within Greece living in cities of less than two thousand people (%)	101	70.440	6.301	56.500	80.000	6
old	Population over the age of 65 as a share of total population (%).	101	3.919	0.918	3.058	5.905	7
population spikes	Dummy variable that takes the value of 1 in the years 1864, 1881, 1913, 1920 and 1922, and 0 otherwise.	101	0.050	0.218	0.000	1.000	Own calculations
debt crisis	Dummy variable that takes the value of 1 the years 1833-1878, 1894-1897 and 1932-1933, and 0 otherwise.	101	0.515	0.502	0.000	1.000	8
currency crisis	Dummy variable that takes the value of 1 the years 1919-1921, 1924 and 1931, and 0 otherwise.	101	0.050	0.218	0.000	1.000	8
internal instability	Dummy variable that takes the value of 1 the years 1843, 1862, 1909 and 1916-1917, and 0 otherwise.	101	0.050	0.218	0.000	1.000	Own calculations
wars	Dummy variable that takes the value of 1 during the years 1866-1869, 1878, 1897, 1912-1913 and 1917-1922, and 0 otherwise.	101	0.139	0.347	0.000	1.000	Own calculations

Source:
1. Boix et al. (2013)
2. Marshall and Jaggers (2010)
3. Own calculations based on fiscal data retrieved from Dertilis (1993), Prontzas et al. (2011) and Historical Archives of the National Bank of Greece (DPH). GDP data are taken from and Kostelenos et al. (2007)
4. Own calculations based on fiscal data retrieved from DPH
5. Kostelenos et al. (2007)
6. Dertilis (1993)
7. Siampos (1973)
8. Reinhart and Rogoff (2010)

Table D2: Summary statistics of Greek regional data

Variable	Description	Obs.	Mean	SD	Min	Max	Source
democracy	Dummy variable that takes the value of one after 1865, and 0 otherwise	1075	0.600	0.490	0.000	1.000	1
rural taxes	Sum of land and assessed taxes, expressed in real per capital terms	1075	6.134	4.627	0.000	29.681	2
rural taxes delays	Rural taxes delays as a percentage of rural taxes receivables	1075	13.109	11.893	0.000	74.592	3
farmers and peasants 1861	Farmers and peasants as a percentage of the total province population in 1861	1075	17.078	6.879	2.837	28.426	4
voter turnout	Voters as a percentage of the enfranchised in 1879	1075	65.724	13.288	31.000	88.000	4
population (in thousands)	Total province population for the years 1853, 1861, 1870 and 1879. We obtain the remaining years by linear interpolation	1075	27716.9	15220.3	8377.0	1.23e+05	4
population density	Total province population per unit of province area.	1075	30.769	21.985	8.669	149.777	4

Source:

1. Boix et al. (2013)
2. Own calculations based on fiscal data retrieved from the Historical Archives of the National Bank of Greece (HANBG), and census data from the Hellenic Statistical Association (HSA). To express the variable real terms we use data for changes in the price level from Lazaretou (2014).
3. Own calculations based on fiscal data retrieved from the Historical Archives of the National Bank of Greece (HANBG)
4. Own calculations based on census data obtained from Hellenic Statistical Authority (HSA)

