# Democracy, redistribution, and economic growth: Some evidence from post-1974 Greece

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## Abstract

In the post-war period, Greece experienced two distinct phases of economic growth. From 1954 to 1974, the average annual growth rate was close to 7%. However, from 1975 to 2023, this rate plummeted to less than 1%. This paper aims to explore the reasons behind this stark asymmetry. By utilizing annual data from reputable international databases that span from 1995 to 2023, the estimated dynamic ARDL model reveals that the decline in economic growth after 1974 can largely be attributed to a range of redistribution policies implemented under the guise of promoting "social rights". These policies were expected to discourage saving, diminish investment, suppress risk-taking and entrepreneurship, and incentivize businesses and professionals to relocate abroad. Unfortunately, this is precisely what transpired. While the rationale of fostering "social rights" was used to garner public support and maintain political stability, the primary objective of the political order established under the 1975 Constitution was the expansion of the state. This expansion is reflected in the rise of general government expenditure from 24.1% of GDP in 1974 to 52.3% in 2023.To achieve large-scale redistribution, governments consistently hindered economic growth by increasing taxes on income and wealth, imposing heavy value-added taxes, and expanding employment in the public sector, ostensibly to prevent a dramatic rise in unemployment. To restore economic growth while also strengthening democracy, I recommend reverting to the provisions and institutional arrangements of the 1952 Constitution. Alternatively, the adoption of the new constitution recently proposed by six eminent Greek citizens may prove even more beneficial.

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## 1. Introduction

This study develops, estimates, and tests an economic growth model aimed at tracing the effects of the redistribution policies implemented in Greece since its transition from military dictatorship to democracy in the summer of 1974. The model is constructed in the context of the following schematic framework:

Institutions → Policies → | Instruments of:
- Redistribution
  - → Income & wealth (Taxes)
  - → Human freedom (Democracy)
  - → Econmic Freedom (Economy)
  - → Inequality (Democracy)
  - → Patronage (Public employment)
  - → Etc.
- Production
  - → Physical capital
  - → Labor
  - → Human Capital
  - → Technological change
  - → Etc.

| → Economic growth

Referring to the above, two valid questions come to mind. They have to do with: (a) the choice of Greece as a standalone case rather than being included in a cross-sectional analysis of multiple countries, which is common in this research field; and (b) the direction of the arrows, which appears to imply that economic growth does not influence economic policies and institutions. Setting them aside for now, this study is expected to help achieve several objectives. One is to determine whether the decline in human and economic freedom affected Greece's economic growth slowdown post-1974. Another objective is to analyze the data and, if feasible, explore the relationship between inequality and economic growth. This task is important for at least two reasons: first, because as a serious asymmetry excessive inequality weakens the financial strength and political stability of a democratic society; and second, because despite extensive research, the relationship between these two factors remains uncertain. Lastly, the above graph indicates that, in addition to the aforementioned concerns, there are redistributive policies that influence economic growth through various channels, such as patronage, which is evident in excessive or misallocated public employment. Consequently, examining these policies may yield valuable insights.

Now, let us consider the question at hand. Figures 1.1-1.2 depict Greece's real growth rates on two different bases from 1954 to 2023. The top figure displays the growth rates of the Gross Domestic Product (GDP), while the bottom figure illustrates the growth rates of GDP per employed worker,[2] but from 1960. Both graphs indicate that in the period before 1974, the real average annual

[2] The GDP per employed worker is in fact a good productivity of labor index. Therefore, the coincidence that this index declined pari passu with GDP aligns very well with the presumption that redistribution policies may be the culprit for the sharp decline of economic growth in the post 1974 period.

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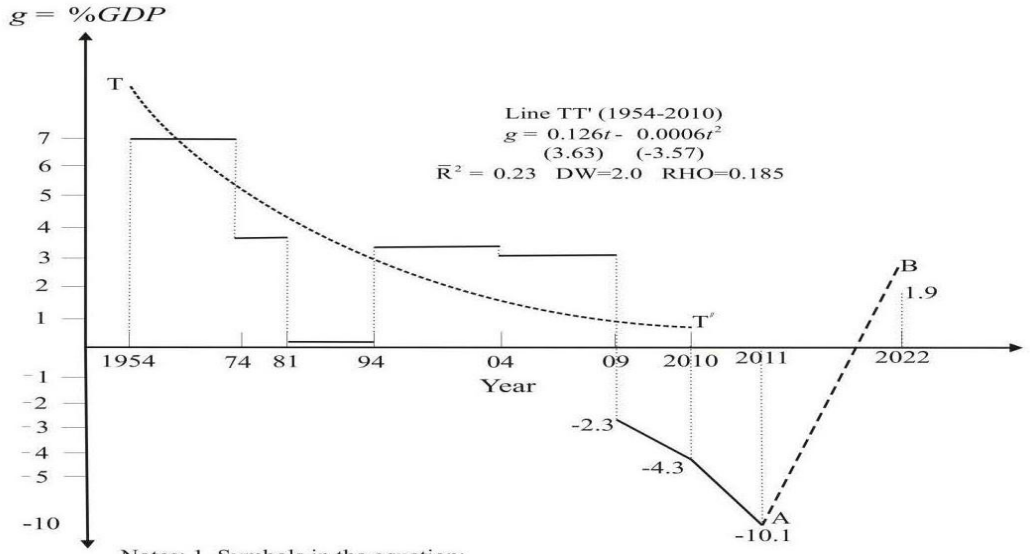
growth rate was close to 7%. In contrast, the data for the period after 1975 reveal a mere growth rate of less than 1%. This stark asymmetry highlights a dramatic slowdown in economic growth in Greece after 1974.[3] Observers from a distance might assume that a natural disaster had struck Greece, disrupting its economic momentum. This was not the case. Instead, it appears that the un-




Notes: 1. Symbols in the equation:
$\bar{R}^2$ = Adjusted coefficient of determination, DW = Dubin-Watson,
RHO = autocorrelation coefficient, Figures in parentheses = t-ratios
2. Line AB shows the hypothetical trend of GDP growth rates during the period 2011-2022

**Figure 1.1**: Structure of real GDP growth rates in postwar Greece

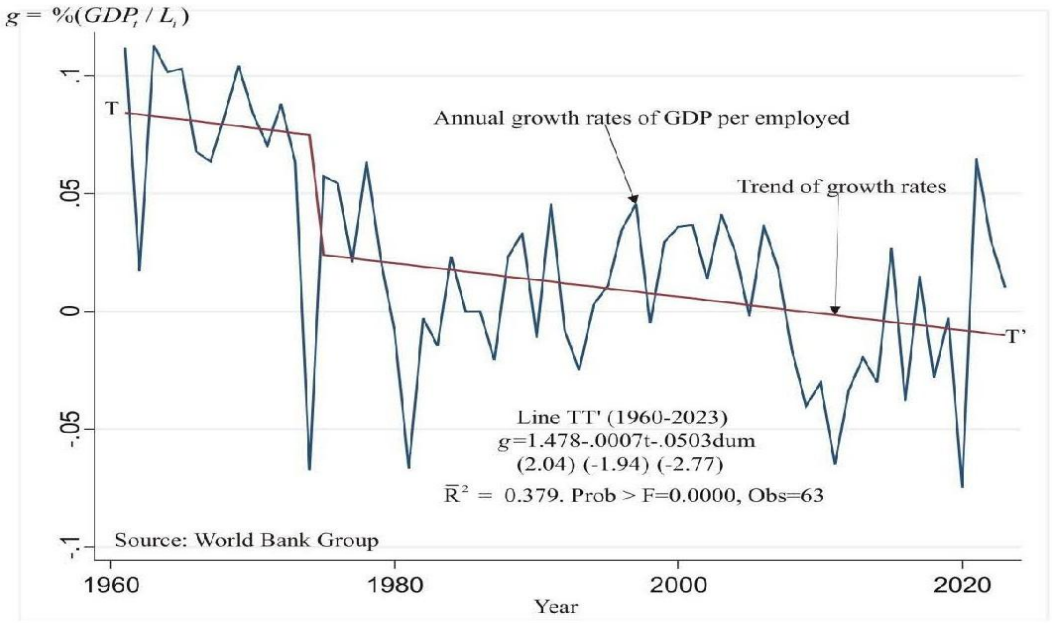



**Figure 1.2:** Structure of real growth rates of GDP per employed worker, 1960-2023

[3] Some readers of earlier versions of this paper have pointed out that by choosing 1975 as the dividing date between the two periods, the difference in growth rates appears artificially emphasized. A clarification is necessary. The return to democracy occurred in the summer of 1974, and as a result, 1975 has become the standard reference year in the relevant literature. However, if we were to shift the dividing date to pre-military rule in 1966, the difference in growth rates between the two periods would decrease from 7:1 to approximately 6:1. This adjustment would unnecessarily highlight the fact that the economic policies implemented during the seven-year military regime were quite successful, as they led to higher rates of economic growth.

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derlying causes of this prolonged period of stagnation are rooted in the institutional and structural policies that were implemented after the country returned to democracy.[4]

In juxtaposition, one might consider three alternative hypotheses, none of which appears credible upon closer examination. The first hypothesis pertains to the adverse effects suffered by European and other non-energy-producing countries during the 1970s, particularly due to the two oil shocks. With a few exceptions, most of these countries experienced a prolonged decline in economic growth. However, it is challenging, if not impossible, to identify any of these nations where growth rates fell as drastically as they did in Greece following the oil shocks. The second hypothesis involves Greece's entry into the European Union (EU) in 1981 and its subsequent membership in the European Monetary Union (EMU) in 2001. By comparison, smaller EU countries like Portugal, Ireland, and Estonia, which faced similar or even worse initial conditions when they joined the EU, and later joined the EMU on comparable paths, have recorded positive trend growth rates. Finally, the third hypothesis is based on the widely accepted finding in development studies that political instability adversely affects economic growth. Nevertheless, it is generally acknowledged that Greece has maintained a socially stable political environment since 1974.[5] These considerations lead me to question the validity of these hypotheses. In Greece's case, other factors may explain the difference in economic performance. They include, for example, excessive restrictions on property rights, substantial market interventions, and numerous “social rights” that distort incentives, all newly authorized by the 1975 Constitution. Can this hypothesis be substantiated using available data? If so, to what extent might the unprecedented decline in Greece's economic growth be attributed to these constitutional arrangements? The following discussion will focus on the conceptual and econometric challenges associated with these questions.

To avert the bankruptcy of Greece that they saw forthcoming early on, several economists and political scientists raised major concerns about the 1975 Constitution and the economic policies it

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[4] Similar to the period before 1975, the structure of the Greek economy continues to be heavily influenced by significant state interventions. These interventions have led to extensive controls over market mechanisms in key areas such as international trade, banking, industry, and agriculture. If the indices for human and economic freedom, like those presented in Table 1, were available for 1960, they would look significantly better, because the 1952 Constitution was much more favorable to freedom and business compared to the one enacted in 1975. The nationalizations that occurred in the 1970s under Article 106 of the 1975 Constitution, particularly involving the Commercial Bank group of companies, marked a significant ideological and policy shift. To maintain power over the years, the right-of-center New Democracy (ND) party gradually shifted toward the left. Conversely, the moderate left-of-center Panhellenic Socialist Movement (PASOK) began to lose support rapidly after the financial crisis of 2009, paving the way for the Coalition of the Radical Left (SYRIZA) to gain traction. By 2015, a substantial number of citizens, disillusioned with the austerity measures and the unfulfilled promises of the 2012 ND-PASOK coalition government, decided to change their support. They cast their votes for SYRIZA, whose four-year government ultimately failed to meet expectations. As it stands, Greece currently has a parliament dominated by a single party capable of forming a government, alongside nine relatively small parties that range from the extreme left to the extreme right.

