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The impact of Public Debt on the general business climate in
Greece (2000-2025)

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Patras, Greece, May 2026

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“To my husband and our children. Thank you for your boundless patience and your unwavering belief in me”

Abstract

Public debt and economic growth have long been central issues in macroeconomic research, particularly following the European sovereign debt crisis and the COVID-19 pandemic. At the same time, economic sentiment has emerged as an important indicator of economic expectations, influencing investment decisions, consumer behavior, and overall economic activity. Therefore, understanding the interaction between public debt, economic sentiment, and economic growth is important for both economists in evaluating economic performance and policymakers in designing effective policy measures.

The present dissertation examines the relationship between public debt and economic growth in Greece during the period 2000–2025, with the Economic Sentiment Indicator (ESI) performing as an indicator of economic expectations and thus as a transmission mechanism. Greece represents a relevant case study due to its economic fluctuations through this period, the severe fiscal and economic challenges it experienced during the sovereign debt crisis, the subsequent recovery period, and the economic disruptions caused by the COVID-19 pandemic. The study uses data obtained from ELSTAT, Eurostat, the European Commission, and the IMF. It employs data presentation of public debt, economic growth, and the ESI, descriptive statistics, graphical, and correlation analysis to examine the relationship between these three variables over time. The theoretical model suggests that public debt influences economic growth both directly and indirectly, with economic sentiment playing an intermediary role in the transmission mechanism between public debt and economic growth. In particular, high levels of public debt may increase fiscal uncertainty and weaken business and consumer confidence, resulting in vulnerability to economic growth. Conversely, lower debt levels improve economic sentiment and strengthen economic activity.

Keywords

Public Debt, Economic Sentiment Indicator (ESI), Economic Growth, Greece, Debt Sustainability, Expectations.

Περίληψη

Το δημόσιο χρέος και η οικονομική ανάπτυξη αποτελούν εδώ και καιρό κεντρικά θέματα στη μακροοικονομική έρευνα, ιδίως μετά την ευρωπαϊκή κρίση δημόσιου χρέους και την πανδημία COVID-19. Ταυτόχρονα, το οικονομικό κλίμα έχει αναδειχθεί ως σημαντικός δείκτης των οικονομικών προσδοκιών, επηρεάζοντας τις επενδυτικές αποφάσεις, τη συμπεριφορά των καταναλωτών και τη συνολική οικονομική δραστηριότητα. Η κατανόηση της αλληλεπίδρασης μεταξύ του δημόσιου χρέους, του οικονομικού κλίματος και της οικονομικής ανάπτυξης είναι επομένως υψηλής σημασίας τόσο για τους οικονομολόγους για την αξιολόγηση της απόδοσης μιας οικονομίας, όσο και για τους υπεύθυνους χάραξης πολιτικής που σχεδιάζουν αποτελεσματικά μέτρα πολιτικής. Η παρούσα διατριβή εξετάζει τη σχέση μεταξύ του δημόσιου χρέους και της οικονομικής ανάπτυξης στην Ελλάδα κατά την περίοδο 2000-2025, με τον Δείκτη Οικονομικού Κλίματος (ESI) να λειτουργεί ως δείκτης οικονομικών προσδοκιών και συνεπώς ως μηχανισμός μετάδοσης. Η Ελλάδα αποτελεί μια μελέτη περίπτωσης με μεγάλο ενδιαφέρον, λόγω των οικονομικών διακυμάνσεών της κατά τη διάρκεια αυτής της περιόδου, των σοβαρών δημοσιονομικών και οικονομικών προκλήσεων που αντιμετώπισε κατά τη διάρκεια της κρίσης δημόσιου χρέους, καθώς και της επακόλουθης περιόδου ανάκαμψης και των οικονομικών διαταραχών που προκλήθηκαν από την πανδημία COVID-19. Η μελέτη χρησιμοποιεί στοιχεία που ελήφθησαν από την ΕΛΣΤΑΤ, τη Eurostat, την Ευρωπαϊκή Επιτροπή και το ΔΝΤ. Χρησιμοποιεί παρουσίαση δεδομένων για το δημόσιο χρέος, την οικονομική ανάπτυξη και τα ESI, περιγραφικές στατιστικές, γραφική ανάλυση και ανάλυση συσχέτισης για να εξετάσει τη σχέση μεταξύ αυτών των τριών μεταβλητών με την πάροδο του χρόνου. Το θεωρητικό μοντέλο προτείνει ότι το δημόσιο χρέος επηρεάζει την οικονομική ανάπτυξη τόσο άμεσα όσο και έμμεσα, όπου το οικονομικό συναίσθημα παίζει ενδιάμεσο ρόλο στον μηχανισμό μετάδοσης μεταξύ του δημόσιου χρέους και της οικονομικής ανάπτυξης. Ειδικότερα, τα υψηλά επίπεδα δημόσιου χρέους ενδέχεται να αυξήσουν τη δημοσιονομική αβεβαιότητα και να αποδυναμώσουν την εμπιστοσύνη των επιχειρήσεων και των καταναλωτών, με αποτέλεσμα να είναι ευάλωτη η οικονομική ανάπτυξη. Από την άλλη πλευρά, τα χαμηλότερα επίπεδα χρέους βελτιώνουν το οικονομικό κλίμα, ενισχύοντας την οικονομική δραστηριότητα.

Λέξεις – Κλειδιά

Δημόσιο Χρέος, Δείκτης Οικονομικού Κλίματος (ESI), Οικονομική Ανάπτυξη, Ελλάδα, Βιωσιμότητα χρέους, Προσδοκίες.

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List of Abbreviations & Acronyms

GDP	Gross Domestic Product
ESI	Economic Sentiment Indicator
EC	European Commission
ESM	European Stability Mechanism
EFSF	European Financial Stability Facility
IMF	International Monetary Fund
ELSTAT	Hellenic Statistical Authority
EUROSTAT	Statistical Office of the European Union
PMI	Purchasing Managers’ Index

1. Introduction

The global economy is adjusting to a landscape reshaped by new policy measures. The COVID-19 pandemic of 2020 caused debates over the macroeconomic implications of rising public debt. Governments around the world reacted to the crisis with expansive fiscal measures, which raised sovereign debt to new heights. High debt means less room to respond to shocks. High and rising debt levels raise concerns about fiscal sustainability, intergenerational equity, and potential constraints on future policy space. On the other hand, fiscal stimulus funded by debt can be used as a policy during economic downturns, particularly when monetary policy may be constrained. A key policy question, therefore, is not whether public debt is good or bad, but rather under what conditions it becomes harmful to long-run economic performance (Salmon, 2026).

At the same time, economic sentiment has emerged as an important indicator of economic expectations, affecting investment decisions, consumer and business behavior, and economic activity (European Commission, 2023; Mourougane & Roma, 2002). Thus, public debt, economic sentiment, and economic growth constitute three of the most important dimensions of macroeconomic analysis, and their interaction is essential in economic policymaking. Analyzing the experiences of specific countries can provide valuable knowledge about their challenges and policy implications.

Greece provides a notable case study in the context of public debt, economic growth, and economic sentiment. During the period 2000–2025, it experienced substantial economic fluctuations, including the global financial crisis, the sovereign debt crisis, fiscal adjustment programs, and the COVID-19 pandemic. Greece experienced high debt levels and unsustainable fiscal policies, which led to the accumulation of debt, loss of market confidence, and higher interest rates on Greek government bonds, increasing borrowing costs. Thus, they entered bailout programs and received financial assistance from the International Monetary Fund (IMF), the European Commission (EC), and the European Central Bank (ECB) with exchange austerity measures and structural reforms measures, including reduction in spending, increases in taxes, pension and labor market reforms, and privatizations. The population of Greece faced a reduction in income, increasing unemployment, and deterioration of living standards. Therefore, Greece provides an

interesting case for investigating how public debt interacts with economic growth through various channels.

The purpose of this dissertation is to examine the relationship between public debt and economic growth in Greece during the period 2000–2025, with ESI performing as an indicator of economic expectations and thus as a transmission mechanism. More specifically, this study aims to examine the research question: “Does rising public debt affect economic growth directly and indirectly through changes in economic sentiment”?