Table D3: Summary statistics of European sample

Variable	Description	Obs.	Mean	SD	Min	Max	Source
democracy	Dummy variable that equals to one whenever a political regime is characterized as democratic and 0 otherwise	670	0.485	0.500	0.000	1.000	1
total taxes	Total tax revenues as a percentage of GDP	425	7.284	3.713	1.300	20.500	2
rural taxes	Sum of land and assessed taxes as a percentage of total tax revenues	668	9.032	9.605	0.000	33.800	2
urban taxes	Sum of income, trade, corporation, property, inheritance, extraordinary and other direct taxes as a percentage of total tax revenues	670	18.641	14.803	0.000	73.500	2
customs taxes	Customs taxes as a percentage of total tax revenues	670	30.859	23.915	4.200	96.400	2
market taxes	Sum of excise, turnover, and other indirect taxes as a percentage of total tax revenues	670	41.479	16.060	0.000	73.900	2
direct/indirect	Ratio of direct taxes -rural and urban taxes- to indirect taxes -customs and market taxes.	670	0.452	0.362	0.000	2.774	2
GDP per capita	Log of GDP per capita	670	7.935	0.363	6.997	8.753	3
agricultural rate	Percentage of workforce occupied in agriculture	670	38.318	15.101	5.700	69.300	4
old	Population over the age of 65 as a percentage of total population	670	6.392	1.255	3.465	9.745	5
population	Log of population	670	9.247	1.161	7.512	11.098	3
debt crisis	Dummy variable that takes the value of 1 if a debt (domestic or external) crisis occurred during the year, and 0 otherwise	670	0.009	0.094	0.000	1.000	6
currency crisis	Dummy variable that takes the value of 1 if a currency crisis occurred during the year, and 0 otherwise	670	0.033	0.178	0.000	1.000	6
internal instability	Dummy variable that takes the value of 1 if a revolutionary event took place in a given year, and 0 otherwise	670	0.052	0.223	0.000	1.000	7
wars	Dummy variable that takes the value of 1 if a country participated in an armed conflict with another country in a given year, and 0 otherwise	670	0.373	0.484	0.000	1.000	8
voting system	A dummy variable equal to 0 if majority representation is used and equal to 1 if proportional representation is used	660	0.209	0.407	0.000	1.000	9
left	Share of seats won by left-wing parties in elections to the lower chamber of parliament in percentage of all seats	637	10.262	14.666	0.000	55.400	9
x-polity	Polity index without competitiveness of political participation (PARCOMP), and regulation of political participation (PARREG)	670	5.590	1.771	0.000	7.000	10

Source:

1. Boix et al. (2013)
2. Flora et al. (1983)
3. Bolt and van Zanden (2014)
4. Banks and Wilson (2015)
5. Mitcell (2003)
6. Reinhart and Rogoff (2010)
7. Aidt and Jensen (2014)
8. Brecke (1999)
9. Aidt et al. (2008)
10. Marshall and Jaggers (2010)

Table D4. Fiscal effects of democratisation in Greece: Robustness checks

	total taxes (1)	*direct/indirect* (2)	*rural taxes* (3)	*urban taxes* (4)	*customs taxes* (5)	*market taxes* (6)
Panel A: Restricting the set of covariates						
democracy	0.725	-0.093*	-3.748**	1.046	4.866**	-0.060
	(0.756)	(0.053)	(1.559)	(0.842)	(1.870)	(1.121)
Observations	100	100	100	100	100	100
R2	0.870	0.918	0.974	0.886	0.763	0.971
Panel B: Sample 1845-1915						
democracy	-1.363	-0.295***	-10.603***	0.133	9.421**	3.472
	(1.090)	(0.105)	(2.795)	(0.325)	(4.204)	(2.780)
Observations	71	71	71	71	71	71
R2	0.755	0.899	0.964	0.947	0.780	0.973
Panel C: Sample 1853-1879						
democracy	2.083	-0.368	-12.227*	0.111	13.838***	-0.059
	(1.665)	(0.255)	(7.265)	(0.402)	(4.391)	(1.369)
Observations	27	27	27	27	27	27
R2	0.445	0.876	0.918	0.948	0.935	0.710
Panel D: ECM – Long-run effect						
democracy	-2.503	-0.242**	-8.391***	-14.043	13.320***	-2.503
	(6.551)	(0.110)	(2.215)	(17.910)	(3.693)	(6.551)
Observations	100	100	100	100	100	100
R2	0.346	0.327	0.388	0.543	0.673	0.645
Panel E: Using alternative measure of democracy						
polity2	-0.002	-0.011**	-0.425***	-0.160	0.410***	0.161*
	(0.057)	(0.005)	(0.160)	(0.118)	(0.136)	(0.086)
Observations	100	100	100	100	100	100
R2	0.897	0.920	0.975	0.926	0.777	0.975
Panel F: Testing for outliers						
democracy	0.430	-0.115***	-4.227***	-1.529**	4.745***	1.121
	(0.499)	(0.037)	(1.514)	(0.611)	(1.384)	(0.871)
Observations	93	95	96	95	94	94
R2	0.930	0.970	0.985	0.983	0.854	0.983
Panel G: SURE						
democracy	-0.122	-0.121*	-3.534***	-1.497*	4.525***	0.595
	(0.618)	(0.072)	(1.285)	(0.814)	(1.413)	(0.891)
Observations	100	100	100	100	100	100
R2	0.896	0.917	0.974	0.925	0.782	0.974