[5] The relationship between political stability and economic growth has been analyzed by numerous authors. For example, see Kuznets (1965, 451-453), Alesina, Perotti (1996), and more recently Aisen, Veiga (2011). Bitros (2025) examines the precariousness of political stability in Greece, emphasizing that the absence of fundamental structural reforms may hinder a return to a path of robust economic growth.

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inspired. However, their warnings went unheeded and when the crisis erupted in 2009, Greek citizens were compelled by foreign creditors to endure three consecutive memoranda of austerity. Having experienced this situation firsthand, I know how harsh it can be, and I would like to share my insights with everyone, especially in poor and developing nations, on how Greece transitioned from relative prosperity to bankruptcy. Thus, responding to the first question raised earlier, to thoroughly investigate the fundamentals of this case, it is essential to examine Greece as a distinct case study. For, if the data from Greece were included in a broader sample of cross-sectional countries, the analysis would likely overlook significant institutional differences, resulting in the critical lessons being lost.

Section 2 outlines the nature of the redistribution mechanism that was introduced in Greece upon its return to democracy in 1974. The documentation begins by examining the fundamentals of the constitutional theory that justified the changes in 'social' and 'property' rights, first inserted in the Constitution of 1975. In the years that followed, these changes led to significant government interventions in the private sector, including nationalizations; The state expanded its employment across all levels of government, resulting in an increase in bureaucracy; Unilateral and bilateral budget transfers rose; And notably, entrepreneurial initiatives and Foreign Direct Investment (FDI) were discouraged. These policy shifts would be expected to have severe adverse effects on economic growth. To trace them, Section 3 addresses three key tasks. First, it lays out the theoretical foundations of the adopted model; second, it highlights the data used and the first-best estimates obtained; and thirdly, it discusses the pre- and post-estimation tests to which the estimated model was subjected to ensure that the results are statistically dependable and robust. Section 4 comments on the estimated effects of redistribution on economic growth, and finally, Section 5 summarizes the findings and suggests a few issues for further research.

## 2. Institutions, policies, and instruments of redistribution

The transition in Greece from military dictatorship to democracy on July 24, 1974,[6] brought significant changes to the state. A major one was the abolition of the previous regime, a crowned democracy, which was confirmed by a referendum, held on December 8, 1974. Another crucial development occurred six months later, with the establishment of a presidential parliamentary democracy and the approval of a new constitution on June 8, 1975.

A cursory comparison of this constitution with its predecessors reveals that several new articles have been added. Notably, those addressing 'social' and 'property' rights stand in stark contrast to the principles of Western-style democracy. Drafting and explaining their implications to the Greek citizens within the brief period of six months presented a daunting task. It is possible that the authors,

[6] Voulgaris (2013, 13) states that "the beginning of the period is clear and unambiguous: July 24, 1974, is the day the seven-year Dictatorship of the Colonels fell."

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working under the guidance of Constantinos Tsatsos, who later became President of the Hellenic Republic, had prepared and agreed upon these articles much earlier. A thorough investigation of the available historical evidence shows that New Democracy (ND) returned to power in July 1974 under Prime Minister Constantinos Karamanlis by shifting to left-of-center policies that closely aligned with the aim of these constitutional changes. Their objective appears to have been the transformation of Greek democracy from a representative system into one where the state claims sovereign rights that supersede those of the Greek people. Any doubts regarding this assessment can be addressed by examining the following key excerpt from Katrougalos (2010, 4):[7]

> In the European social states—in contrast to the Anglo-Saxon model—and in the context of a combination of the *liberal* and the *social principle*, the common legislator is free to determine the economic policy within the limits of the free market system, but with respect to the social priorities, which derive from the principle of the *social state*. ... The crucial provisions for the determination of the Greek Economic Constitution are, on the one hand, those of articles 5 § 1 and 17 (protection of economic freedom and property), in terms of the establishment of the traditional capitalist market economy and the freedoms associated with it, and on the other hand, the new provisions of articles 21, 22, 25 § 1, 2, and 4, 106, and 17 § 1 of the Constitution. With these last regulations, on the one hand, the rights of property and economic freedom were given a functional character, and the interventionist, regulatory role of the state was recognized, with the explicit establishment of the *principle of the social state*. On the other hand, economic development was elevated to a constitutional objective but subordinated to the service of *human value*, *social justice*, and *solidarity*, as well as *fundamental social rights*. In the context of the balance between the above countervailing principles, *economic freedom and property no longer occupy the center of the rights protection system*. (Italics are the author's.)

In other words, in the republic established by the constitutionalists who introduced these provisions in the 1975 Constitution, governments may legitimately restrict citizens' ownership of their income, savings, wealth, and, more importantly, their economic freedoms, to any extent recommended by the indeterminate *principle of the welfare state*.

This scenario unfolded precisely as expected. Freedoms significantly declined due to cumulative heavy-handed state interventions, often masked by concepts such as 'social justice,' 'national interest,' and 'social peace,' along with other noble yet vague pronouncements. Table 1 illustrates Greece's position in 2020 relative to a small sample of selected countries, based on standard metrics. Human freedom in Greece was 6, 11, and 14 times lower than in Australia, Ireland, and Denmark, respectively, while economic freedom lagged by factors of 14, 8.5, and 17, thus placing

**Please place Table 1 about here**

[7] This paper has only been published in Greek. It is worth studying because it provides a candid interpretation of the political agendas of constitutionalists, economists, and other experts who participated in the Tsatsos Committee that drafted the 1975 Constitution..

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Greece on both indices alarmingly close to that of communist China. Additionally, during that same period, with the exception of the ND government from 1990 to 1993, led by Prime Minister Constantinos Mitsotakis, which made unsuccessful attempts to reverse the trends, the journey toward bankruptcy was intermittent. Between 1974 and 2009, the 'social mania' of ND governments was only nominally different from the 'socialism of the third way' adopted by PASOK governments under Prime Ministers Andreas Papandreou and Constantinos Simitis.[8] As a result, the dramatic increase in state debt—particularly from governments borrowing abroad, surpassing even the substantial aid received from the EU—compromised private savings and wealth as never before.

With the rising levels of income and consumption, fueled by excessive public spending, few people had reasons to complain, and even fewer noticed the losses in human and economic freedom. Empowered by the aforementioned constitutional provisions and motivated by a desire for reelection, governments felt compelled to pursue two main objectives: first, to transfer sovereignty and economic power from the people to the state, and second, to minimize the perceived extent of inequality. To achieve these goals, governments enacted thousands of redistribution policies over the past several decades, utilizing both fiscal and non-fiscal channels. These measures include:

1. Streamlining the steps and increasing the rates on the personal income tax scale.
2. Expanding social programs to enhance and broaden the welfare state.
3. Introducing significant administrative controls in both input and output markets that shift the balance of bargaining power among the so-called 'social partners' in favor of the 'state' and 'labor,' and against 'capital.'
4. Transforming public administration into a stronghold for governing parties, leading to drawbacks such as excessive and misallocated public employment, low morale, and distorted incentives for productive efficiency.
5. Turning labor unions in the public and private sectors, as well as mass media, into tools of party politics.

The following four subsections present and evaluate the instruments which have been used to implement the policies on these fronts and their potential effects on economic growth.

## 2.1 Imperium of the social state over freedoms and private property

According to the earlier quotation from Katrougalos (2010) , following the ratification of the 1975 Constitution, economic freedom and private property were no longer regarded as unalienable rights of citizens. Instead, they were viewed as concessions granted by the state, which could be modified based on the whims of the governments, even by those representing small minorities of the elec-

[8] Additionally, please remember the brief description provided in footnote 3 that discusses the developments in Greece's political system.

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torate. Table 1 exhibited the extensive limitations placed on human and economic freedoms. This subsection focuses on the burdens that Greek governments imposed on citizens' income and wealth in their pursuit of the social state envisioned in the 1975 Constitution.

Based on OECD economic surveys for Greece and various other sources, Table 2 presents data on two key metrics: current budget imbalances and the accumulation of debt at the general government level. The figures for the current budget reveal that: a) the size of the public sector in Greece grew

**Please place Table 2 about here**

significantly from less than 24% of GDP in 1974 to 57% in 2021, an increase of 139% [(57.1/23.9)-1]; during the same period, the public sector in the average OECD country only increased by 25.6% [(47.1/37.5)-1]; b) although Greece's public sector size was 63.7% (23.9/37.5) of the OECD average in 1974, by 2021, it exceeded this average and stood at 121.2% (57.1/47.1); and c) shortly after 1974, Greece's fiscal imbalances turned negative but continued to rise in the following years, reaching a level in 2021 that was significantly above the OECD average. These observations clearly indicate that post-1974 Greek governments engaged in an unprecedented redistribution of the economy's resources from the private to the public sector. Their constitutionally supported goal was to enhance state sovereignty, which they accomplished by increasing public assets through taxation, debt, inflation, and other means, including the utilization of state-controlled banks and public enterprises.

The preference for taxes and debt as tools for large-scale redistribution is evident in the figures from the second row of the table. These figures show that total government revenue in Greece during this period increased by 88.3% [(49.7/26.4)-1], while the tax burden was significantly higher than that of the average OECD country, where taxes grew by only 7.9% [(39.4/37.5)-1]. This notable difference highlights both the intent and the determination of post-1974 governments to expand state ownership and sovereignty. Doing so aligned precisely with the directives of the first paragraph of Article 106 of the 1975 Constitution, and the increase in taxes supported the political agenda of those who drafted it. However, for populist political parties to remain relevant and maintain their grip on power, it is well known that borrowing is often preferred over taxing. Consequently, it is not surprising that, despite slight uncertainties regarding the exact level of public debt in 1974, Greek governments pushed the net-debt-to-GDP ratio to 168.6% by 2021—107.9% [(168.6/81.0)-1] higher than the OECD average, and up from around -70% [(16.2/55)-1] in 1974. Furthermore, it is also unsurprising that since 1974, governments have utilized inflation—more noticeably during the drachma era before 2001 and less so under the euro—to expand the state's assets and sovereignty by eroding the purchasing power of citizens' savings and other near-money assets.

In summary, the governments of Greece after 1974 took unilateral control over the property of citizens through direct and indirect policy channels. This development, coupled with Greece's ac-

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cession to the EU and the EMU, likely raised the stakes for public actors, and bolstered the political system's stability. However, although Tables 1 and 2 confirm that post-1974 governments established a stronghold of the social state over individual freedoms and private property, the question of whether these significant institutional changes contributed to the sharp decline in economic growth remains unresolved. This issue will be addressed through empirical testing.

## 2.2 Jawboning of markets to serve the imperium of the social state

The numerous labor-related rights enshrined in the 1975 Constitution reinforced the claims of the seemingly conservative ND government, portraying it as pro-labor, pro-equality, and pro-social justice, alongside other populist yet ambiguous assertions that are difficult to quantify. However, as highlighted in the quotation from Katrougalos (2010), the primary objective was to establish the dominance of the social state. This objective was pursued through management of the economy from approximately 50 minimally coordinated government decision centers. Unfortunately, as evidenced by the flood of frequently conflicting laws and ministerial ordinances, this institutional framework has increasingly diverged from national priorities. Recall that during the 1970s, the country applied for and gained full membership in the EU in 1981, thereby committing to open the economy to European and global competition. Instead, successive governments, motivated by the constitutional growth of labor rights and market controls, took two significant steps: (a) they expanded the public sector in an unsustainable manner, and (b) they utilized private markets to distribute income generated not through productivity gains, but primarily through borrowing and/or European aid.