The study attempts to connect the existing literature by focusing on the relationship between public debt, economic growth, and ESI. It employs descriptive statistics, graphical analysis, and correlation analysis to analyze the interaction among these variables for Greece. The analysis is based on annual and quarterly data obtained from international and European statistical databases, including Eurostat, the European Commission, ELSTAT(Hellenic Statistical Authority), and the IMF. In addition, this study examines the evolution of the variables across different economic periods, including the pre-crisis period, sovereign debt crisis, recovery phase, and post-pandemic period.

The significance of this study lies in its attempt to combine fiscal variables and confidence indicators within one framework. Most existing studies have extensively examined the relationship between public debt and economic growth; however, fewer studies have examined the role of economic sentiment as a potential transmission mechanism, especially in Greece.

The theoretical model proposed in this study suggests that public debt influences economic growth both directly and indirectly via economic sentiment. In particular, high levels of public debt may increase fiscal uncertainty and weaken business and consumer confidence. Consequently, economic growth may deteriorate. The study also establishes that ESI plays an intermediary role in the transmission channel between public debt and economic growth. Improvements in economic sentiment are associated with stronger economic activity and higher growth rates, whereas deteriorating confidence may lead to downturns during periods of fiscal instability. Overall, the theoretical framework indicates that the relationship between public debt, economic sentiment, and economic growth is closely interrelated. Fiscal instability appears to negatively affect confidence and

macroeconomic performance, whereas stable economic conditions and improved expectations may contribute positively to economic recovery and long-term growth.

The remainder of this dissertation is structured as follows. Chapter 2 presents a literature review (theoretical and empirical) regarding public debt, economic sentiment, and economic growth, referring to the case of Greece. Chapter 3 presents the data for Greek public debt, growth, and ESI, as well as descriptive statistics, and graphical analysis and correlation of the variables. Finally, Chapter 4 presents the policy implications, limitations of the study, recommendations, and conclusions.

2. Literature review

“There is no simple relationship between debt and growth [...] There are many factors that matter for a country’s growth and debt performance. Moreover, there is no single threshold for debt ratios that can delineate the “bad” from the “good”. (International Monetary Fund, 2012, p. 9).

This chapter is a synthesis of the main theoretical and empirical studies that examine the relationship between public debt, economic growth, and economic sentiment, focusing on the case of Greece, to the end of this chapter. This analysis has long been debated by researchers due to the importance of fiscal sustainability and expectations and their impact on economic performance, especially after the European debt crisis. On the one hand, high debt levels can lead to economic volatility and fiscal instability. On the other hand, policymakers often use debt as a fiscal tool to stimulate production and the economy, especially during periods of subdued economic activity, where monetary policy may be limited.

Many empirical researchers have used different approaches, such as regression analysis, panel data analysis, and threshold models, to examine whether public debt affects GDP growth. The majority of empirical studies suggest a negative relationship between public debt and growth, especially beyond specific debt thresholds (Reinhart & Rogoff, 2010; Kumar & Woo, 2010). However, the literature also highlights the presence of non-linearities and cross-country variation in the debt-growth relationship (Checherita-Westphal & Rother, 2012; Panizza & Presbitero, 2014). The empirical results vary, depending on the amount of debt, its purpose, and the structural and macroeconomic circumstances.

The existing literature emphasizes that the effects of debt on economic activity are often transmitted through indirect channels, such as uncertainty and reduced confidence of investors, and focuses on the role of expectations. ESI, developed by the European Commission, has long been used to capture information about expectations and future economic activity, from business and consumer surveys. Empirical research shows that sentiment indicators are predictors of short- term fluctuations in GDP, investment, and business cycle dynamics. (Mourougane & Roma, 2002; Zanin, 2011; Gajewski, 2014; European Commission, 2023).

While limited empirical studies have directly related public debt, economic sentiment indicators, and growth into a unified framework, existing studies suggest that high levels of public debt may reduce investor and consumer confidence through increased fiscal uncertainty and concerns about debt sustainability. As a result, expectations may deteriorate, leading to lower investments and constraints in economic activity and growth (Ardagna, 2009; Arghyrou & Kantonikas, 2012; Lane, 2012).

This review aims to present the main theoretical studies and the main empirical findings on the interaction between public debt, expectations, economic sentiment, and growth. Finally, this review focuses on the interaction of these macroeconomic variables in the case of Greece, which experienced a high increase in public debt, especially after the European sovereign debt crisis, and was accompanied by a decline in economic sentiment and a shrinkage in GDP.

Thus, a key question that remains is not whether debt is bad or good, but under what circumstances it can have a positive or negative impact on economic activity.

2.1 Theoretical Background

The theoretical framework is very important in understanding the interconnections between debt, economic sentiment, and growth, as it explains the mechanism behind the observed data. Understanding these interconnections is crucial for analyzing macroeconomic activity and designing effective economic policies.

2.1.1 Public Debt and Economic Growth

As far as public debt and GDP are concerned, three major theories relate these two macroeconomic variables.

Classical- Neoclassical Theory- Crowding out effect

Classical and neoclassical theories point out that debt has negative or zero effects on growth in the long run. Classical economists such as Smith (1776/1976), Ricardo (1817/2004), and Mill (1848/2004) showed that financing public expenditures via borrowing is harmful to the economy. This is because borrowing reduces savings directly

and thus income to be invested in a productive way. Therefore, if government expenditures are not productive, this undermines the economy's capacity to accumulate (Tsoulfidis, 2007), because public debt redirects private capital from its productive uses to non-productive uses.

This is the main idea of the crowding out effect. According to this effect, when the government borrows more to finance budget deficits, it diverts available savings in the loanable fund market, which leads to an increase in real interest rates and reduces private investments (Barro, 1974,1979), which in turn reduces capital stock in the long run and thus, the economic activity.

According to Solow's (1956) neoclassical growth model, capital accumulation, productivity, and technological progress are the major determinants of long-run GDP. Salmon (2025), concentrating on many empirical studies, stated that each percentage increase in the public debt ratio leads to a three to five basis point increase in long-term interest rates. In addition, according to the traditional view of public debt in the short run (Elmendorf and Mankiew, 1999), when government debt is issued, it stimulates aggregate demand and growth because spending on infrastructure and wages stimulates consumption and investment, leading to higher output. However, in the long run, things differentiate, and higher public debt reduces national savings, interest rates may increase, private investment may decline, leading to a reduction of capital stock.

In this context, Barro formally developed the theory of Ricardian Equivalence (1974), based on the earlier insights of Ricardo. According to this theory, taxation and public borrowing are equivalent forms of financing public expenditures, because rational individuals will increase their private savings to pay higher taxes in the future caused by government borrowing. This means that a tax cut funded by debt issuance would not stimulate the economy due to the increase in consumers' savings to pay higher taxes in the future. On the other hand, a tax increase financed by a reduction in debt would have a similar impact on aggregate demand. However, if Ricardian Equivalence does not hold, for example, due to credit constraints or myopic consumer behavior, the issuance of government debt reduces disposable income and savings, and thus investments, leading back to the crowding- out effect. (Elmendorf & Mankiw, 1999)

Keynesian growth theories

While classical and neoclassical theories argue that in the long run debt has a negative or zero impact on growth, Keynesians argue that, in the short run, increases in aggregate demand raise national income. (Elmendorf and Mankiew, 1999). According to Keynes (1936), during periods of recession or decline in economic activity, output is mainly affected by demand and not by supply, and the market cannot achieve full employment on its own. Therefore, according to Keynesian Theory, the government must intervene by cutting taxes and increasing government spending. Thus, public debt has a positive multiplier effect on the economy. New Keynesian Theories focus on how the interest rate on government debt is related to the growth rate. Blanchard (2019) mentioned that if the average interest rate is below the growth rate, governments can sustain higher levels of debt without crowding out effects.

Overall, under Keynesian Theory, government debt in the short run and under specific conditions can have a positive impact on stimulating demand and boosting the economy. Tkacova, Toth et al(2015) in their empirical research emphasized the role of tailored fiscal policies and prudent strategies in debt management.