Notes: Column titles refer to the dependent variable. Panel A reports OLS estimates of equation (19) after restricting the set of controls. Panels B and C report OLS estimates of equation (19) for the subsamples 1844-1915 and 1853-1879, respectively. Panel D reports OLS estimates after transforming equation (19) to an ECM. Panel E reports OLS estimates of equation (19) after replacing the variable democracy with the variable polity2. Panel F list coefficient estimates of equation (19) after removing observations with standardized residuals above 1.96 or below -1.96. Panel G lists a complete system of SURE estimates. In all Panels (except A and C) we control for the lagged dependent variable, GDP per capita, agricultural rate, old, population spikes, debt crisis, currency crisis, internal instability, wars, an intercept and a time trend. Panels A and C exclude from this set the variables debt crisis, currency crisis, internal instability, wars. Additional covariates are not reported for brevity. Panels A-F report robust standard errors in parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Table D5. Fiscal effects of democratisation in Europe: robustness checks

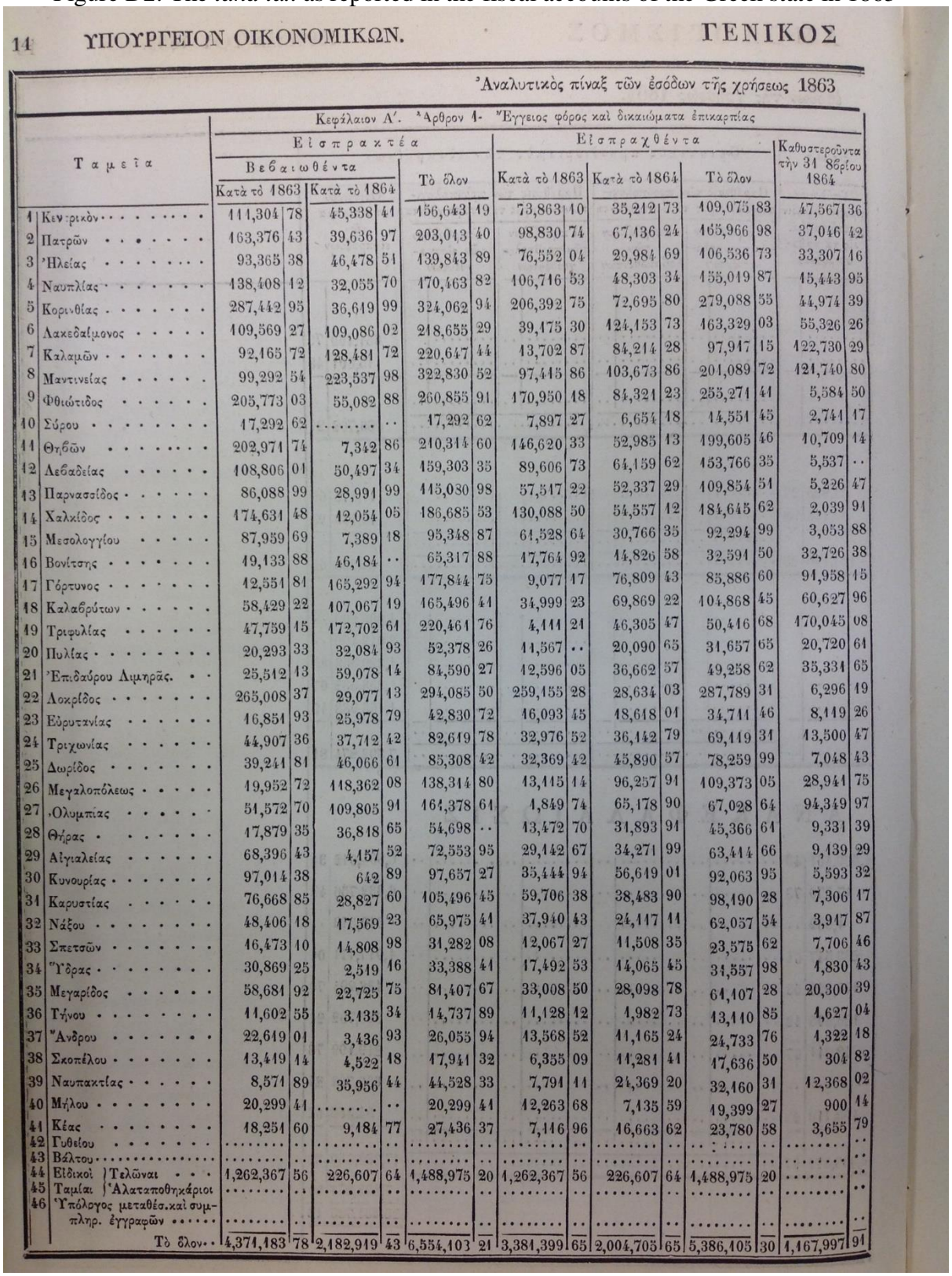
	total taxes	*direct/indirect*	*rural taxes*	*urban taxes*	*customs taxes*	*market taxes*
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: ECM – Long-run effect						
democracy	1.701**	0.764***	4.209	26.049***	-20.495***	-11.151***
	(0.704)	(0.120)	(3.146)	(3.963)	(3.582)	(4.046)
democracy agricultural rate*	-0.043**	-0.016***	-0.167*	-0.435***	0.415***	0.189*
	(0.018)	(0.002)	(0.087)	(0.082)	(0.109)	(0.104)
agricultural rate	0.157***	0.024***	0.123	0.900***	-0.791***	-0.256
	(0.051)	(0.006)	(0.119)	(0.251)	(0.207)	(0.204)
Observations	393	639	639	639	639	639
R2	0.509	0.489	0.250	0.372	0.254	0.287
Panel B: Additional controls						
democracy	0.587*	0.252***	0.074	5.060***	-1.859**	-2.408
	(0.269)	(0.062)	(0.345)	(1.097)	(0.682)	(1.441)