The outcome was predictable, and several Greek economists have noted what could be expected.[9] As losses in competitiveness led to rising unemployment and a decline in both domestic and foreign investment—prompted by the visible actions of the social state—governments resorted to taxing and borrowing, particularly from abroad. This pattern was evident in Athens, with the only uncertainty being when international financial markets would cut off access to foreign lending, thus making it impossible to service the enormous foreign debt and ultimately forcing the country to declare bankruptcy. This risk became apparent in 2007 when the housing market in the USA began to severely shake international markets for derivatives and other modern financial assets. By that time, however, it was too late for Greek leadership to take meaningful action. Shortly after Greece's bankruptcy in 2009, OECD economists assessed the structure of the Greek economy, and alongside various fiscal measures aimed at reducing budget deficits and controlling debt, they stressed the importance of implementing several hundred structural reforms in the labor and product markets to

[9] For example, see Kollintzas, Bitros (1992) and Bitros (2015).

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'enhance competitiveness and raise welfare and incomes.'[10]

OECD economists likely viewed the Greek economy as being roughly similar to those of Western democracies and did not consider the unique institutional foundations that underpin the social state in Greece. Some of their less ambitious reforms were implemented, and the subsequent return to moderate economic growth may be partly attributed to these cautious changes. However, the prolonged suppression of competition in domestic markets through direct and indirect administrative controls, combined with an economy open to the competitive forces of European and international markets, has made it exceedingly difficult for Greek governments to fully implement the OECD's transformative reforms. This challenge arises not just from economic calculations, but also from the values, character, and education of the median voter. Greek citizens were not prepared to embrace these reforms, as doing so could jeopardize political stability and Greece's membership in the EU.

Therefore, since the shock of the 2009 bankruptcy was insufficient to force a clean break from the institutions of the failed social state, looking ahead, the lack of competitiveness in the Greek economy is likely to remain a significant obstacle to economic growth. For this reason, in the empirical part, the effect of changes in market structure will be represented by various proxy variables.

## 2.3 The inequality-economic growth relationship[11]

Inequality is a primary concern for Western-style democracies, and the reasons for this are numerous. It cannot be eliminated without sacrificing personal freedoms, nor can it be allowed to grow uncontrollably without tearing society apart and ultimately threatening a free way of life. When kept within moderate limits, inequality can offer significant social and economic benefits to democratic nations However, developing effective policies to achieve this balance remains a challenge. The experience of the first democracy in the world, that of Athens in classical times, provides valuable insights in this regard. Bitros, Karayiannis (2008, 2010) found that ancient Athenians viewed inequality that stemmed from inherited wealth as detrimental and punished it because it led to conspicuous consumption. At the same time, they recognized a positive link between economic progress and inequality resulting from entrepreneurial and other productivity-enhancing activities. They considered this a form of creative inequality and tolerated it to some extent for the benefit of their city-state.

Their views regarding the relationship between inequality and economic progress aligned with curve EE′ in Figure 2. Up to point A, inequality was deemed acceptable because it boosted private

[10] Their suggestions took the form of the so-called Toolkits I, II, and III and were consistent with their earlier findings in OECD (2011).

[11] In addition to excessive inequality, democracy creates several serious asymmetries. For instance, patronage can result in an excessive amount of public employment, while rent seeking allows organized minorities to exploit public funds. Furthermore, the asymmetry of information between voters (the principals) and elected officials (the agents) highlights some of the inherent drawbacks of representative democracy. These issues have garnered significant attention in the relevant literature. Readers interested in exploring these asymmetries further may refer to the sources cited in Bitros (2022).

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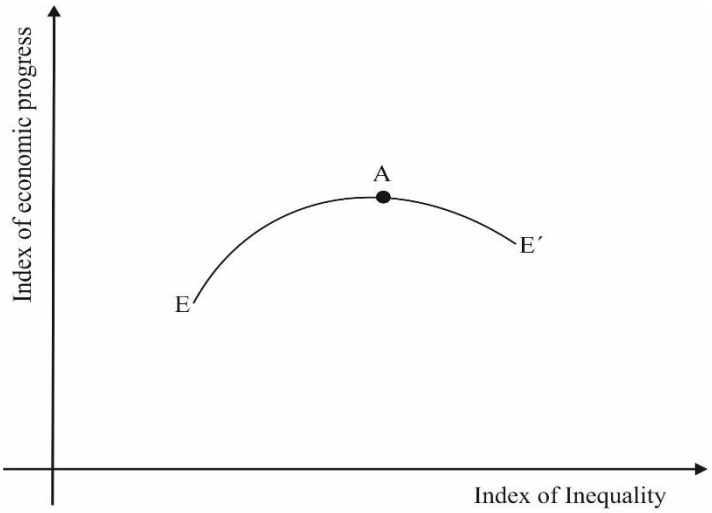


**Figure 2**: Relationship of inequality and economic progress based on the ancient Athenian conceptualizations

wealth, and hence, the resources available to citizens for paying taxes and supporting public services. However, beyond point A, inequality was considered: (a) politically unacceptable, because it erodes social cohesion by fostering envy, community conflicts, and civil wars, and (b) economically harmful, because wealth begins to lose its social value, the incentives for individuals to accumulate wealth weaken, and their motivation to engage in entrepreneurial activities and make investments diminishes. Therefore, ultimately, as a result of these evils of inequality, economic progress declines.

Thanks to postwar research, we now have a clearer understanding of the forces that shape the inverted-U relationship depicted in Figure 2. Moderate inequality can actually encourage entrepreneurship and innovation, which in turn drive investment. As illustrated by the EA segment of the EE' curve, this leads to accelerated economic growth. Conversely, excessive inequality negatively impacts economic development through two main channels. The first, identified by Alesina et al. (1996), pertains to the social problems associated with inequality that were mentioned earlier. These increase sociopolitical instability, creating uncertainty in the socioeconomic environment, which discourages investment and hampers economic progress. The second channel is based on the understanding that heightened inequality expands the number of individuals living in poverty. This, in turn, results in decreased consumption and suppressed human capital development; Productivity and investment are further hindered, potentially exacerbated by the increased savings of the wealthy; And as the AE' segment of the EE' curve indicates, the cumulative effect of these dynamics is a noticeable slowdown in economic progress.

Unlike the above conceptualizations, Kuznets (1955) has argued that in the process of economic development, inequality initially increases and then declines as society becomes more affluent. Based on this hypothesis, the curve EE' in Figure 2 would rise along the vertical axis. From both analytical and methodological perspectives, this form of the inverted-U relationship implies two key points: (a) inequality influences economic growth and is also influenced by it, and (b) to account for

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the possibility of simultaneity between them, one must employ systems estimation techniques and conduct tests for causality and other related factors. For the period of the econometric analysis, the perspective advanced in this paper aligns with the inverted-U curve shown in Figure 2. This suggests that: (a) inequality in Greece is determined by the institutions and policies through which governments affect the distribution of income and wealth, and (b) explains why we have chosen to utilize the single-equation ARDL method in our estimations, which accommodates only exogenous and weakly exogenous variables on the right-hand side.[12]

Given the significant increase in data availability, estimation methods, and computing power, one might assume that governments in Western democracies could now develop and implement effective policies to address inequality based on stronger evidence. However, this is rarely the case. As highlighted in the literature reviews by Ferreira, Gisselquist, Tarp (2022), as well as Zweimüller (2000), our current understanding is still limited and lacks the empirical precision necessary to inform meaningful policy decisions. In other words, while we have several plausible hypotheses about the potential relationship between inequality and economic growth, as well as the structural channels involved, the empirical evidence remains inconclusive. Hence, there may be a flaw in the foundations of the general equilibrium model from which these estimated reduced-form equations are derived, or there may be issues with the data and methods used in the estimations.

Let me explain. Persson and Tabellini (1994) were the first to formally derive the relationship in question. They accomplished this by integrating two strands of literature into a unified analytical framework: the endogenous theory of economic growth and the endogenous theory of policy.[13] After controlling for the types of governance present in the sampled countries, they found that in democracies, the estimated relationship was negative. To rationalize this finding, they suggested that high inequality in pretax incomes leads the majority of people to vote for redistribution. The political system responds by providing the level of redistribution demanded by the median voter. This, in turn, distorts the incentives driving productive investments, and ultimately, the slowdown in these investments harms economic growth. However, the empirical evidence gathered since then has neither supported their proposed 'fiscal channel' nor other potential channels, such as the idea that inequality may provoke political instability, which could discourage investment.[14] One possible explanation for this deadlock is that democracies might have become dysfunctional, rendering the endog-

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[12] In the context of the schematic framework presented in the introduction, Kuznets's hypothesis suggests that the extreme right arrow points in both directions. However, in the case of Greece during the period under investigation, we believe that if economic growth did have an effect on inequality, it would be minimal. Therefore, we treated the index of inequality as weakly exogenous and disregarded the possibility of simultaneity. This approach addresses the second question posed in the first paragraph of the introduction.

[13] The theory of endogenous policy is based on the idea that policy variables are jointly determined with economic variables within an integrated political-economic framework.

[14] See Perotti (1996), Alesina, Perotti (1996).

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enous theory of policy irrelevant and resulting in misspecified models.[15] Another possibility is that the democracies included in the cross-sectional data might be institutionally and functionally very different, making the results inconclusive. A third possibility is that measurement errors in the variables could be so complex that no estimation technique, regardless of its sophistication, can properly account for their effects on the rate of economic growth.

Between 1954 and 1974, Greece experienced exceptionally robust economic growth. Unsurprisingly, this period attracted the attention of researchers interested in understanding its impact on inequality. However, due to a lack of suitable data, only a limited number of studies were conducted. A notable one is by Livada (1991). Despite several warnings regarding the limitations of the available data sample, this study analyzes a grouped time series of family incomes before taxation, covering the years from 1959 to 1986. The author subjects the data to a series of econometric tests, the results of which are interpreted as tentative, if not inconclusive. Nevertheless, a closer examination of the reported shares of the top 1% and 5% of the income distribution allows for more reliable inferences about the trends in inequality during this period. This assessment is supported by arguments from the World Inequality Database (WID), which suggest that the shares of the top 1% and 10% are preferred measures of inequality because households in these income brackets are much less susceptible to tax evasion.

Table 3 shows the trends in income shares for the top 1% and 5% during the subperiods of 1959-1974 and 1975-1986.[16] In the years leading up to 1975, income inequality consistently de decreased

**Please place Table 3 about here**

though perhaps not as quickly as governments had hoped. Robust economic growth significantly contributed to reducing inequality, which aligns with the experience represented by the AE' segment of the EE' curve in Figure 2. In contrast, the period after 1974 saw a notable change. Figure 1 indicates that the rate of economic growth nearly halved by 1980 and continued to decline until 1986. Despite this, Table 3 reveals that income inequality continued to decrease during these years, and indeed did so at a much faster rate. This was primarily due to policies inspired by the provisions of the 1975 Constitution. Consequently, in the post-1974 period, economic growth and income inequality became positively correlated, resulting in the shift of experience which is reflected in the AE segment of the EE' curve.[17]

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[15] Much more will be said about the weaknesses of the endogenous growth theory later on.

[16] Throughout both subperiods, the values of the shares declined consistently without any reversals. This allows us to simplify the analysis by comparing the share values at the beginning and end of each subperiod, rather than examining the trends across the two subperiods.

[17] Andriopoulou, Karakitsios, Tsakloglou (2018, 24) review the literature accumulated in this field during the 1980s and 1990s. They conclude that, regarding inequality, "the main findings of these studies were that in Greece, unlike many other developed countries in recent decades, inequality was gradually but not continuously declining since the mid-

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In addition to the aforementioned indices, the WID database offers time series data on inequality in Greece since 1980, based on the Gini coefficient. However, as this source utilizes pre-tax income data, using it would fail to adequately capture the effects of changes in the progressive tax scale. For this reason, we found it necessary to switch to the Gini coefficient published by the OECD,[18] which is based on disposable income.