Endogenous Growth Theories

According to the endogenous growth model, economic growth can be achieved internally through factors that are endogenous, mainly technological progress, generated by the rate of investments, the size of capital stock, and the stock of human capital. Advancements in innovation, knowledge, and human capital can increase productivity and thus economic performance, Romer (1986, 1990). In some endogenous growth models, productive expenditure plays an important role. Barro (1990) states that when public expenditures on services such as education and infrastructure enter the production function, they can increase productivity and boost growth. However, when public spending is not in moderation, it leads to higher public debt or taxation and can negatively affect growth.

Debt Overhang Theory

In the literature, several theories support the impact of public debt on GDP, depending on the level of debt, often called the debt overhang hypothesis. This theoretical literature is

often associated with the empirical literature on non-linear (asymmetric) effects of debt on GDP, which implies that low levels of debt can boost growth, while unsustainable levels of debt can hinder it. Debt overhang theory was proposed by Krugman (1988), who argued that "Debt Overhang" is a scenario in which "the expected present value of future country transfers is less than the current face value of its debt" (pg 254). The idea behind this is that when debt levels are excessive, they discourage investments. This occurs because investors anticipate that any future investment earnings will be subject to higher taxation to pay off the debt. At lower levels, debt may not have a negative impact but may even be beneficial. Furthermore, excessive levels of debt lead to higher indebtedness, deteriorate the business climate, and make creditors demand higher interest rates to be compensated for the increased risk. This will increase borrowing costs, decrease investments, and deteriorate economic activity.

An influential study was that of Reinhart and Rogoff (2010), who studied growth across many countries and periods and found a 90% threshold of debt-to-GDP ratio. When the debt-to-GDP ratio is above 90%, the growth rate decreases substantially. Overall, the debt overhang theory is relevant for many economies that have experienced sovereign risk and a persistent high level of public debt, such as Greece during and after the 2010 crisis.

Finally, there are studies that are difficult to group in a particular school, and argue that the impact of debt on growth depends on several countries' distinct characteristics, such as institutional framework, debt decomposition, and governance, as for example in Eberhardt and Presbitero (2015).

In conclusion, the association between the debt-growth nexus is complicated, and several theories attempt to explain it. The first one is that of crowding out perspective, where high levels of public debt can crowd out private investment and impede growth, due to higher interest rates because of an increase in demand for loanable funds. On the other hand, Keynesian demand stimulus theory supports that in the short run, debt can stimulate economic growth under certain conditions, such as for example during an economic recession. Debt overhang and threshold perspective argues that the impact of debt depends on its level, and endogenous theory states that debt's impact depends on how it is used, where it can boost the economy in the long run if it is used to fund productive investments. Thus, empirical research is important to build up these theories, keeping in mind that the

actual interconnection between debt and growth may vary across different countries and time horizons.

2.1.2 Expectations and Economic Sentiment

Extensive literature pays attention to the role of expectations and economic sentiment in determining economic performance. In modern macroeconomics, expectations are very important because they affect the way that consumers, politicians, businesses, and economic agents decide. In investment decisions, present-value calculations are based on future prices and sales, and asset prices (equity prices, interest rates, and exchange rates) are also based on forward-looking prices and sales, Blanchard (2021).

There are two main expectation concepts. The first one is Adaptive Expectations (AE), according to which people form their forward-looking decisions based on what occurred in the past. The second one, which became the mainstream approach, is that of Rational Expectations (RE), according to which people make economic decisions considering all available information, including knowledge about government policies already taken, macroeconomic stability, and fiscal policies that the government takes when the economic situation begins to change.

Muth (1961) stated that expectations depend on the structure of the whole system and can be used as predictions of future events. Lucas (1972) studied the relation between the rate of change in nominal prices and the level of real output, arguing that economic agents form their expectations by behaving optimally and rationally based on future economic conditions.

Economic sentiment indicator (ESI), developed by the European Commission, reflects economic expectations and is designed to oversee developments in economic performance and anticipate changes in GDP. The economic sentiment index is measured by collecting monthly data for each member of the European Union and then aggregating and weighting on the basis of five confidence indicators: industrial confidence (40%), service confidence (30%), consumer confidence (20%), construction confidence (5%), and retail trade confidence (5%). These indicators provide insight into how consumer businesses react to the fluctuations of the economy. (European Commission, 2023).

The literature on business cycle analysis often examines how the business cycle is affected by shocks in consumers' and firms' cycle evaluations as summarized by ESI (Kappler & van der Aarle, 2012). Keynes(1936, Chapter 12) linked sentiment to "the state of long-term expectations" and "the state of confidence" and argued that consumer and business sentiment play an important role in explaining economic fluctuations.

2.1.3 Interconnection between the concepts of Public Debt- Economic Sentiment and Growth

Public debt, economic sentiment, and growth are macroeconomic variables that are highly correlated. First, public debt affects economic performance both directly and indirectly. Directly, at moderate levels, it can positively affect growth because it can stimulate aggregate demand by financing infrastructure, human capital, and technology (Keynesian stimulus effect) and thus enhance productivity and investments. However, at excessive levels, it can have a negative impact by funding non-productive sectors. Indirectly, high public debt can lead to higher interest payments and higher borrowing costs, which lead to lower private investments.

Also, high debt increases the need for future taxation and thus undermines fiscal sustainability, which in turn may weaken consumers' and businesses' confidence. When economic agents anticipate austerity, they delay their investments or move their capital out of the country. Consequently, the business climate and overall economic climate may deteriorate. (Lane,2012, Mencinger et al., 2014).

Overall, we could argue that there is a transmission mechanism in which public debt affects economic growth not only directly, but also indirectly through expectations and confidence, which can be captured by ESI.

Interaction: Public Debt→ ESI→ Economic Growth

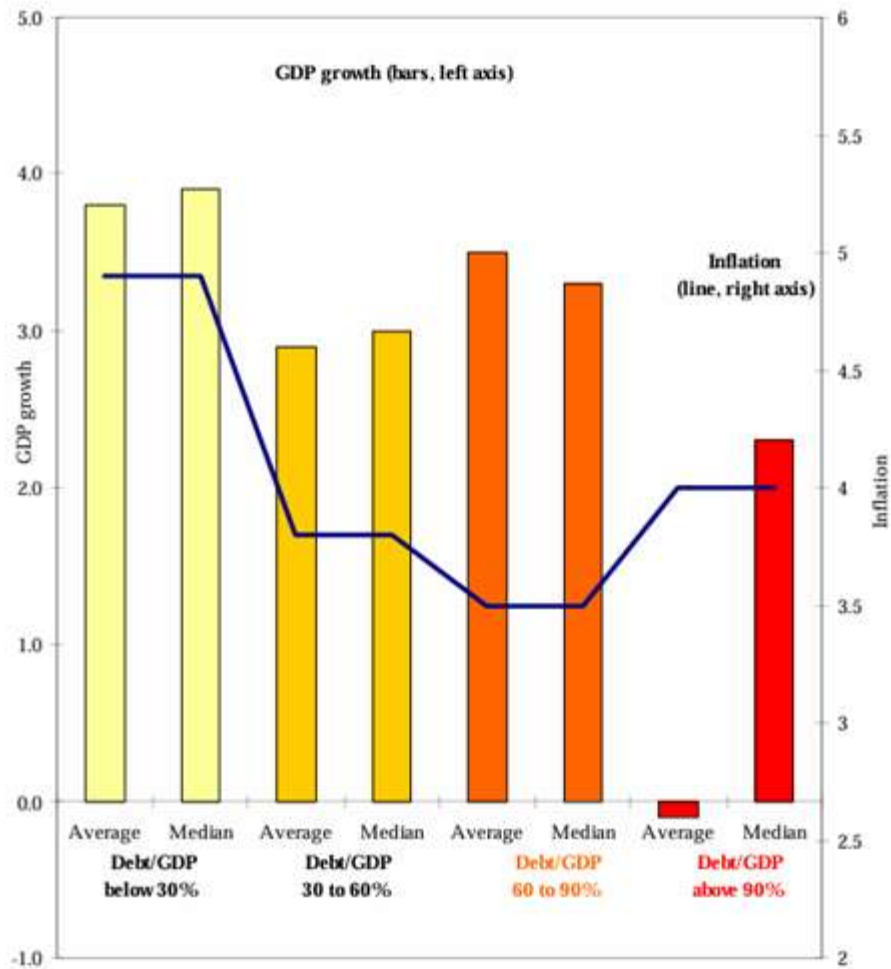
2.2 Empirical studies

2.2.1 Studies related to public debt and growth

The results from empirical studies vary, and public debt can have either positive or negative effects on the economy, depending on the amount of debt and its purposes.