democracy agricultural rate*	-0.018**	-0.006***	-0.006	-0.086***	0.040*	0.038
	(0.006)	(0.001)	(0.011)	(0.022)	(0.019)	(0.030)
agricultural rate	0.015	0.008***	0.048	0.165**	-0.132**	-0.040
	(0.012)	(0.002)	(0.035)	(0.064)	(0.054)	(0.045)
Observations	386	620	623	626	620	620
R2	0.943	0.895	0.959	0.944	0.947	0.844
Panel C: SURE						
democracy	0.755**	0.263***	0.157	4.041***	-1.073	-3.130***
	(0.300)	(0.049)	(0.333)	(1.292)	(1.123)	(1.183)
democracy agricultural rate*	-0.018**	-0.006***	-0.004	-0.082**	0.018	0.072**
	(0.008)	(0.001)	(0.009)	(0.034)	(0.029)	(0.031)
agricultural rate	0.021	0.005**	0.007	0.115*	-0.086	-0.047
	(0.014)	(0.002)	(0.016)	(0.059)	(0.053)	(0.055)
Observations	466	466	466	466	466	466
R2	0.982	0.939	0.988	0.972	0.985	0.957
Panel D: Tobit estimates						
democracy	0.789***	0.526***	0.467	5.863***	-2.554***	-1.971*
	(0.166)	(0.140)	(0.335)	(1.320)	(0.534)	(1.008)
democracy agricultural rate*	-0.018***	-0.011***	-0.016	-0.093***	0.053***	0.024
	(0.005)	(0.003)	(0.013)	(0.029)	(0.014)	(0.028)
agricultural rate	0.018	0.019***	0.063	0.195***	-0.142***	-0.065
	(0.013)	(0.006)	(0.058)	(0.059)	(0.042)	(0.042)
Observations	413	654	657	660	654	654

Notes: Column titles refer to the dependent variable. Panel A reports OLS estimates after transforming equation (24) to an ECM. In Panel B equation (24) is augmented with additional controls: *voting system*, *left* and *x-polity*, but these coefficients are not reported to save space. Panel C lists a complete system of SURE estimates. Panel D reports Tobit model regressions of equation (24). All models control for the *lagged dependent variable, GDP per capita, agricultural rate, old, population, debt crisis, currency crisis, internal instability, wars*, but these coefficients are not reported for brevity. Panels A, B and D report robust standard errors, clustered by country, in parentheses. *** denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10% level.