This index is depicted in Figure 3. It is evident that, despite some occasional fluctuations, the trend in inequality has been declining since 1986. If we had calculated the trends using the pre-tax

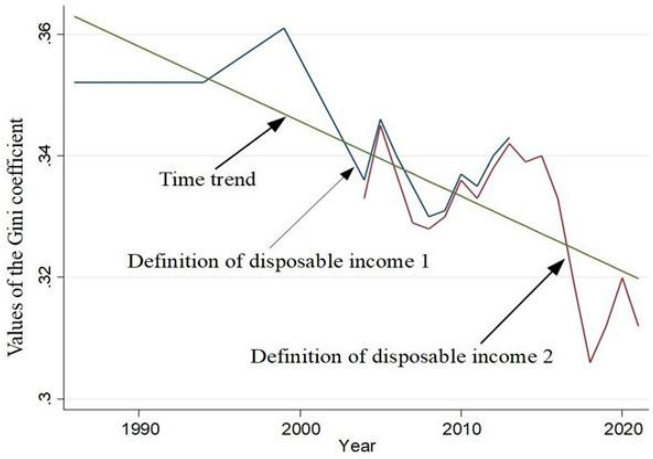


**Figure 3**: Trend of inequality based on the Gini coefficient using two definitions of the disposable income

time series for the top 1% and 10% shares from the WID database, they would also indicate a decline, albeit at a slower pace. This evidence confirms that since 1974: (a) inequality has been decreasing; (b) redistribution policies implemented through changes in the tax scale have contributed to accelerating this decline; and (c) given that the trend in the rate of economic growth during the same period was negative, the long-term decrease in inequality must have resulted from administrative rather than market forces. Based on these findings, in the estimations further below, we would expect the inequality variable to be positively correlated with economic growth.

## 2.4 The patronizing bent of the Greek state

Recall from the introduction to Section 2.1 that, on an expenditure basis, the public sector in Greece expanded from less than 24% of GDP in 1974 to 57% in 2021. Since then, its scale has somewhat retreated to approximately 50%. However, it remains among the largest in the EU and the free world. Therefore, a significant question arises: why did the public sector expand uncontrollably after 1974?[19]

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1970s." However, the indices presented in Table 3 indicate that the decline in inequality may have started much earlier, even though it progressed at a slower pace.

[18] See OECD Data Explorer • Income distribution database.

[19] A brief examination of postwar literature indicates that few authors believe that the quality and quantity of public services are adequate to justify the costs associated with the public sector. This brings up two interesting questions: (a) Why has the public sector in Greece remained inefficient? and (b) Why have citizens not opposed the expansion of the

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One of the significant reasons highlighted by Bitros (2015) is that political parties in Greece have consistently relied on public employment as a strategy to win elections. This trend intensified in the wake of the unique social circumstances that followed the military rule. Prime Minister Andreas Papandreou's revelation during a press conference, published on October 25, 1987, in a prominent Greek newspaper, fully corroborates the outcomes of this practice. He confidently stated, without any doubt, regarding the accuracy of his claim:

> We now have about twice the staff needed to produce the required government services.

He did not need to exaggerate since the data was even worse. This explains why, in 2010, when the experts of Troika—representing the International Monetary Fund (IMF), the European Central Bank (ECB), and the European Commission (EC)—arrived in Athens, to present the first memorandum of austerity, were adamant. Among their non-negotiable conditions was a requirement to reduce public employment by implementing a policy of hiring one civil servant for every five retirees. Of course, how effective this policy will be in addressing the problem remains uncertain.

The plethora of social rights, such as the right to employment, the right to education, and the right to health, established by the 1975 Constitution, essentially without corresponding material obligations by citizens, is another significant contributor to budget deficits, the accumulation of public debt, and the erosion of national sovereignty to foreign creditors. Beneficiaries of these rights have grown accustomed to believing that governments have unlimited resources to cover the associated costs. When those resources were insufficient, governments resorted to taxing the income and wealth of the 'haves' or borrowing from future generations. The latter practice is a problematic form of redistribution since future generations are not present and cannot have a voice in these decisions. Moreover, there is the problem of interest groups that formed around exploiting these social rights. Gradually they gained political influence, aligned with the ruling political parties, and the fundamental aspect of democracy, promising equal access to public services for all citizens, became an exception.

Lastly, there is an endless array of laws that impose taxes on one group of people to benefit another. For instance, when examining a monthly electricity bill, it is impossible to miss several charges that support groups with no direct connection to the production and distribution of electricity. These taxes have resulted in the emergence of various categories of rent seekers, which undermine both the political system and the markets.

## 3. Tracing the effects of redistribution on economic growth

Before engaging in the empirical analysis, it is important to clarify a few methodological points. First,

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public sector, which has coincided with a reduction in their freedoms, as noted in Table 1? However, delving deeply into these questions would divert us far from the main topic.

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let us revisit Table 1. The indices for human and economic freedom rank Greece in a way that raises serious doubts about its status among Western democracies. These concerns are further corroborated by The Economist's democracy index, which has consistently categorized Greece as a 'flawed democracy' from 2006 to 2022. Given this evidence, the endogenous theory of policy proposed by Persson, Tabellini (1994), among others, appears to be inapplicable. Additionally, aside of this quality-of-democracy asymmetry, Romer's (1990) framework of endogenous growth is also unsuitable, since Research and Development (R&D) in Greece has been minimal[20] and research-associated higher education is a state-produced, excludable good.[21] Therefore, by elimination, the appropriate model of choice should be based on the exogenous theory of growth, allowing though any instruments aimed at capturing the influence of redistribution policies to have permanent growth effects. Following this approach, a clear path is to expand on Solow's (1956) exogenous theory of growth by incorporating instruments of economic policies aligned with the redistributive provisions in the 1975 Constitution.

Building on these clarifications, this section addresses three tasks: first, defining the empirical model; second, describing the available data; and third, presenting the estimates and the results of the pre- and post-estimation tests. The following three subsections are dedicated to these tasks.

## 3.1 Specification of the empirical model

Subject to testing, assume that all variables in the model to be estimated are $I(1)$ in the levels and $I(0)$ in their first differences. Furthermore, for simplicity, assume that $X$ stands for a vector of other variables that have permanent effects on growth. The augmented Solow model with constant returns to returns to scale capital and labor, but with constant or increasing returns to the growth-affecting determinants in $X$, would be as follows:

$$Y_t = A_0 e^{gt} X_{it}^{\beta_i} L_t^{\alpha} K_t^{1-\alpha},\ A_0 > 0,\ g \geq 0,\ \beta_i \text{ for } i = 1,2,...,n, 0<\alpha<1, \qquad (1)$$

where $Y =$ output, $A_0 =$ Constant, $g =$ Rate of exogenous technological change, $t =$ time, $X_i =$ Data determined and permanetly growth affecting exogenous and weakly exogenous variables, $L =$ labor , and $K =$ Capital . Next, dividing both sides of (1) by $L_t$ and taking logs yields:

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[20] Between 1954 and 1974, Greece experienced significant inflows of Foreign Direct Investment (FDI). However, from 1975 to 2022, there was a decline in FDI as many foreign companies withdrew their production facilities and new inflows of such investments were discouraged. These two contrasting phases of FDI imply a general agreement that the extent of technological change absorbed from abroad correlates with high growth rates in the first period and low growth rates in the second. However, the aim of this argument is not to emphasize this relationship. Instead, it is crucial to recognize that technological change in Greece has consistently been exogenous, arising either through FDI or through the importation of equipment and knowledge associated with domestic investment.

[21] Since the university system in Greece is public, it is hardly surprising that Asteriou, Agiomirgianakis (2001, 489) find that "... the acquisition of higher degrees and certificates is not necessarily associated with an improved ability to undertake productive work and hence to foster economic growth." Unfortunately, the state monopoly on higher education, which was established by article 16 of the 1975 Constitution, functions as a giant back channel of redistribution and social injustice. But for these distortions, the defenders of the state's imperium keep conspicuous silent.

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$$y_t = \ln A_0 + gt + \sum_{i=1}^{n} \beta_i x_{it} + (1-\alpha)k_t, \quad (2)$$

$y_t = \text{Log of output per worker}$, $k_t = \log$ of capital per worker, $x_{it} = \text{logs of } X_{it} \text{variables for } i = 1,2,\cdots,n$
Finally, denoting the long-term equilibrium values of variables by a star and taking the first differences, (2) yields:[22]

$$\Delta y_t^* = g + \sum_{i-1}^{n} \beta_i \Delta x_{it}^*, \text{ since } (1\text{-}\alpha)\Delta k_t^* \to 0. \quad (3)$$

Since this equation will serve as the foundation for our empirical analysis, some explanations are in order. In the steady state of the original Solow model, output per worker grows at the rate of technological progress. Growth occurs because the investment from new savings is equal to the depreciation of the capital stock, stabilizing $k^*$ at a fixed level. Although capital per worker continues to contribute to the level of output per worker, it ceases to contribute to the growth of output per worker. To clarify further, while total output changes at a rate that equals the sum of technological progress and the growth rate of the workforce, output per worker increases solely by the rate *g*. Our proposed adaptation of the model allows for this growth rate to vary—increasing or decreasing—based on statistically significant $x_{it}$ variables. In the case of Greece, a country defined by its unique institutions, market structures, values, culture, geography, and history, this conceptualization provides a practical empirical framework. It enables us to identify and test for factors that may have contributed to the sharp decline in economic growth since 1974.[23]

As we might expect, the leading source of this regrettable experience is likely the constitutional provisions from 1975 that authorized the various redistribution policies currently in place. However, we would not be surprised if another policy process, such as the curtailment of human and economic freedoms, emerges as a significant factor. Our goal is to examine the policies that may be respon-

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[22] The relevant literature contains a long-standing controversy regarding the factors that raise the growth rate of a country on a permanent basis. The debate lingers around two differing viewpoints. The older one, which originates from Solow (1956), holds that sustained economic growth springs from the exogenous or unexplained process of technological change. Mankiw, Romer, Weil (1992) further elucidated on this perspective by incorporating in the steady state of the model population growth, physical capital, and human capital accumulation as forces that contribute to economic growth. The more recent viewpoint, proposed by Romer (1990) contends that the source of sustained economic growth is the advancement in science and technology facilitated by R&D. For readers interested in the empirical implications of this debate, Rao (2007) provides valuable insights.

[23] Solow and neoclassical growth models focus solely on the initial term on the right-hand side of equation (3). Along the balanced growth path, the growth rate *g* of *y* is exogenous and constant. In this context, by conditioning on the vector of $X_i$ variables, the proposed expansion of Solow's model connects with endogenous growth theory, as it allows a range of variables to influence the growth rate. For instance, these variables may include individual skills, time spent in education, and educational spillovers from society, as emphasized by Lucas (1988). Additionally, relevant are factors such as Research and Development (R&D), creative destruction, and technological innovations that affect $A_0$, highlighted by Aghion, Howitt (1992); and the same holds for institutions that promote economic growth by steering $A_0$ toward the most profitable opportunities, as discussed by Acemoglu, Robinson (2012). If the variables incorporated through the vector of $X_i$'s in this study are correlated with some of the factors highlighted by these authors, the expanded Solow model could be interpreted as a proxy for the endogenous growth models presented in the literature. I am grateful to Professor Leonidas Michelis for pointing out to me this implication of the proposed expansion of Solow's model.

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sible for the long-term decline in economic growth using purely statistical criteria.

## 3.2 Data, variables, and pre-estimation tests

Our primary data consists of time series extracted from various databases maintained by widely known international organizations. In particular, most come from the databases of the European Commission (AMECO), the World Bank (WB), and the Organization for Economic Cooperation and Development (OECD). For each variable, we sought to use the longest available time series. Table 4 indicates their symbols, the periods they cover, the units in which they are measured, and the sources from which we obtained them.