A study with high acceptance is that of Reinhart and Rogoff (2010) and is based on debt thresholds and non-linearities. They conducted a historical analysis on 44 countries starting over 200 years and selected 3700 annual observations which were grouped into four categories according to the debt to GDP ratio: i) years where debt/GDP ratio was below 30%(low debt), ii) years where the ratio was between 30 and 60%(medium debt), iii) years where the ratio was 60 to 90%(high) and iv) above 90%(very high). Their main finding was that although the relationship between growth and debt is weak for debt to GDP levels below 90%, when debt rises above 90% growth rate falls sharply. Another finding was that this threshold remains about the same for advanced (including Greece) and emerging countries.

Table 1: Growth, Government Debt, and Inflation: Selected Advanced Economies (1946-2009)



Source: Reinhart, C. M., & Rogoff, K. S. (2010, p. 575)

Table 2: Real GDP Growth Rates across Different Public Debt-to-GDP Categories in Advanced Economies (1790–2009)

Table Real GDP Growth as the Level of Government Debt Varies:
Selected Advanced Economies, 1790-2009
(annual percent change)

Country	Period	Central (Federal) government debt/ GDP			
		Below 30 percent	30 to 60 percent	60 to 90 percent	90 percent and above
Australia	1902-2009	3.1	4.1	2.3	4.6
Austria	1880-2009	4.3	3.0	2.3	n.a.
Belgium	1835-2009	3.0	2.6	2.1	3.3
Canada	1925-2009	2.0	4.5	3.0	2.2
Denmark	1880-2009	3.1	1.7	2.4	n.a.
Finland	1913-2009	3.2	3.0	4.3	1.9
France	1880-2009	4.9	2.7	2.8	2.3
Germany	1880-2009	3.6	0.9	n.a.	n.a.
Greece	1884-2009	4.0	0.3	4.8	2.5
Ireland	1949-2009	4.4	4.5	4.0	2.4
Italy	1880-2009	5.4	4.9	1.9	0.7
Japan	1885-2009	4.9	3.7	3.9	0.7
Netherlands	1880-2009	4.0	2.8	2.4	2.0
New Zealand	1932-2009	2.5	2.9	3.9	3.6
Norway	1880-2009	2.9	4.4	n.a.	n.a.
Portugal	1851-2009	4.8	2.5	1.4	n.a.
Spain	1850-2009	1.6	3.3	1.3	2.2
Sweden	1880-2009	2.9	2.9	2.7	n.a.
United Kingdom	1830-2009	2.5	2.2	2.1	1.8
United States	1790-2009	4.0	3.4	3.3	-1.8
Average		3.7	3.0	3.4	1.7
Median		3.9	3.1	2.8	1.9
Number of observations = 2,317		866	654	445	352

Source: Reinhart, C. M., & Rogoff, K. S. (2010, p. 575). *Growth in a Time of Debt*. *American Economic Review*, 100(2), 573–578.

These debt thresholds are country-specific. From table 2, focusing on Greece’s debt, in excess of 90%, is associated with a mean growth of 2.5% (when the mean of all selected advanced economies was 1.7%) versus 4% when debt was low (compared to 3.7% for all advanced countries).

This study has gained the attention of policymakers during the financial crisis because it first covered a long period that incorporated war periods and peace periods, and also because it provided empirical support and highlighted that as debt rises above historical limits, these lead to an increase in risk premiums, which in turn leads to difficult trade-offs for governments and thus tightened fiscal policies.

However, many criticized this study and pointed out coding errors, problems in weighting coefficients of observations, and selective exclusion of observations in the original dataset (Herdon, Ash, Polins, 2013). Herdon, Ash, and Polin (2013), in their study, focusing on 20

advanced economies, found that the average real GDP for countries with a debt-to-GDP ratio over 90% is 2.2% and not -0.1% as Reinhart and Rogoff found. Also, they showed that the relationship varies across different periods and countries. Recent research supports the idea that there isn't any standard debt threshold. For example, Egert (2015) in his study reviewed Reinhart and Rogoff's data (2010), set with improved econometric techniques, and did not find a common 90% threshold for all countries. The debt level may vary from one country to another, as well as from one period to another. Also, according to Egert's study, there is evidence of a negative nonlinear relationship between debt and growth, but the non-linear effect can appear at much lower levels of public debt (between 20% and 60% of GDP).

Similarly, an IMF study by Kumar and Woo (2010) based on endogenous growth models examined the impact of gross public debt on long-run growth of real per capita GDP, and nonlinearities and threshold effects were examined using a panel of 38 advanced and emerging economies over 1970-2007. The authors point out that large public debt negatively affects capital accumulation, labor productivity, and investment and reduces growth through various channels, such as long-term interest rates, higher future taxation, inflation, and thus greater uncertainty. According to empirical findings by Kumar and Woo, there is an inverse relationship between public debt and economic growth, specifically a 10% increase in the debt-to-GDP ratio leads to a 0.2% slowdown in real per capita GDP growth, with a smaller impact on advanced economies (around 0.15%). Also, there is evidence of non-linear effects, with only higher levels of debt having a higher negative impact on growth.

Similarly, Checherita and Rother (2010) found in 12 European countries, including Greece, covering a period of 40 years, a non-linear impact of debt on growth with the "turning point" at around 90-100% of debt to GDP. Confidence intervals suggest that the negative impact of high debt may already start from levels of 70 to 80% of GDP. Some of the channels through which debt negatively affects growth are private savings, investments, and raised long-term interest rates Checherita and Rother, 2010).

In the empirical literature, another analysis consistent with threshold effects of debt on growth is that of Ceccetti, Mohanty, and Zampolli (2011), who examined government debt, corporate debt, and household debt separately in a sample of 18 OECD economies. They reported that beyond a certain level of debt may be a drag on growth. More

specifically, they estimated a threshold of 85% of GDP for household and government debt and a corporate threshold close to 90%. Also, in the case of Greece, they stated that from the above three components of debt, public debt is dominant, compared to some countries (e.g., Belgium, Norway, and Sweden) where corporate debt dominates, and compared to other countries (e.g. Denmark, the Netherlands) where household debt is dominant.

"Debt is a two-edged sword. Used wisely and in moderation, it clearly improves welfare. But when it is used imprudently and in excess, the result can be disaster. For a country, too much debt impairs the government's ability to deliver essential services to its citizens."
(Cecchetti et al. 2011, pg. 4)

Also, Eberhardt and Presbitero (2015), using public debt data from 118 developing, emerging, and advanced countries, found that economies with a higher debt-to-GDP ratio would have a negative impact on long-run growth. However, they pointed out that the debt- growth relationship differs significantly across countries, depending on a country's characteristics, which could constrain government choices. Therefore, policies that are suitable for one country may be misguided by another, and the notion of a specific threshold that leads to a growth slowdown should be based on debt composition.

Furthermore, there are empirical studies that highlight the time dimension, so that the net effect of debt to growth may change over different time horizons. For example, Baum, Checherita et al (2012), focusing on 12 Euro Area economies, provide evidence that in the short run, debt has a positive impact on growth, but beyond debt-to-GDP ratios of around 67%, the impact is close to zero. For ratios above 95%, there is a negative effect. This study is consistent with Keynesian Theory and multipliers. So, in the long run, as debt increases, the short-run positive effects may be offset.

Although many studies focus on the impact of debt on economic growth, some analyses examine the "causal effect" between these two macroeconomic variables. For instance, Panizza and Presbitero (2012), using an instrumental variable approach to address endogeneity, found no evidence that public debt causes growth. They stated that correlation does not mean causation and that the link between debt and growth could be driven by the fact that when economic growth is low, this can lead to rising debt-to-GDP ratios. They supported that a government with a high level of debt may apply restrictive

fiscal policies to change investors' sentiment and market signals. These policies are the reason for the negative effect on growth performance, especially if applied during a recession. So, there is a need for "lenders of last resort" that can rule out multiple equilibria.