Figure D1: Ballot box after the reform of 1864

Notes: Images for the ballot box used after the reform of 1864. The ballot box was divided internally into two parts in which there were two sacks. As can be seen, the outside of each box was painted half white and half black, corresponding to a positive vote (i.e., NAI) or no vote (i.e., OCHI) for the candidate. At the top of the ballot box it was stuck a tube angle from top to bottom inside the ballot box, resulting in a round hole. The elector was given a lead ball by the attendant (a member of the Election Committee), and approaching the ballot box he had to put his hand into the tube dropping the pellet into the desired compartment - i.e., black or white. In each polling station there was a number of ballot boxes equal to that of candidates standing for elections in the province.

Figure D2: The *land tax* as reported in the fiscal accounts of the Greek state in 1863



14 ΥΠΟΥΡΓΕΙΟΝ ΟΙΚΟΝΟΜΙΚΩΝ. ΓΕΝΙΚΟΣ

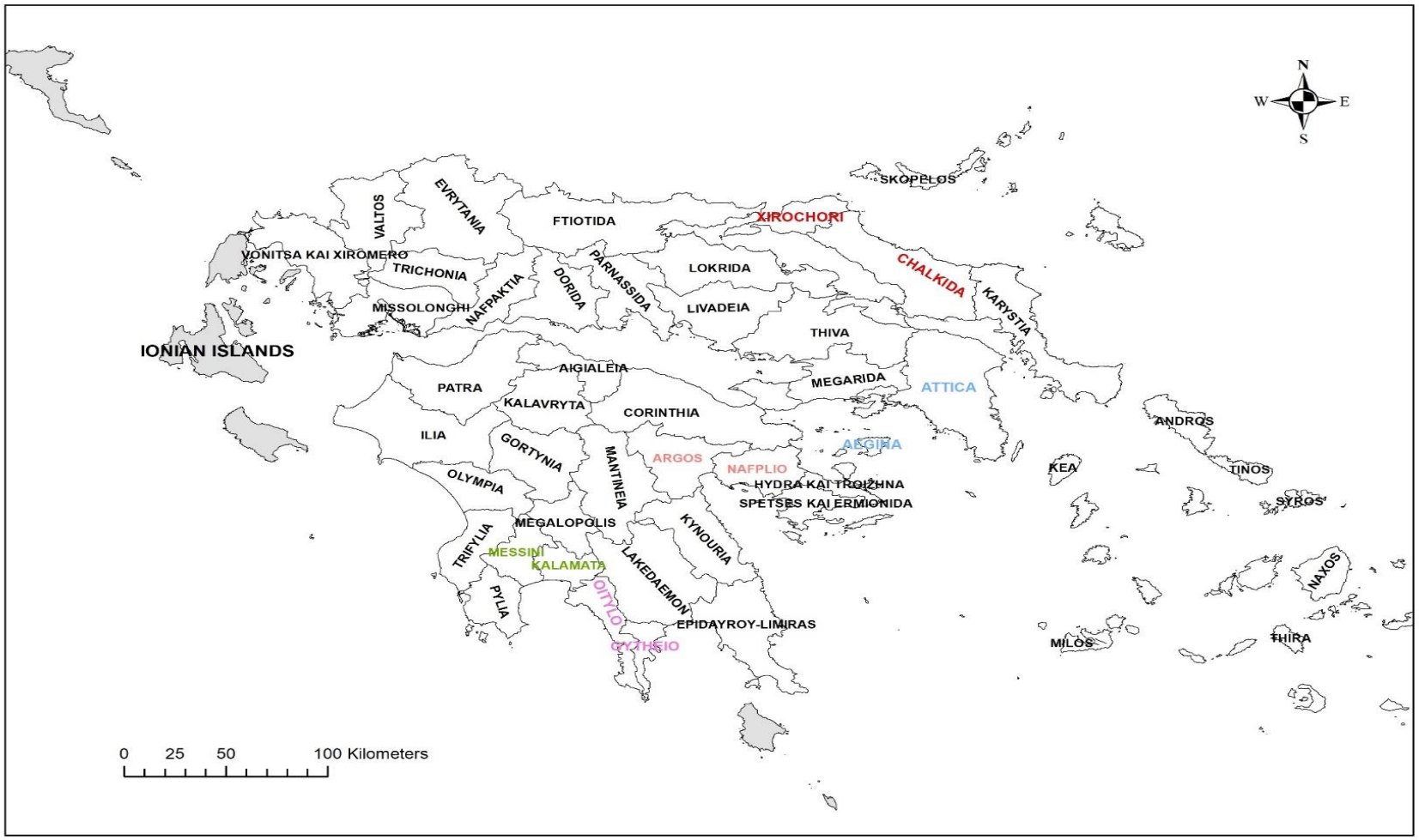
Ἀναλυτικὸς πίναξ τῶν ἐσόδων τῆς χρήσεως 1863