**Please place Table 4 about here**

According to Engle, Granger (1987), if, say, two time series $Q(t)$ and $W(t)$ are $I(1)$ in the levels and the residuals from a regression between $Q(t)$ and $W(t)$ are $I(0)$, then these two time series are said to be cointegrated. If so, their relationship would lack stationarity and classical regression estimation techniques might lead to spurious inferences. In such cases, the challenges that arise can be addressed by utilizing the Autoregressive Distributed Lag (ARDL) estimation method. One such approach was first introduced by Pesaran, Shin (1999) and further extended by Pesaran et al. (2001). This method allows researchers to include a mix of regressors in the estimation, provided that the dependent variable is stationary and that no regressor on the right-hand side of the equation is integrated to an order greater than one.[24] Therefore, ensuring that these conditions are met in our analysis requires conducting unit root tests on both the levels and the differences of the variables.

Tables 5, 6, and 7 are relevant to this task. Table 5 presents the standard descriptive statistics of the

**Please place Table 5 about here**

variables. When examining the min-max columns from top to bottom on the far left, there is no indication of a sharp break in any of the time series. If this were not the case, we would have an early indication of the existence of structural breaks in the data. However, it is important to exercise caution. For, while descriptive statistics offer a preliminary insight into the structure of the data, they cannot replace the need for formal pre- and post-estimation tests.

Table 6 presents the results from four classic unit root tests, which were conducted on both the levels and the first differences of the variables. The findings from the ADF and PP tests indicate that, in

**Please place Table 6 about here**

[24] Additionally, the ARDL estimating technique provides the great advantage that it allows researchers to incorporate different numbers of lags in different variables, thus making it very flexible.

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the vast majority of cases, the variables are $I(1)$ in the levels and $I(0)$ in the first differences. This outcome meets the conditions for adopting the Pesaran et al. (2001) approach to the ARDL estimation. However, the results of the KPSS test reveal that a few of the regressors are not trend stationary. Therefore, during the estimation phase, it will be necessary to account for the potential instability that this source of variability—primarily affecting the dependent variable—may introduce into the model's parameter estimates.[25]

Before we proceed with the estimation, it is important to address the complex econometric issue of potential structural breaks in the data. All unit root tests, including those shown in Table 6, tend to be biased towards rejecting the null hypothesis when structural breaks are present. To determine whether there are indeed any structural breaks in the variables, or to account for them if they exist, we conduct the Zivot-Andrews test. The results of this test are presented in Table 7. Upon closer examination, we find that certain time series exhibit structural breaks in the years noted in the sec-

**Please place Table 7 about here**

ond row. Consequently, to mitigate the potential impact of these findings on our estimates, we adopt the conventional approach of incorporating dummy variables.

## 3.3 Estimation and post-estimation tests

The estimates to be presented derive from the form of ARDL that Kripfganz, Schneider (2018) introduced in the following error correction form:

$$\Delta y_t = \alpha_0 + \alpha_1 t - \gamma(y_{t-1} - \delta' \mathbf{x}_{t-1}) + \sum_{i=1}^{p-1} \psi_{yi} \Delta y_{t-i} + \sum_{j=1}^{q-1} \psi'_{xj} \Delta \mathbf{x}_{t-i} + e_t, \qquad (4)$$

where $\mathbf{x}_t$ is a vector of control variables, $\delta$ is a vector of the long run coefficients, $\gamma$ is defined as the speed-of-adjustment coefficient, $p$ and $q$ stand for the optimal lag length operators selected by the Akaike information criterion, which can be different for each control variable, $\psi_{yi}$ and $\psi_{xj}$ represent vectors of coefficients showing the short run effects, and $e_t$ denotes the residuals at time *t*.

In estimating equation (4), we recall from Tables 6 and 7 that the null hypotheses regarding the dependent variable—specifically that it has neither structural breaks nor a unit root amidst structural breaks—were both rejected. Consequently, we incorporated dummy variables to account for the time trend and the structural breaks in 2001 and 2009. After extensive trials, we determined that the empirical specification of equation (4), as presented in Table 8, is the best of several models. This specification not only explains a significant percentage of the variability in the dependent variable but also

[25] Regarding the series of inequality, it should be noted that the stationarity and specification tests of the model meet the criticisms which have been addressed by Parker (2000).

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**Please place Table 8 about here**

meets various desirable criteria, including successfully passing all post-estimation diagnostic tests.[26] To assess the robustness of the chosen model, the first step was to confirm the existence of a long-term relationship in a statistical sense. This would suggest that the data-generating process primarily conforms to this relationship. The appropriate test for this purpose is the PPS bounds test, developed by Pesaran et al. (2001). The results, as shown in Table 9, indicate that the null hypothesis of no relationship can be rejected with confidence. After this finding, we proceeded to evaluate the stability and robustness of the estimated coefficients. While most coefficients were found to be highly significant, we conducted additional tests, the results of which are presented in Table 10. Row 2 reports the results of the heteroskedasticity test. They show that we cannot reject the null hypothesis of homoscedastic residuals. Rows 3, 4, and 5 present the results of tests for serial correlation, including those of Durbin's (1970), Breusch's (1978), and Godfrey's (1978) for high-order serial correlation,

**Please place Table 10 about here**

along with Engle's (1982) LM test for autoregressive conditional heteroskedasticity. The results do not provide grounds for rejecting the null hypothesis of no serial correlation. Furthermore, Ramsey's (1969) RESET test was employed to assess the presence of omitted variables; the findings in line 6 indicate that we cannot reject the null hypothesis, suggesting the model is correctly specified. Rows 7 and 8 evaluate the normality of residuals using the tests proposed by D'Agostino et al. (1990) and Jarque-Bera (1987). Both tests suggest that the residuals are normally distributed. Finally, row 9 reports the cumulative recursive residuals test, introduced by Brown, Durbin, Evans (1975) and refined by Ploberger, Kramer (1992). The results. which supports the stability of the parameters, are also illustrated in Figures 5 and 6.

[26] To reinforce this assessment, consider the alternative specification of the equation (4) below. Based on the statistical significance of its coefficients, the degree to which it explains the variability in the dependent variable, and its consistency with economic theory, this specification is superior to the one we selected as first best. For one of its comparative advantages, observe that present in this specification with a positive sign is the variable of human freedoms $hf_t$ . We believe that enhancing economic and human freedoms is conducive to economic growth; hence, we would be happy to select it. However, upon further examination, it becomes apparent that this specification fails all tests for serial correlation or autocorrelation, rendering it unreliable for drawing conclusions and policy implications.

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In conclusion, all post-estimation diagnostic tests indicate that the ARDL estimates are both reliable and robust. Therefore, we can confidently utilize the estimated model to highlight the implications of the redistribution policies implemented by Greek governments, particularly regarding their impact on the decline of economic growth since 1974.

**Please place Table 9 about here**

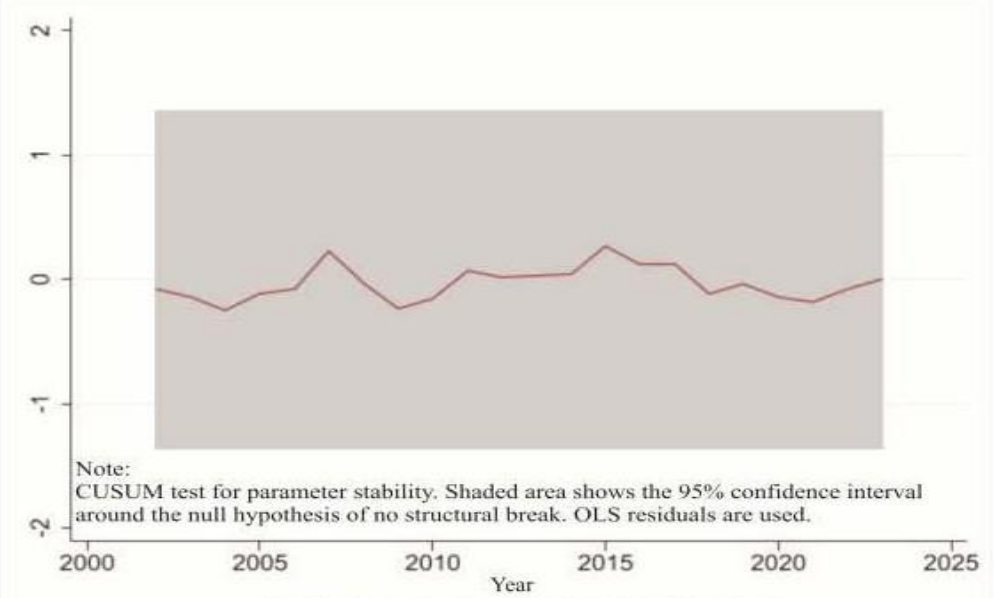


**Figure 5**: Cumulative test using OLS CUSUM plot

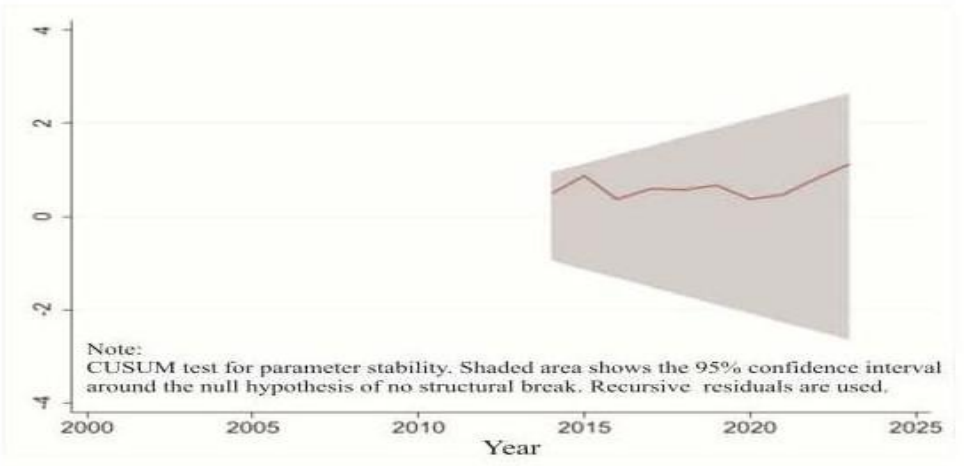


Figure 6: Cumulative test using RECURSIVE CUSUM plot

## 4. Social state, redistribution, and the decline of long-term growth

As could have been expected, following the ratification of the 1975 Constitution, successive Greek government began to transform the previous citizen-based democracy into a social state. In this new

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system, the government possesses an elevated level of sovereignty and currently controls more than 50% of the country's GDP production. To achieve this shift, governments utilized several main strategies: a) appealing to populist sentiments by promoting the reduction of inequality through various direct and indirect policy measures; b) employing public sector jobs to support organized minorities that backed the ruling parties; c) continuously increasing taxes on income and wealth to cover the costs associated with maintaining the clientelist public sector, while simultaneously turning citizens into dependents through large subsidies and providing substandard public services; d) raising overall economic burdens by imposing high value-added tax rates, which rank among the highest in the EU and worldwide; and e) relying heavily on public borrowing, particularly from abroad, without considering the future burdens this creates, even as politicians repeatedly assert that they are promoting 'social justice.'

A brief look at Table 4 clearly indicates that the empirical part of this paper was designed to examine how social and economic policies enacted on the above five fronts since 1974 have affected economic growth. Now that we have a solid empirical model, it is time to utilize it effectively. Our goal is to understand why the growth rate has declined during the current democratic phase. Before delving into this analysis, we will conduct one final test. We re-estimate the chosen model equation using the new dynamic ARDL simulations method proposed by Jordan, Philips (2018). The results are presented in Table 11. We limited the maximum number of lags to 2, selecting the optimal number by the Akaike information criterion as applied by the dynamic ARDL approach. The F- and t-

**Please place Table 11 about here**

statistics from the PSS bounds test confirmed the existence of the estimated equation in the specific configuration outlined in the long-term section of this table. Furthermore, since this specification is slightly better than the one in Table 8, and given that the dynamic ARDL simulations method provides several advantages for analyzing policy implications, we will refer to this version from now on.