Similarly, Thomas Malinen et al (2013) estimated a panel vector autoregressive model in a panel of 20 developed countries to examine the relationship between debt and growth. They found that the negative correlation between them is derived from the impact of growth on debt rather than the opposite. They found that a decrease in growth has a negative effect on debt, but they found no evidence for a reverse impact of debt on growth.

2.2.2 New evidence from the Sovereign European debt crisis and from the post-COVID-19 period

The relationship between public debt and growth can differ during or after an economic crisis. The European sovereign debt crisis is a recent example, where high-debt countries performed better growth outcomes during the crisis than low-debt countries. For instance, in an IMF study, de Soyres, Kawai, and Wang (2024) revisited the relationship between public debt and real GDP, analyzing data over 1995-2020 and found that an anticipated increase in the public debt-to-GDP ratio reduces real GDP levels in countries with larger initial debt levels and that this increase can boost countries with low-income levels.

Also, Lane (2012) in his study pointed out that countries such as Greece, Portugal, and Italy, which already had high public debt-to-GDP ratios before the 2008 financial crisis, experienced a further increase in these ratios in the following years. Countries that mainly relied on external funding and on short-term debt markets were more affected by the crisis, since investors lost their confidence in these countries. This was reflected in rising spreads on 10-year bond yields, which in turn led to more stringent fiscal measures, a weakness of the banking system, a decrease in household disposable income, and thus to a downturn in profits of firms and an increase in private sector default risk.

In another analysis referring to European countries, Mencinger et al (2024), in data from 25 EU member countries, examined the relationship between debt and growth using a growth model that incorporated debt levels, after categorizing member states as "old" and "new". Their results indicated a non-linear relationship for both old and new members, but

for newer members, there was a lower threshold of debt-to-GDP ratio for negative effects (53%-54%) compared to the threshold for older members (80-94%). Updated empirical research on the ongoing nexus between public debt and growth is that of Toth, Tkacova, and Gavurova (2025), where they used a linear panel regression model during 2000-2022. Their findings show a negative linear relationship.

The COVID-19 pandemic necessitated fiscal measures to support individual businesses and healthcare systems, which led to an increase in public debt levels. Simionescu (2025) analyzed the connection between the above two variables, examining a data panel of EU-27 countries during 1995-2023, with the use of dynamic panel threshold models, emphasizing the Covid-19 pandemic period. In December 2020, more than half of the 27 countries had debt-to-GDP ratios exceeding 50%, with Greece reaching a 165.5% ratio, due to its ongoing financial crisis. Simionescu's analysis indicated that public debt negatively affects growth and places emphasis on the government's effectiveness as a key factor to ensure economic growth for a country. Also, there was evidence that during the pandemic period, the turning point at which debt is harmful is lower compared to other periods.

2.2.3 Studies related to Public Debt- Expectations and Business Climate

Public debt, economic development, and business climate are macroeconomic variables that are highly related. Although there are not many empirical studies that directly connect public debt, economic sentiment, and growth, there are many studies that connect two of them: debt-growth, sentiment-growth-debt-expectations. As mentioned in the above theoretical framework and empirical studies, high public debt may have a negative impact on growth, especially in the long run, through various channels. High public debt raises uncertainty and deteriorates expectations about fiscal policy. As expectations deteriorate, business and consumer confidence "decline". Empirical research shows that ESI reflects economic confidence and expectations and informs about future economic performance. Increases in ESI have a positive impact on investment and growth, while a decline in ESI leads to a reduction of consumption, decline in investments, and thus in economic

performance. (Mourougane & Roma, 2002; Zanin, 2011; Gajewski, 2014; European Commission, 2023).

During the European crisis of 2008, countries with high debt-to-GDP ratios faced high bond spreads due to higher perceived risk and lower fiscal credibility. This led to the deterioration of the business climate, lower investments, and economic downturn.

Jacobs et al (2019), using a panel VAR model, analyzed the way that public debt, economic growth, and real long-term interest rates interact, examining a sample of 27 EU countries and 4 OECD countries (Australia, Canada, Japan, and the U.S.) over the period 1995-2013. They pointed out a negative causal link from economic growth to public debt when introducing long-term real interest rates, which is a key mechanism that transmits a shock in economic growth to public debt. A decrease in growth rate leads to an increase in the long-term real interest rate, which in turn decreases interest-sensitive demand and thus consumer spending deteriorates business expectations and investments, due to higher borrowing costs and further increases in public debt. In their study, the authors referred to Greece, which during this period had an undue burden of government and foreign debt on the growth rate (mean debt ratio was 112.14%, mean growth rate was 0.87%) and had the highest real interest rate (mean was 5.13%).

Arghyrou and Kontinikas (2012), in their study, using time-series and panel data estimation techniques to model the 10-year government bonds against Germany, have focused on the European sovereign debt crisis covering the period 1999-2010. They analyzed the determinants of sovereign bond spreads, making a substantial reference to the case of Greece. They found out that mainly during the crisis period, markets had put intense pressure on spread values associated with risk, fiscal unsustainability, and changes in market behavior and expectations. Also, they pointed out that many European countries have experienced a rise in their bond spreads as a "contagion" from Greece's unfavorable shift in market expectations.

Furthermore, Alfonso and Jalles (2013) used growth equations and growth accounting techniques to find out different channels of impact of debt on growth. They found evidence that high levels of debt negatively affect the allocation of resources and thus productivity and growth through various channels, such as uncertainty, higher financing

costs, and future tax increases, which lead to a decrease in public capital expenditure (or public investment), resulting in lower output growth and productivity.

Ardagna (2004) investigated the behavior of financial markets around events of large changes in fiscal stance, in a panel of OECD countries from 1960 to 2002, focusing on the effect of fiscal policy on interest rates and stock market prices. The author pointed out that fiscal consolidations(expansions) have been related to economic booms(recessions), and a transmission channel for this is financial markets that value fiscal discipline. If market agents perceive that fiscal stabilization will reduce the stock of public debt, this will reduce interest rates and increase the stock market price index, which can lead to an increase in private demand components vulnerable to interest rates and to economic growth. Similarly, a fiscal expansion that is perceived to last for a long time will negatively affect the stock of public debt and can lead to increases in interest rates.

2.2.4 Studies that incorporate ESI in GDP regression models

Several empirical studies have related sentiment indicators with economic activity. For example, Van Aarle and Kappler (2012), by developing vector autoregressive models (VAR), investigated the role of economic sentiment in business cycle fluctuations. They suggested that sentiment shocks affect macroeconomic variables, such as output and unemployment, and vice versa, that economic conditions and shocks also affect economic sentiment. They concluded that policymakers should enhance economic sentiment because this can have a positive impact on the economy.

Furthermore, Zanin (2012) examined the relationship between changes in the Economic Sentiment Indicator and economic growth, in a sample of 6 European countries, using a time-varying regression model, where ESI was the explanatory variable and GDP growth the dependent variable. The results showed that the coefficient of the ESI variable is positive and statistically significant in each country, but the elasticity varies over time.

In addition, Mourougane and Roma (2023), in their study, showed that confidence indicators and especially ESI can be beneficial in monitoring and forecasting real GDP in the short run, applying least squares techniques on a data set of the six largest euro area countries. Similarly, Tkacova and Gavurova (2023), in a more recent study, analyzed the

ESI predictive power and its components on GDP for the economic cycles of selected EU countries. They concluded that ESI can be applied for forecasts of high-quality economic cycles in the short run for selected countries (e.g., Denmark, Germany, Finland), while for others, the guide period prediction is minimal. Also, they pointed out that ESI prediction capabilities can differ across different types of an inbound crisis, such as the 2008 crisis, the pandemic Covid-19 crisis, etc, and recommended that a new system for weighting individual components of ESI is necessary for the needs of every country, to improve ESI prediction capabilities.

Another influential study on this topic is that of Gayer (2005), who estimated bivariate VAR models and examined the contribution of survey indicators published by the European Commission to forecasting economic performance in the Euro Area. The author suggested that ESI provides high “added value” as a short-term GDP forecaster. In this notion, Tomic et al (2020), using a panel regression analysis over 2000-2018 for EU28 countries, suggested that ESI can offer useful information on the development of the real GDP both in the short-run and in the long-run.