Κεφάλαιον Α'. Ἄρθρον 1. Ἔγγειος φόρος καὶ δικαιώματα ἐπικαρπίας

	Ταμεῖα	Εἰσπρακτέα: Βεβαιωθέντα Κατὰ τὸ 1863	Εἰσπρακτέα: Βεβαιωθέντα Κατὰ τὸ 1864	Εἰσπρακτέα: Τὸ ὅλον	Εἰσπραχθέντα: Κατὰ τὸ 1863	Εἰσπραχθέντα: Κατὰ τὸ 1864	Εἰσπραχθέντα: Τὸ ὅλον	Καθυστεροῦντα τὴν 31 Δεκεμβρίου 1864
1	Κεντρικὸν	111,304 78	45,338 41	156,643 19	73,863 10	35,212 73	109,075 83	47,567 36
2	Πατρῶν	163,376 43	39,636 97	203,013 40	98,830 74	67,136 24	165,966 98	37,046 42
3	Ἠλείας	93,365 38	46,478 51	139,843 89	76,552 04	29,984 69	106,536 73	33,307 16
4	Ναυπλίας	138,408 12	32,055 70	170,463 82	106,716 53	48,303 34	155,019 87	15,443 95
5	Κορινθίας	287,442 95	36,619 99	324,062 94	206,392 75	72,695 80	279,088 55	44,974 39
6	Λακεδαίμονος	109,569 27	109,086 02	218,655 29	39,175 30	124,153 73	163,329 03	55,326 26
7	Καλαμῶν	92,165 72	128,481 72	220,647 44	13,702 87	84,214 28	97,917 15	122,730 29
8	Μαντινείας	99,292 54	223,537 98	322,830 52	97,445 86	103,673 86	201,089 72	121,740 80
9	Φθιώτιδος	205,773 03	55,082 88	260,855 91	170,950 18	84,321 23	255,271 41	5,584 50
10	Σύρου	17,292 62	....	17,292 62	7,897 27	6,654 18	14,551 45	2,741 17
11	Θηβῶν	202,971 74	7,342 86	210,314 60	146,620 33	52,985 13	199,605 46	10,709 14
12	Λεβαδείας	108,806 01	50,497 34	159,303 35	89,606 73	64,159 62	153,766 35	5,537 ..
13	Παρνασσίδος	86,088 99	28,991 99	115,080 98	57,517 22	52,337 29	109,854 51	5,226 47
14	Χαλκίδος	174,631 48	12,054 05	186,685 53	130,088 50	54,557 12	184,645 62	2,039 91
15	Μεσολογγίου	87,959 69	7,389 18	95,348 87	61,528 64	30,766 35	92,294 99	3,053 88
16	Βονίτσης	19,133 88	46,184 ..	65,317 88	17,764 92	14,826 58	32,591 50	32,726 38
17	Γόρτυνος	12,551 81	165,292 94	177,844 75	9,077 17	76,809 43	85,886 60	91,958 15
18	Καλαβρύτων	58,429 22	107,067 19	165,496 41	34,999 23	69,869 22	104,868 45	60,627 96
19	Τριφυλίας	47,759 15	172,702 61	220,461 76	4,111 21	46,305 47	50,416 68	170,045 08
20	Πυλίας	20,293 33	32,084 93	52,378 26	11,567 ..	20,090 65	31,657 65	20,720 61
21	Ἐπιδαύρου Λιμηρᾶς.	25,512 13	59,078 14	84,590 27	12,596 05	36,662 57	49,258 62	35,331 65
22	Λοκρίδος	265,008 37	29,077 13	294,085 50	259,155 28	28,634 03	287,789 31	6,296 19
23	Εὐρυτανίας	16,851 93	25,978 79	42,830 72	16,093 45	18,618 01	34,711 46	8,119 26
24	Τριχωνίας	44,907 36	37,712 42	82,619 78	32,976 52	36,142 79	69,119 31	13,500 47
25	Δωρίδος	39,241 81	46,066 61	85,308 42	32,369 42	45,890 57	78,259 99	7,048 43
26	Μεγαλοπόλεως	19,952 72	118,362 08	138,314 80	13,115 14	96,257 91	109,373 05	28,941 75
27	Ὀλυμπίας	51,572 70	109,805 91	161,378 61	1,849 74	65,178 90	67,028 64	94,349 97
28	Θήρας	17,879 35	36,818 65	54,698 ..	13,472 70	31,893 91	45,366 61	9,331 39