Drawing on the results from Table 11, equation (5) depicts the relationship of $y_t$ with its determinants $(gn_t, tiw_t, epss_t, tb_t)$ in the long run. In other words, assuming a policy-associated shock in one of the latter variables, holding the remaining fixed, this equation shows where the level of $y_t$ will be after all its short- and medium-term adjustments have subsided.

$$y_t = 6.946 + 0.527\, gn_t - 0.221\, tiw_t + 0.279\, epss_t - 0.367\, tb_t \qquad (5)$$

For example, suppose a policy is introduced with the goal of reducing the mean Gini coefficient by 1%. Given the latter's positive coefficient, which implies that Greece is situated on the upward-sloping section of Figure 2, this reduction in inequality through administrative means is likely to result in a decline in economic growth. To gauge the magnitude of its potential impact,

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we can refer to the elasticity, which stands at 0.527%. However, this estimate could be conservative. For, if the government adheres to the usual approach of financing the policy's costs through increased taxes on income and wealth or by raising the overall tax burden on the economy, the resulting losses in terms of foregone economic growth could be significantly larger, as both of these factors are negatively related to $y_t$ .

Thinking along these lines, one can verify the validity of the following propositions by referring to equation (5):

1. To some extent, responsible for the long-term decline in Greek economic growth are the various explicit and implicit institutional arrangements through which Greek governments reduced inequality ( $gn_t$ ) by redistributing income and wealth under the provisions of the 1975 Constitution.
2. Similarly responsible for their dampening effect on long-term economic growth have been the taxes on income and wealth $(tiw_t)$ and the total tax burden $(tb_t)$ imposed on the economy by having raised and kept the rates of value-added taxes and other charges exorbitantly high.
3. In contrast, the excess employment in the public sector has acted as a stabilizer, slowing the decline in long-term economic growth due to the aforementioned policies. However, the transfer of employment from the private sector to the public sector negatively impacts Total Factor Productivity (TFP), which means that this practice within the political system has only partially mitigated the adverse effects of the other three policies.
4. One significant disappointment is the absence of both human freedom and economic freedom from this equation. Does this imply that economic growth in Greece is invariant with respect to these freedoms, especially when compared to communist China, where liberalization since 1978 has led to substantial economic growth? We believe it is only a matter of time before more comprehensive data regarding these indices will allow us to confirm the positive relationship that undoubtedly exists.

However, since these propositions hold true over the very long run, an observer with a shorter time horizon may wonder: a) How might we expect the impact of the policies to shape in the transition phase from the short to the medium term? b) Can the analysis provide insights into the adjustment process? and c) Given that the policies enacted by governments are usually interconnected, can we guess what the outcome might be if governments implemented policies affecting more than one of the independent variables in equation (5)? The remainder of this section is dedicated to addressing these questions.

Table 11 demonstrates that the assumed reduction in $gn_t$ would significantly boost economic growth, particularly in the few years following the policy change. This finding stems from the high

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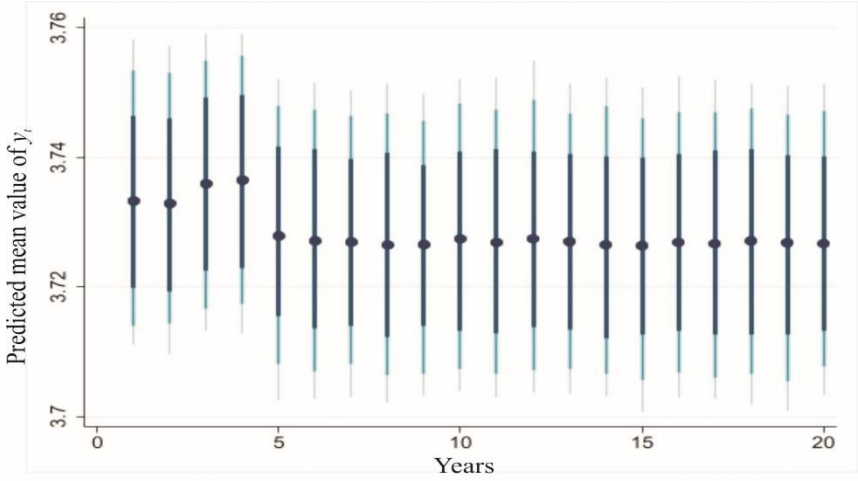
negative coefficients of the $gn_t$-related differenced variables. It is important to note that this experience may have misled Greek politicians into advocating for redistribution policies aimed at reducing inequality because, over the long term, such policy initiatives have ultimately undermined economic growth. To better understand this interpretation of the evidence, we can analyze the short- and medium-term dynamics that the ARDL simulations procedure allows.

To identify the pattern of the policy's effects on $y_t$, we will consider a reduction of 1% in the mean of $gn_t$, while keeping the variables $(tiw_t, epss_t, tb_t)$ fixed at their respective means. After the introduction of the policy, the mean of $y_t$ will undergo a series of cumulative changes over a varying period before ultimately converging to a new long-term equilibrium. The coefficient of the Error Correction Term (ADJ) is critical in determining the speed of convergence and, consequently, the length of the transition period. As shown in Table 11, this coefficient is -0.8707. This is significant for at least two reasons. First, it has the expected negative sign, which gives us additional confidence that the cumulative changes will converge by evolving either monotonically or cyclically around a new mean, whether lower or higher, depending on the direction of the policy shift. Second, the relative size of this coefficient is noteworthy. Its proximity to 1 suggests that the majority of the convergence will take place within 2 to 3 years following the policy's introduction.

The plot in Figure 7 displays the cumulative response of $y_t$, assuming it was in long-term equilibrium during the two years prior to the introduction of the policy at $t = 3$. There are four key patterns to emphasize. First, observe that in the year the policy is introduced and the following one, the decline in inequality increases $y_t$. This finding supports the previous assertion that this positive eco-




Note: This figure shows the cumulative response in the mean value of yt to a -1% shock in the mean value of the Gini index $gn_t$. Black circles show the cumulative changes that occur every year in the rate of economic growth, whereas the spikes from the darkest blue to the light blue show the 75%, 90%, and 95% confidence intervals, respectively. We apply 5,000 simulations and assume the shock takes place at time t=3.

**Figure 7:** 1% reduction in the mean value of the Gini index $gn_t$

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nomic growth effect is likely the reason Greek politicians have insisted on basing the stability of the political system on this socially very costly policy. Second, shortly after the two-year period, $y_t$ decreases to a new mean that is lower than before the policy was implemented. Third, before converging to this new lower mean, $y_t$ fluctuates closely around it during the last three years of the 20-year span considered. This suggests that inequality is an unstable social process, and attempts to address it on an ad hoc administrative basis may not be effective. Lastly, and perhaps most importantly, as Greek governments consistently focused on redistribution, and inequality followed the trend shown in Figure 3, the downward trajectory of $y_t$ became the only logical outcome. For, given a series of such policy shocks throughout the years, the curve traced by the bullets in Figure 7 shifted persistently downward, forcing $y_t$ to trace a trend similar to that depicted in Figure 1.

The preceding analysis is quite illuminating. However, Greek governments did not focus exclusively on addressing inequality, nor were they able to do so, as such policies require funding, which can only come from raising taxes and/or borrowing. In line with this conceptualization, the estimated equation indicates that governments also acted on policy fronts defined by the variables $(tiw_t, epss_t, tb_t)$. Consequently, questions remain about how the model applied to the actual environment, which involved multiple simultaneous policy changes. Figures 8, 9, and 10 were computed under the assumption that isolated policy changes influence one of these variables at a time while keeping the others fixed. From Figures 8 and 9, we can infer that increasing taxes would exacerbate the negative effects of inequality policies on economic growth. On the other hand, Figure 10 demonstrates that an expansion of excess employment in Greece's public sector contributed positively to the economy.[27] In a hypothetical scenario where the government implemented simultaneously policies across all four fronts, the likely outcome would hinder economic growth. This is exactly what appears to have happened because excess public employment can never be sufficient to outbalance the negative effects on growth caused by the policies in the other three areas.

[27] The rationale for constructing and testing the variables $epsi_t$ and $epss_t$ requires some explanation. Many governments utilize public employment for reasons beyond providing public goods and services efficiently. For example, Alesina et al. (1998, 2001) find that governments in Italy have utilized public employment in a redistributive manner, particularly to favor the northern regions over those in the south. That governments in Greece have been doing the same to provide patronage to their presumed voters is already known from Varvaresos (1952). To capture the potential effect of such practices on economic growth, we initially examined the level and growth rate of public employment in Greece, but without success. In this light, we then hypothesized that the test failed because Greek citizens expect all governments to use public employment to some extent for electoral purposes. With this thought in mind, we then sought to capture the redistributional effects of unexpected public employment changes by considering the excess public employment in Greece over e public employment in Italy and Spain, for which we found adequate data.

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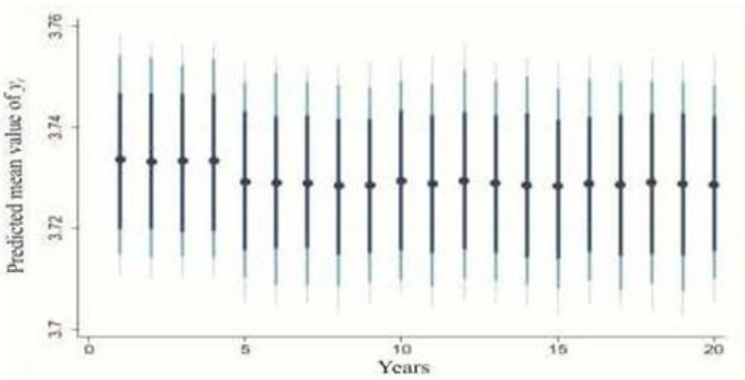
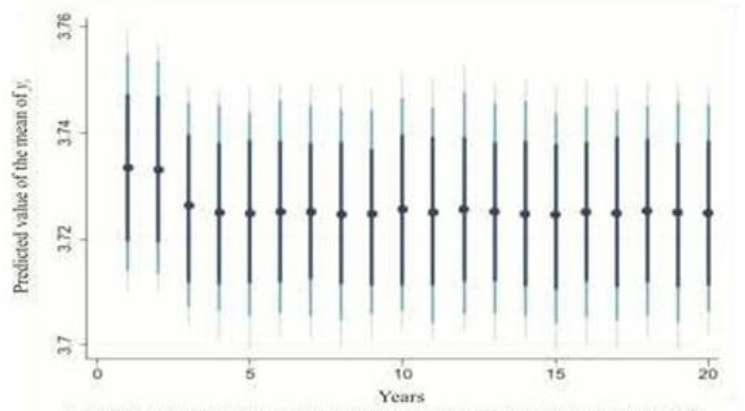


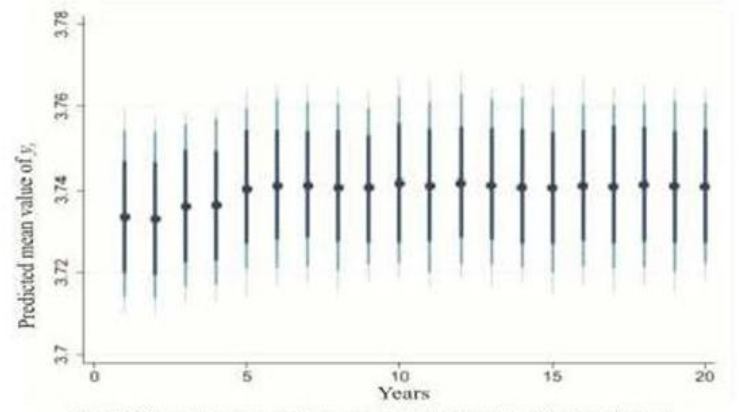

Note: This figure shows the cumulative response in the mean value of $y_t$ to a +1% shock in the mean value of $tiw_t$. For the rest, see note at the bottom of Figure 7.