Other studies compare results while employing different sentiment indicators for short-term GDP forecasting. Camacho and Serrador (2011), using a dynamic factor model, evaluated the accuracy in forecasting GDP of the two most popular business survey indicators for the Euro area: first, the Purchasing Manager’s Index (PMI), released by Markit Economics and based on monthly surveys of private sector firms, and second, ESI, published by the European Commission. They concluded that substituting PMI with ESI in the dynamic factor model reduced standard errors, and ESI performs better when forecasting quarterly GDP.

On the other hand, De Bondt (2018) found evidence that PMI performs better as a real GDP tracker and provides more accuracy and lower forecast errors compared to flash estimates by the European Commission. Furthermore, Gajewski (2014) presented empirical evidence that models that incorporate PMI perform better in some countries, like Germany, France, and Italy, while ESI-based models perform better in other cases, as Spain.

2.2.5 Empirical Findings for the case of Greece

Among the European countries in the periphery, during the financial crisis, Greece was the country that was most affected in a negative way and from 2008 to 2016 lost more than one fourth of its GDP (European Commission, 2017). In 2018, Greece exited from three adjustment programs and a total amount of 288 billion euros of financing assistance from EFSF (European Financial Stability Facility), ESM (European Stability Mechanism), and IMF (International Monetary Fund). After the economic adjustment program, combined with severe fiscal austerity, Greece's recovery path was disrupted by the pandemic in early 2020. According to Economides et al (2021), the fall in GDP between 2008 and 2016 occurred not only due to the austerity (fiscal and monetary) of the program of financial assistance, but also due to poor institutional quality.

The empirical literature, focusing on Greece (although limited), confirms a relationship between public debt and economic growth. Spilioti and Vamvoukas (2015), using a panel of Greek data from 1970 to 2010, investigated the relationship between these two macroeconomic variables, based on time-series analysis. Their results suggest a statistically significant impact of debt on GDP. Markou and Karamitrou (2017) also found a negative effect of public debt on growth rate between 2017 and 2017, which, for example, in 2017 reached 166.9%, while the growth rate was -1.05. Furthermore, Pegkas (2017) covering data over the period 1970-2016 and using a structural break model, indicated a negative relationship between debt-to GDP ratio and growth during 1970 to 2006, while during 2007 to 2016 the relationship was insignificant.

To sum up, the existing empirical literature shows a negative effect on growth through various channels. The crowding out effect on private investments caused by high public debt can negatively impact capital accumulation due to high interest rates, and can lead to macroeconomic vulnerability, increased future taxation, and inflation. Also, some empirical studies showed a non-linear relationship, where although thresholds may exist, there is no general level of threshold effects.

At the same time, another strand of empirical literature emphasizes the importance of economic sentiment and expectations in explaining fluctuations in economic activity. Studies using the ESI provide evidence that sentiment indicators are strong predictors of

GDP growth, investment, and business cycle fluctuations, reflecting the expectations of consumers and firms regarding future economic conditions.

The Greek case provides particularly empirical evidence supporting this relationship. During the sovereign debt crisis, Greece experienced a high increase in public debt, accompanied by a sharp decline in the ESI and a severe contraction in GDP. Empirical analyses indicate that fiscal uncertainty and debt sustainability concerns negatively affected investment, consumption, and confidence.

Overall, the debt–growth nexus is unique to individual countries across different periods, being conditional on several factors, such as the business cycle and institutional quality, and the literature supports the existence of a transmission mechanism in which public debt affects economic growth both directly and indirectly through expectations and economic sentiment. Building on these theoretical and empirical insights, the next chapter presents the data and provides a preliminary analysis of the variables under investigation through descriptive statistics and graphical analysis, in an attempt to understand their pattern over the study period.

3. Data presentation and preliminary analysis

3.1 Introduction

This chapter presents the main variables and data used in the study and provides a review of the evolution of public debt, economic growth, and the economic sentiment indicator in Greece during the period 2000–2025. Understanding the behavior of these variables is essential for examining the relationship between fiscal conditions, business confidence, and macroeconomic performance in the Greek economy.

The research examines publicly available secondary data obtained by ELSTAT, EUROSTAT, and the IMF. Data for GDP and public debt were taken at a quarterly frequency. However, ESI consists of monthly observations. To attain unity in frequency between the series of quarterly and monthly observations, the mean of each 3-month period of the latter was estimated for ESI.

$$ESI_{quarter} = \frac{Month1 + Month2 + Month3}{3}$$

This chapter begins with a descriptive analysis of public debt in Greece, focusing on its structural characteristics, composition, and historical evolution over time. Particular emphasis is placed on the impact of the global financial crisis, the sovereign debt crisis, and the COVID-19 pandemic on debt dynamics. In addition, comparisons with other European countries are presented to highlight the persistence of high public debt levels in Greece.

The second part of the chapter examines the evolution of economic growth in Greece. The analysis explores the major phases of economic expansion, recession, and recovery that characterized the Greek economy between 2000 and 2024. Special attention is given to the interaction between public debt and economic growth during periods of economic instability and fiscal adjustment.

The third part presents the ESI, which measures business and consumer confidence. Since economic sentiment reflects expectations regarding future economic conditions, its evolution provides important insights into the behavior of economic agents during periods of crisis and recovery. The analysis of the ESI highlights the potential role of confidence as a transmission mechanism between public debt and economic growth.

Finally, descriptive statistics were applied to explore the evolution of public debt in relation to GDP growth and ESI over time. Time series visualization, through appropriate graphs, was leveraged to extrapolate the relationship between these variables and the effects of economic shocks throughout the two decades. The descriptive analysis supports the overall objective of the study, which is to investigate the interaction between fiscal conditions, economic confidence, and economic performance in Greece.

3.2 Public Debt

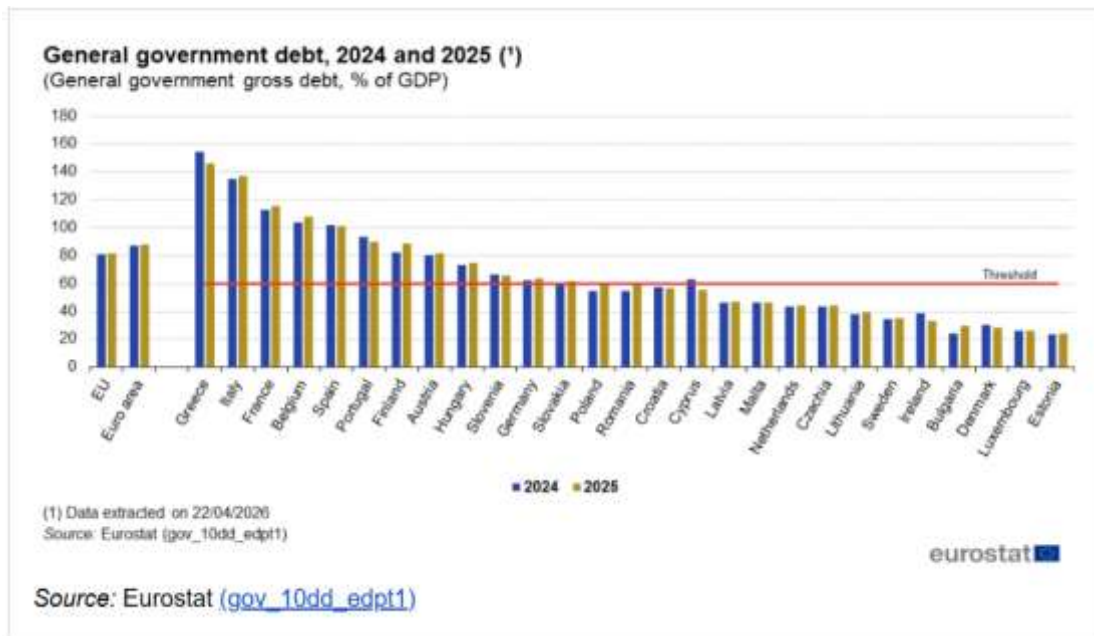
Public debt, also called government debt, is the financial liabilities of the government sector. Government debt has changed over time, and this reflects borrowing due to past government deficits (where a government's revenues are less than its expenditure). According to the European system of accounts (ESA 2010), general government debt consists of the government's liabilities in currency and deposits (A.F 2), debt securities

(A.F3), and loans. Similarly, the public debt ratio is commonly used and measures the ratio of public debt to GDP, and reflects the evolution and risk of public debt.