29	Αἰγιαλείας	68,396 43	4,157 52	72,553 95	29,142 67	34,271 99	63,414 66	9,139 29
30	Κυνουρίας	97,014 38	642 89	97,657 27	35,444 94	56,619 01	92,063 95	5,593 32
31	Καρυστίας	76,668 85	28,827 60	105,496 45	59,706 38	38,483 90	98,190 28	7,306 17
32	Νάξου	48,406 18	17,569 23	65,975 41	37,940 43	24,117 11	62,057 54	3,917 87
33	Σπετσῶν	16,473 10	14,808 98	31,282 08	12,067 27	11,508 35	23,575 62	7,706 46
34	Ὕδρας	30,869 25	2,519 16	33,388 41	17,492 53	14,065 45	31,557 98	1,830 43
35	Μεγαρίδος	58,681 92	22,725 75	81,407 67	33,008 50	28,098 78	61,107 28	20,300 39
36	Τήνου	11,602 55	3.135 34	14,737 89	11,128 12	1,982 73	13,110 85	1,627 04
37	Ἄνδρου	22,619 01	3,436 93	26,055 94	13,568 52	11,165 24	24,733 76	1,322 18
38	Σκοπέλου	13,419 14	4,522 18	17,941 32	6,355 09	11,281 41	17,636 50	304 82
39	Ναυπακτίας	8,571 89	35,956 44	44,528 33	7,791 11	24,369 20	32,160 31	12,368 02
40	Μήλου	20,299 41	....	20,299 41	12,263 68	7,135 59	19,399 27	900 14
41	Κέας	18,251 60	9,184 77	27,436 37	7,116 96	16,663 62	23,780 58	3,655 79
42	Γυθείου	....	....	....	....	....	....	....
43	Βάλτου	....	....	....	....	....	....	....
44	Εἰδικοὶ Τελῶναι	1,262,367 56	226,607 64	1,488,975 20	1,262,367 56	226,607 64	1,488,975 20	....
45	Ταμεῖα Ἀλαταποθηκάριοι	....	....	....	....	....	....	....
46	Ὑπόλογος μεταθέσ. καὶ συμπλήρ. ἐγγραφῶν	....	....	....	....	....	....	....
	Τὸ ὅλον	4,371,183 78	2,182,919 43	6,554,103 21	3,381,399 65	2,004,705 65	5,386,105 30	1,167,997 91

Notes: From the left to the right the table reports the name of the public cashier (i.e., Ταμεία), tax receivables (i.e., Εισπρακτέα), tax receipts (i.e., Εισπραχθέντα), and the percentage of delayed payments (i.e., Καθυστερούντα) for the land tax of 1863. Source: HANBG

Figure D3: Final tax administrative units of the Kingdom of Greece



Notes: The map shows the final tax administrative units we have in our sample between 1853-1879. Before the union of Ionian Islands in Greece in 1864 (grey colour), Greece was divided in 48 provinces. However, for two of those (i.e., Aegina, Oitulo) no cashier was established between 1853-1879, whereas in three cases (i.e., Argos, Xirochori, Messini) a cashier was established after 1874. In the former case, we assume that taxes are collected in the nearest available cashier that in both cases coincides with the cashier of the capital city of the region. We apply the same logic in the latter case, since we merge the new cashiers with those at the shortest distance. Again, for two out of the three new cashiers (i.e., Xirochori, Messini) the merging choice coincides with the cashier of the capital city. The Ionian Islands are not part of the sample.