**Figure 8**: 1% increase in the taxes on income and wealth, $tiw_t$




Note: This figure shows the cumulative response in the mean of $y_t$ to a +1% shock in the mean value of $tb_t$. For the rest, see note at the bottom of Figure 7

**Figure 9**: 1% increase in the mean value of the total tax burden on the economy, $tb_t$




Note: This figure shows the cumulative response in the mean value of $y_t$ to a +1% shock in the mean value of $epss_t$. For the rest, see note at the bottom of Figure 7.

**Figure 10**: 1% increase in the mean value of excess public employment, $epss_t$

In summary, combating inequality through top-down policies and expanding public sector employment can stimulate economic growth in the short term. However, over the medium and long term, these policies tend to undermine growth. This adverse outcome worsened significantly in the period following 1974. To cover the associated costs, Greek governments adopted a permanent practice of raising taxes and, to avoid disrupting the electoral cycle, borrowing as if there were no consequences. This behavioral trend explains how Greece hit the wall of its first postwar bankruptcy in 2009.

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## 5. Summary, recommendations, and suggestions for further research

The success of democracy in classical Athens was built on several fundamental principles, three of which stand out. First, there was a strong protection of private property. Second, a balance of moderate inequality coexisted with the benefits of socially tolerant individualism. Third, the citizens who governed the city-state took ownership of the consequences of their decisions. Contemporary Greeks, having experienced excellent results between 1954 and 1974 from the combination of these principles, "decided" to change course after returning to democracy following seven years of military dictatorship.[28] With the adoption of the 1975 Constitution, they embraced a regime designed to promote a social state, where governance institutions hold greater power than the sovereignty of the people.

On a theoretical level, this paper examines the evolution of economic growth during this period, identifying key factors that contributed to its downward trend and the framework in which these factors interacted to produce this outcome. The analysis reveals that the redistribution mechanisms embedded in the 1975 Constitution were motivated by appeals for social programs aimed at reducing inequality, persistent demand for public sector employment, funding these programs through increased taxes and public borrowing, and expanding the state's domain through numerous restrictions on individual and economic freedoms. On the empirical side, our task was both clear and challenging, as it was difficult to extend several crucial time series back to years prior to 1995. Nevertheless, the estimated model successfully passed all rigorous tests, and the experiments conducted with it were highly enlightening.

Our findings indicate that the downward trend in economic growth during the post-1974 period can be attributed to various redistribution policies introduced with the express aim of reducing inequality and expanding public employment. These policies have undoubtedly discouraged savings, reduced investment, suppressed risk-taking and entrepreneurship, and incentivized businesses and skilled professionals to relocate abroad. While reducing inequality served as the justification for garnering public support and maintaining political stability, the primary aim of the political order established under the 1975 Constitution was to expand the social state. As evidenced by general government expenditure, this expanded from 24.1% of GDP in 1974 to 52.3% in 2023.[29, 30] Moreover, the estimated model confirms that to achieve this vast redistribution, governments have impeded economic growth by continually increasing taxes on income and wealth, imposing high value-

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[28] I inserted quotation marks in the word “decided” because in several papers and books published in Greek either by myself alone or jointly with other authors, we have documented that the 1975 Constitution was ratified in a period of anomalous political circumstances and under the influence of a narrow circle of politicians, academics, entrepreneurs, etc., who held ideas considerably alien to Western type democracy.

[29] See OECD (1975, 2023).

[30] In the Fraser Institute index of Economic Freedom for 2021, which was just published, as well as that of the CATO institute cited in the text, Greece ranks in the second quartile among the rather illiberal countries. What is of importance in this regard is that Greece’s ranking is due mostly to the large size of its public sector.

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added taxes, expanding public sector employment, and employing various means to prevent rising unemployment.[31]

In light of this evidence, pertinent questions arise: What should be done? What can be done? And what are the chances of reversing the troubling trends facing Greece looking forward? A review of the literature on why reforms often fail in Greece leaves me skeptical regarding the implementation of any fundamental structural changes. Having illustrated in this paper the significant social costs of past practices, I can only hope that my fellow citizens may support my singular recommendation: to return to the provisions and institutional arrangements of the 1952 Constitution. Alternatively, if some readers find my suggestion outdated, we might consider the proposal for a new, innovative constitution recently put forth by Alivizatos et al. (2016). If six distinguished Greek citizens can dedicate their time to articulating the need for a new constitution, their ideas deserve broader public communication and discussion, especially as the Greek parliament is presently in the process of revising the Constitution from 1975. Unfortunately, that is not happening.

Lastly, there is a specific aspect of this paper that warrants further research: the data which did not meet our expectations regarding the indices of human and economic freedoms yielding statistically significant results. As researchers acknowledge the vital role these freedoms play in enabling competitive markets to address social challenges, the relationship between these indices and economic growth will become clearer.[32]

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[31] The tragedy, if not sheer mockery, of it all is that the ideologues and promoters of the social state in all political parties in Greece attribute this transformation to "neoliberal" policies.

[32] Tsitouras, Papanagos (2023) have taken notice of the importance of these freedoms by focusing on their linkage to inequality in Greece.

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θρο ανέβηκε και πάλι και βρίσκεται στην ιστοσελίδα Το «παρασύνταγμα» του μνημονίου και ο άλλος δρόμος - constitutionalism.gr, (Katrougalos, 2010).

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# Annex: Tables

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**Table 1**: Ranking of certain key countries based on indices of human and economic freedom[1]

| Countries | Human freedom[2] | Economic freedom |
|---|---|---|
| Australia | 11 | 6 |
| Ireland | 5 | 10 |
| Denmark | 4 | 5 |
| USA | 23 | 7 |
| Greece | 57 | 85 |
| China | 152 | 139 |

Notes:
1. Based on the Human Freedom Index: 2022 | Cato Institute. The data refer to the year 2020.
2. The index of Human Freedom is computed by taking the average of the indices of Personal Freedom and Economic Freedom.

**Table 2**: Cumulative effects of redistribution policies on the finances of Greece's general government over the period 1975-2021[1]

| 1974 | | | | | 2021[2] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Current[3] | | Debt | | | Current | | Debt[6] | | |
| Expenditure | 23.9 | (37.5) | 16.2[4] | (≈55)[5] | Expenditure | 57.1 | (47.1) | Gross | 225.7 | (129.8) |
| Revenue | 26.4 | (36.5) | | | Revenue | 49.7 | (39.4) | Net | 168.4 | (81.0) |

**Notes**:
1. The figures in the parentheses are simple or unweighted OECD country averages. If not stated expressly otherwise, all figures are reported as % of the Gross Domestic Product (GDP)
2. All figures for 2021 come from OECD (2023, 8).
3. The figures for 1974 were computed as simple averages of those for 1973 and 1975 by drawing on Saunders (1985, 5). For Greece and the OECD, this source reports general government expenditure and revenue as shown below:

| | | 1973 | 1975 |
|---|---|---|---|
| Greece | Expenditure | 21.1 | 26.7 |
| | Revenue | 25.4 | 27.4 |
| OECD | Expenditure | 34.4 | 40.5 |
| | Revenue | 35.3 | 37.6 |

   In contrast, the 1974 figures reported for Greece in OECD (1975, Table: Basic Statistics of Greece) as a percentage of GNP were: expenditure: 24.1%, revenue: 22.6%. Since Greece's GNP exceeds its GDP, the differences in the reported percentages between the two sources should be narrower. However, note that, according to the first source, 1974 was a surplus year for Greece, whereas according to the OECD figures, it was a deficit year. Between 1975 and 1981, both sources indicate that the budget deficit widened.
4. How much debt democratic governments inherited from the military regime in 1974 is a much-contested issue. Sarafidis, Panagiotelis, Panagiotidis (2017, 6) claim that in 1974 the debt-to-GDP ratio was 21.2% and that it remained relatively stable for the rest of the decade, climbing in 1980 only to 22.8%. Several years earlier, Alogoskoufis (2013, 48) found that the ratio rose from a bit less than 20% in 1975 to a bit more in 1980. In contrast, Bitros, Karayiannis (2013, 208), using data from AMECO, found that the debt-to-GDP ratio in 1974 was 16.2% and that it trended upward in the remaining years of the decade. Furthermore, as the responsibility for the accumulation of unsustainable public debt continues to be central to party politics, it is interesting to note that the Greek printed and electronic media are full of heated debates as to what went wrong and who is the prime minister of which party that did the most harm by letting the accumulation of public debt get out of control.
5. The figure in this parenthesis is a conservative guess arrived at as follows. Using data from 1967 to 1969, as reported by the OECD (1974, Table 10), yielded a debt-to-GNP ratio of 45%. The countries included in the computation of this simple unweighted average were Ireland, the United Kingdom, France, Germany, Italy, the Netherlands, the United States, Canada, and Japan. However, this figure does not include debt payable in foreign currency and refers specifically to the central government. Hence, given that in Greece local and regional authorities rarely, if ever, borrow, whereas in most of the abovementioned countries they do, the average OECD debt in 1974 must have been higher because, the trend for this ratio over the period 1968-1974 was positive, the general government debt is typically higher than that of central government, and holding 20-25% of a country's debt in foreign exchange seemed to be the norm at the time.
6. Net debt is Gross debt less any reserves the country may have in cash-like and other highly liquid assets.

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**Table 3**: Evolution of inequality over the period 1959-1986[1]

| Years | Shares | |
|---|---|---|
| | Top 5% | Top 1% |
| 1959 | 0.222 | 0.095 |
| 1974 | 0.205 | 0.079 |
| Decline | **9.9%** | **16.8%** |
| 1975 | 0.193 | 0.069 |
| 1986 | 0.167 | 0.053 |
| Decline | **16.6%** | **30.2%** |

Notes:
1. See Livada (1991,79).

**Table 4**: Details about the data and the variables

| Symbols[1] | Description | Period[2] | Units | Source |
|---|---|---|---|---|
| $y_t$ | GDP per employed worker | 1960-2023 | 1000 € at 2015 prices | AMECO |
| $gn_t$ | Gini coefficient | 1995-2023 | Percentage | OECD |
| $pseg_t$ | Public sector employment in Greece | 1987-2023 | Percentage | NSSG[3] |
| $psei_t$ | Public sector employment in Italy[4] | 1995-2023 | Percentage | NSSI[5] |
| $pses_t$ | Public sector employment in Spain | 2000-2023 | Percentage | ILO[6] |
| $tb_t$ | Tax burden on the total economy | 1995-2023 | % of GDP | AMECO |
| $tiw_t$ | Taxes on income and wealth | 1995-2023 | % of GDP | AMECO |
| $dt_t$ | General government consolidated gross debt | 1995-2023 | % of GDP | AMECO |
| $ef_t$ | Economic freedom[7] | 1995-2021 | Index | CATO |
| $hf_t$ | Human freedom[8] | 2000-2021 | Index | CATO-FRAZER[9] |

Notes:

1. All variables are in logs.
2. Observe that the number of observations that can be extracted from the international databases for the variables in the extreme left-hand column varies significantly. Critical for this paper is the number of observations for the Gini coefficient. That is why, except when included variables in the estimation have fewer observations, the focus is on the 29 observations of the period 1995-2023.
3. National Statistical Service of Greece.
4. The variables $epsi_t$ and $epss_t$ stand for excess employment in the public sector in Greece and have been defined respectively as $(pseg_t - psei_t)$ and $(pseg_t - pses_t)$. For an explanation of the logic for constructing and testing these variables, please see page 28, footnote 29.
5. National Statistical Service of Italy.
6. International Labor Organization.
   This index accounts for the size of the government, the legal system, the property rights, sound money, freedom to trade internationally, and regulation.
8. See note 2 in Table 1. The index of Personal Freedom used in computing the average of the index of Human Freedom accounts for the rule of law, security, and safety, as well as the freedoms of movement, religion, association, assembly, and others. It is published by the Fraser Institute in Canada.
9. I am much indebted to Mr. Constantinos Saravakos of the Center of Liberal Studies, who spotted an inconsistency in the sources of these data and helped us clarify it.