One of the Maastricht criteria, which sets the conditions that member states of the European Union must satisfy to join the Economic and Monetary Union, is “Government Budgetary Position”. According to this criterion, the ratio of debt-to- GDP should not exceed 60%, unless the excess over the reference value is temporary or the debt ratio has declined substantially.

Based on data from the IMF (World Economic Outlook 2025), total worldwide public debt for 2025 is almost \$111 trillion. Including household and corporate liabilities, global debt reached 353 \$ trillion and approximately 235% of world GDP. As far as the Euro area is concerned, according to Eurostat, at the end of the 4th quarter of 2025, the public debt to GDP in the Euro area(EU20) stood at 87.8%. From the diagram below, we can see that the highest ratio was recorded in Greece(146.1%), Italy (137,1%), and the lowest ratio was recorded in Estonia(24.1%), Luxembourg (26.5%), and Bulgaria (29.9%).

Figure 1: General Government Debt, 2024 and 2025 for the Euro area



Source: Eurostat (2026). Government debt at 87.8% of GDP in the euro area – Fourth quarter of 2025.

3.2.1 Classification of Public Debt

Public debt can be classified into various categories based on its use and nature. First, debt borrowed from foreign countries is called "external debt," and it comes from international banks and institutions, while debt borrowed from the same country is called "internal debt", which is owed to domestic commercial banks, citizens, and financial institutions.(IMF, 2013).

A second classification is between productive and unproductive debt. When the government takes loans and invests them in railways, national roads, and ports, this will increase employment, income, and productive capabilities of the economy and thus government revenues, making interest payments easier. This debt is known as "Productive (Reproductive) Debt". On the other hand, when the government raises loans and invests money from them in unproductive assets, such as expenditures on the administration of the public, debt is called "Unproductive (Dead Weight) Debt", which is more difficult to repay (IMF, 2013).

Furthermore, another category is based on the period that debts are grouped into funded and unfunded. When the government opens a separate fund to repay debts, they are called "funded", which have fixed interests and have a long period to repay them (e.g., debentures, convertible bonds). However, when the government opens a separate fund for repayment of debts, these debts are known as "Unfunded (Floating)" and are characterized by a short period. In this case, the government often takes additional loans to repay them within a year (e.g., treasury bills).

Finally, according to the duration, debts are classified as short-term debts, which are taken for 3 to 9 months (e.g., treasury bills), medium-term debts, with a maturity period of 2 to 3 years, and long-term debts with a time horizon of more than 10 years and whose interest rates are higher compared to the others.

3.2.2 Public Debt in Greece

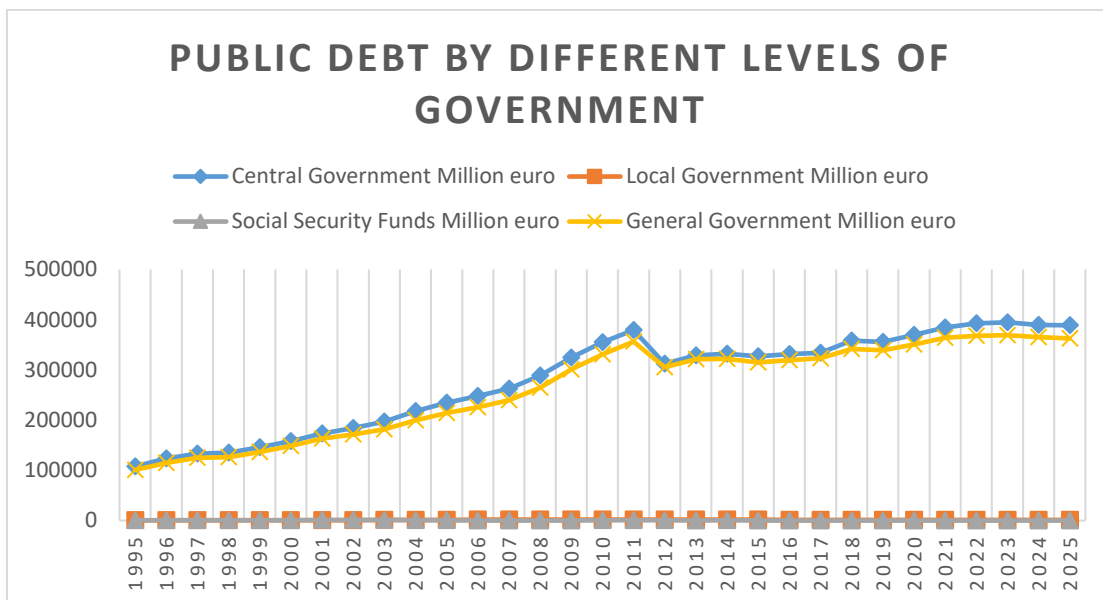
For Greece, public debt remains a macroeconomic variable of high importance, especially after the sovereign debt crisis in 2008, and consists of long-term bonds, loans from European Institutions and international organizations, such as the IMF and the ESM.

3.2.2.1 Public debt by different levels of government

Public Debt is measured, according to the European System of Accounts, under the framework of the General Government Sector, which includes the financial obligations of all levels of government. Greek public administration categorizes debt into three subsectors: central government, local government, and social security funds. The consolidated debt of the general government is lower than the sum of the debt of the three subsectors, because some of their debts are towards other government units.

The diagram below shows the evolution of debt across different levels of government in millions of euros across annual data (2000-2025).

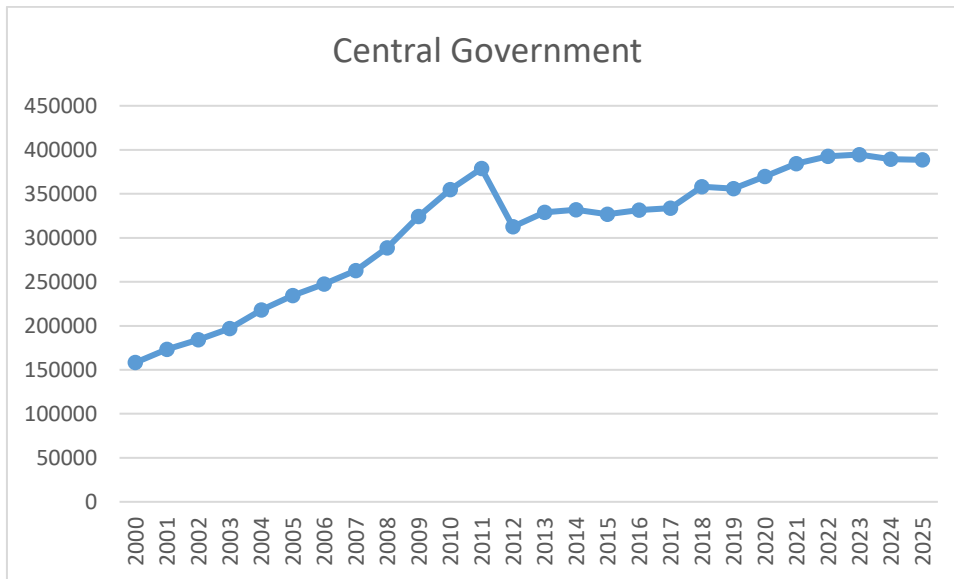
Figure 2: Evolution of Public Debt by Level of Government in Greece, 1995–2025 (Million Euro)



Source: Eurostat, ELSTAT), <https://www.greeceinnumbers.com>. , statistical processing by analyst

As seen in the above time plot, the Greek general government debt increased substantially between 1995 and 2011, with the central government debt representing the largest share of Greek public debt, which consists of treasury bills (T-bills), medium and long-term bonds, and official loans from international institutions and ESM. There was a decline in general debt in 2012, and afterwards it gradually increased again. Local government and social security fund debt remained low and stable during this period, indicating that public debt was primarily driven by central government borrowing.