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**Table 5**. Summary of descriptive statistics[1, 2]

| Variables | Obs. | Mean | Std. Dev. | Min | Max. |
|---|---|---|---|---|---|
| $y_t$ | 29 | 3.738 | 0.094 | 3.584 | 3.912 |
| $gn_t$ | 29 | -1.098 | 0.063 | -1.273 | -1.019 |
| $pseg_t$ | 29 | -1.519 | 0.029 | -1.556 | -1.444 |
| $epsi_t$ | 29 | -2.862 | 0.313 | -3.540 | -2.465 |
| $epss_t$ | 24 | -2.870 | 0.156 | -3.079 | -2.538 |
| $tb_t$ | 29 | 2.187 | 0.133 | 1.857 | 2.396 |
| $tiw_t$ | 27 | 1.959 | 0.029 | 1.892 | 1.995 |
| $dt_t$ | 22 | 2.063 | 0.027 | 2.014 | 2.092 |
| $ef_t$ | 29 | 4.902 | 0.278 | 4.579 | 5.333 |
| $hf_t$ | 29 | 3.583 | 0.124 | 3.380 | 3.764 |

Notes:
1. All variables are in logs.
2. Notice that the variables have 24, 27, and 22 observations, respectively. When these variables are included in the estimating equations, the observations for all variables included are adjusted accordingly.

**Table 6:** Unit root tests[1,2]

| | $y_t$ | $gn_t$ | $pseg_t$ | $epsi_t$ | $epss_t$ | $dt_t$ | $tb_t$ | $tiw_t$ | $ef_t$ | $hf_t$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: Levels** | | | | | | | | | | |
| ADF-test | -1.44 | -0;17 | -2.56 | -2.15 | -2.15 | -1.07 | -1.28 | -3.04** | -1.54 | -0.19 |
| ADF+trend | -2.08 | -2.33 | -2.62 | -1.02 | -2.53 | -1.63 | -1.79 | -3.67** | -2.64 | -2.75 |
| PP-test | -1.73 | -0.65 | -2.79*** | -2.54 | -1.84 | -1.04 | -1.22 | -2.32 | -2.02 | -0.21 |
| PP +trend | -2.11 | -1.67 | -2.78 | -1.24 | -2.59 | -1.54 | -2.04 | -2.76 | -3.08 | -2.46 |
| KPSS-test | 0,18** | 0.13* | 0.09 | 0.20** | 0.08 | 0.10 | 0.09 | 0.07 | 0.12* | 0.12* |
| **Panel B: First Differences** | | | | | | | | | | |
| ADF-test | -4.01*** | -4.76*** | -5.59*** | -5.66*** | -4.82*** | -3.91*** | -5.18*** | -4.97*** | -6.25*** | -4.73*** |
| PP-test | -4.05*** | -4.73*** | -5.60*** | -5.65*** | -4.82*** | -3.94*** | -3.20*** | -4.98*** | -6.93*** | -4.77*** |
| KPSS-test | 0.16** | 0.08 | 0.06 | 0.05 | 0.08 | 0.14** | 0.09 | 0.07 | 0.09 | 0.08 |

Notes:
1. The null hypothesis for ADF and PP unit root tests is that the time series is non-stationary. $Z(t)$-*Statistics* are presented for both tests. The null hypothesis for the KPSS unit root test is that the time series is trend stationary. The *LM-statistics* are reported. The *maximum lag* for the KPSS test is 3, chosen according to the Schwarz criterion.
2. ***, **, * declares the rejection of null hypothesis for $\alpha$*=1, 5,* and *10%,* respectively.

`````
`````

**Table 7:** Unit root results with structural break

| | $y_t$ | $gn_t$ | $pseg_t$ | $epsi_t$ | $epss_t$ | $dt_t$ | $tb_t$ | $tiw_t$ | $ef_t$ | $hf_t$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ZA[1, 2] | -2.817 | -3.693 | -3.830 | -4.821* | -5.328** | -2.698 | -3.163 | -6.160*** | -5.376** | -3.530 |
| Break | 2003 | 2012 | 2015 | 2004 | 2009 | 2009 | 2011 | 2012 | 2015 | 2013 |

Notes:
1. The abbreviation ZA stands for the Zivot-Andrews test. The null hypothesis is that the series has a unit root with a structural break against the alternative hypothesis that it is stationary with a break. The optimal lag is chosen by *Schwarz information criterion*; ***, **, * declares the rejection of the null hypothesis for *α=1, 5,* and *10%*, respectively.
2. From Angyridis, Michelis (2021) we knew that in comparison to the ZA test there is a more powerful unit root test with structural break. The latter test was not available in the Stata package we employed for our estimations and under the circumstances we refrained from investing the time and the effort which would be required to conduct it. However, in future cross-checking of our results, it is advisable to adopt this test.

3.

**Table 8:** ARDL estimates of equation (4)

| Effects | Estimates and test statistics of equation (4)s[1,2,3] | | | | |
|---|---|---|---|---|---|
| | Variables | Coefficients | t-ratios | P>\|t\| | 95% CI |
| Short-term | $\Delta gn_t$ | -.7312*** | -6.42 | 0.000 | [-.9850 -.4774] |
| | $\Delta gn_{t-1}$ | -.7723*** | -5.59 | 0.000 | [-1.080 -.4647] |
| | $\Delta tiw_t$ | .1922** | 2.91 | 0.016 | [.0931 .3267] |
| | $\Delta tiw_{t-1}$ | .2099*** | 4.00 | 0.003 | [-.2408 -.0560] |
| | $\Delta epss_t$ | -.1484*** | -3.58 | 0.005 | [-.2408 -.0560] |
| | $\Delta epss_{t-1}$ | -.1309** | -4.26 | 0.002 | [-.1994 -.0624] |
| Long-run | $gn_t$ | .5188*** | 4.11 | 0.002 | [.2378 .7998] |
| | $tiw_t$ | -.2082* | -1.93 | 0.082 | [-.4480 .0316] |
| | $epss_t$ | .2808*** | 6.74 | 0.000 | [.1879 .3736] |
| ADJ | $y_{t-1}$ | -.8748*** | -9.22 | 0.000 | [-1.086 -.6634] |
| Exogenous | $tb_t$ | -.3295*** | -3.37 | 0.007 | [-.5476 -.1114] |
| | Constant | 6.077*** | 9.52 | 0.000 | [4.654 7.500] |
| ARDL (1,2,2,2) | Observations[4] | 22 | | | |
| | R-squared | 0.9542 | | | |
| | Adjusted $\bar{R}^2$ | 0.9037 | | | |
| | Root MSE | 0.0111 | | | |
| | Log likelihood | 76.432 | | | |

Notes:
1. ***, **, * denote the rejection of null hypothesis for *α=1, 5,* and *10%*, respectively.
2. Due to the limited number of available observations in the data, the maximum lag was restricted to 2. The Akaike information criterion was used to select the optimal number of lags. The values of *F*- and *t*-statistics from the PSS bounds test, both of which ascertain the stability of the estimated coefficients, are shown in Table 9.
3. It is appropriate to stress that in carrying out the estimations, we experimented with two dummy variables, one to allow for the 2001 change in the monetary policy regime, when Greece entered the European Monetary Union (EMU), and another to account for the crisis in 2009. These dummy variables are absent because none were statistically significant.
4. In the estimations, the number of observations utilized is determined by the included variable with the least number of observations. In the present equation, the variable $epss_t$ has 24 observations, thus allowing for two lags, with an equal loss of degrees of freedom.

`````
`````

**Table 9:** ARDL PSS bounds test for equation (4) of Table 8

H0: no level relationship F = 21.904
Case 3 t = -9.223

Asymptotic (3 variables)

Kripfganz and Schneider (2020) critical values and approximate p-values

| | 10% | | 5% | | 1% | | p-value | |
|---|---|---|---|---|---|---|---|---|
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| F | 2.727 | 3.745 | 3.223 | 4.318 | 4.290 | 5.526 | 0.000 | 0.000 |
| t | -2.569 | -3.426 | -2.864 | -3.743 | -3.434 | -4.340 | 0.000 | 0.000 |

do not reject H0 if
either F or t are closer to zero than critical values for I(0) variables
(if either p-value > desired level for I(0) variables)
reject H0 if
both F and t are more extreme than critical values for I(1) variables
(if both p-values < desired level for I(1) variables)

decision: no rejection (.a), inconclusive (.), or rejection (.r) at levels:

| | 10% | 5% | 1% |
|---|---|---|---|
| decision | .r | .r | .r |

**Table 10**: Post-estimation diagnostic tests

| Tests | Specification | Test statistics | Critical values | P-values |
|---|---|---|---|---|
| Heteroskedasticity | Breusch–Pagan/Cook–Weisberg[1] | chi2(1) =0.75 | | Prob > chi2 =0 .387 |
| Serial Correlation/ Autocorrelation | Durbin's alternative[2] | 0.240 | | 0.6244 |
| | Breusch–Godfrey- LM[2] | 0.571 | | 0.4499 |
| | LM test for ARCH[2] | chi2 =0.279 | | Prob > chi2 =0.460 |
| Misspecification | Ramsey RESET[3] | F(3, 3) = 0.97 | | Prob > F = 0.762 |
| Normality | Skewness/kurtosis[4] | Adj chi2(2)= 0.59 | | Prob>chi2=.8571 |
| | Jarque-Bera[5] | chi2(2)=.3085 | | Prob>chi2 =0.8571 |
| Cusum-test for parameter stability | Recursive residuals[6] | 0.6188 | [1%-5%-10%] [1.1430- 0.9479-0.8499] | |

Notes:
1. Null hypothesis: Normal error terms or errors are homoskedastic.
2. Null hypothesis: No serial correlation.
3. Null hypothesis: no ARCH effects.
4. Null hypothesis: The Model has no omitted variables.
5. Null Hypothesis: The data follows a normal distribution.
6. Null hypothesis: No structural breaks.

`````
`````

**Table 11:** Dynamic ARDL estimates of equation (4)[1]

| Effects | Parameter estimates and test statistics | | | | |
|---|---|---|---|---|---|
| | Variables | Coefficients | t-ratios | P>\|t\| | 95% CI |
| Short-term | $\Delta gn_t$ | -.2701** | -2.68 | 0.021 | [-.4915 -.8487] |
| | $\Delta gn_{t-1}$ | -.7787*** | -6.22 | 0.000 | [-1.054 -.5030] |
| | $\Delta tiw_{t-1}$ | .2127*** | 4.54 | 0.001 | [.1096 .3157] |
| | $\Delta epss_t$ | .0967*** | 4.03 | 0.002 | [-.0439 -.1496] |
| | $\Delta epss_{t-1}$ | -.1293*** | -4.70 | 0.001 | [-.1898 -.0687] |
| Long-run | $gn_{t-1}$ | .4585*** | 4.06 | 0.002 | [.2102 .7069] |
| | $tiw_{t-1}$ | -.1925*** | -3.05 | 0.011 | [-.3314 .0537] |
| | $epss_{t-1}$ | .2434*** | 6.29 | 0.000 | [.1582 .3286] |
| ADJ | $y_{t-1}$ | -.8707*** | -10.0 | 0.000 | [-1.061 -.6798] |
| Exogenous | $tb_t$ | -.3197*** | -4.55 | 0.000 | [-.4742 -.1652] |
| | Constant | 6.048*** | 10.4 | 0.000 | [4.768 7.328] |
| ARDL(1,2,2,2) | Observations | 22 | | | |
| | F(10, 11) | 22.84 | | | |
| | R-squared | 0.9540 | | | |
| | Adjusted $\bar{R}^2$ | 0.9123 | | | |
| | Root MSE | 0.0106 | | | |

Notes:
1. See notes in Table 8