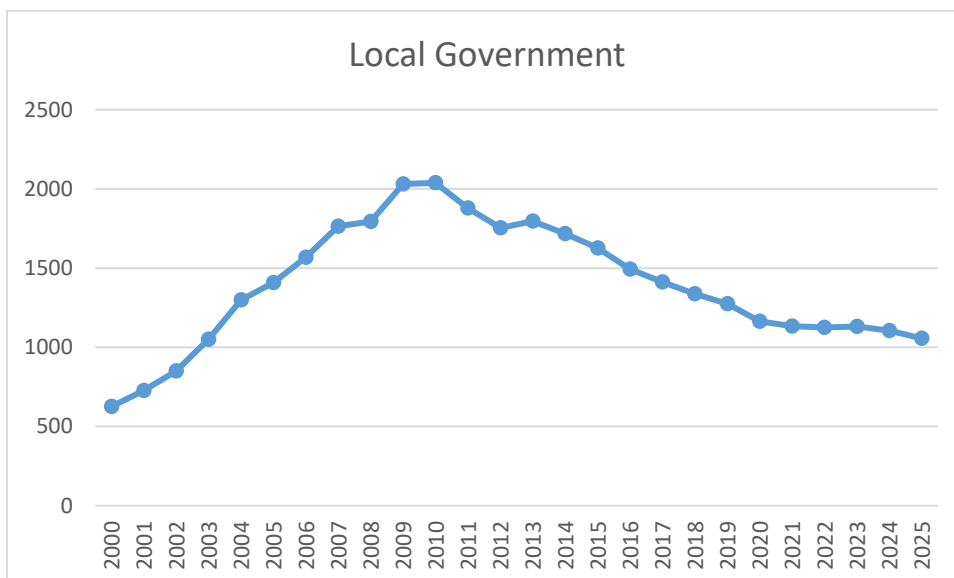
Figure 3: Evolution of Central Government Debt in Greece, 2000–2025 (Million Euro)



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

For 2025, central government debt amounted to approximately € 388 billion and followed an upward trend during the period 2000-2025.

Figure4: Evolution of Local Government Debt in Greece, 2000–2025 (Million Euro)

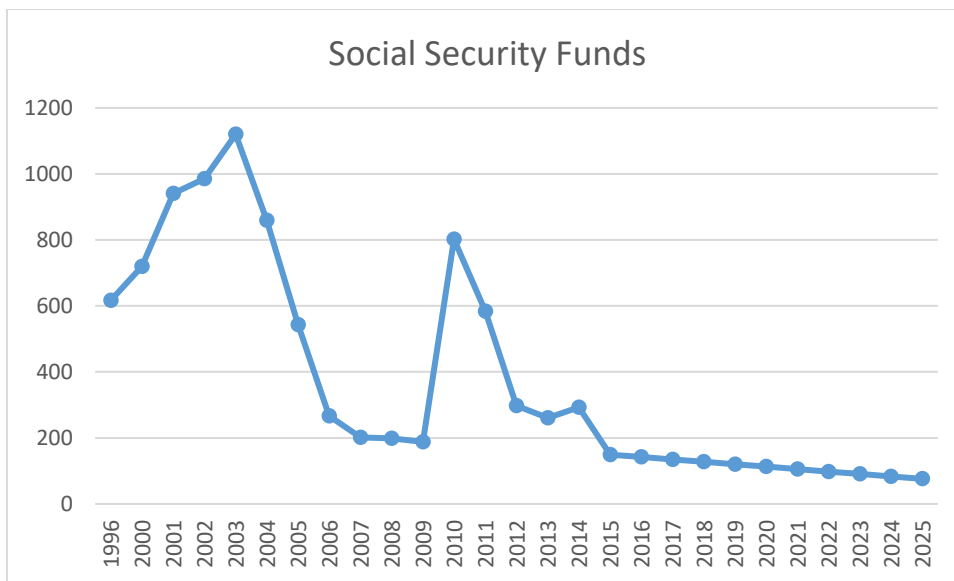


Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

In 2025, local government debt stood at approximately €105 billion. (graph 4) and presents an upward trend during 2000-2010, while it has a descending trend afterwards.

Social Security Funds consist of the second largest component of public debt and refer to the liabilities of pension funds and social security(e.g., healthcare funds). During the debt crisis, pension system deficits increased the financial needs of the general government, and this source of debt was integrated into the general government consolidated debt.

Figure 5: Evolution of Social Security Funds in Greece, 2000–2025 (Million Euro)



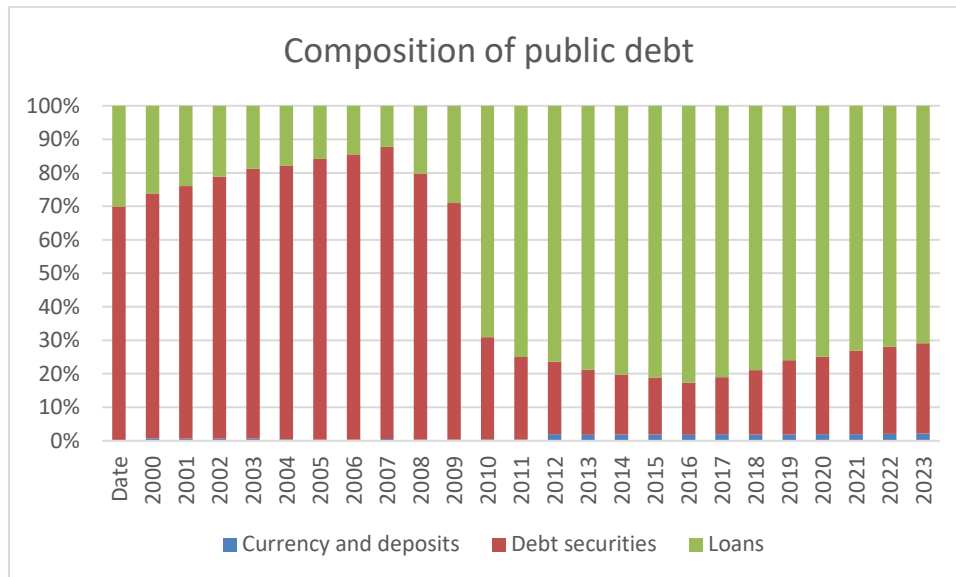
Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

From all the above, we conclude that public debt is mainly centralized, while local debt remains at low levels. After the sovereign debt crisis, the composition of debt changed, increasing the dependence on official European institutions.

3.2.2.2 Composition of public debt

Public debt of Greece is classified into three debt instruments according to Eurostat: currency and deposits, debt securities, and loans. Debt securities mainly consist of long-term government bonds, currency, and deposits, including currency in circulation and various types of deposits and loans from European institutions and international organizations.

Figure 6: Composition of public debt in Greece (2000-2025)



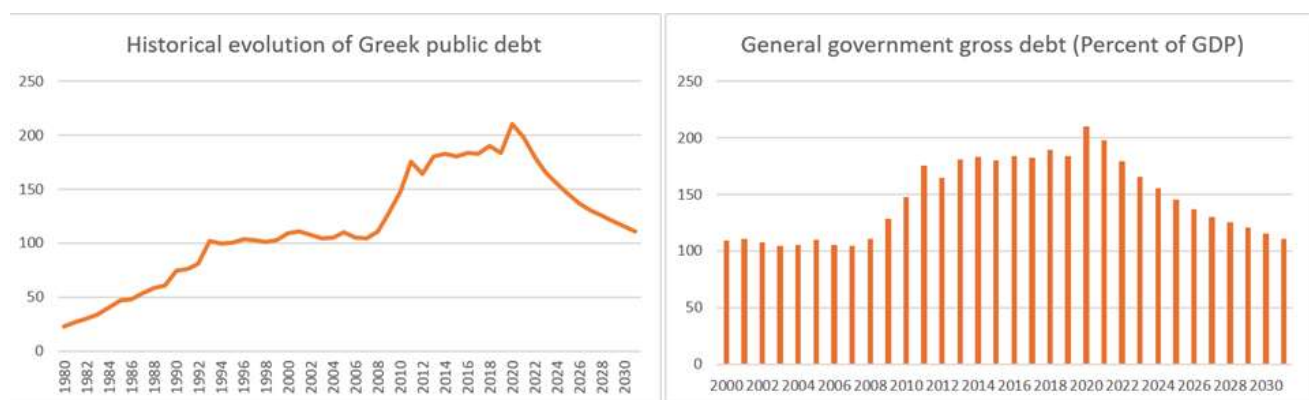
Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

From graph 6, we can see that for the period 2000-2007, debt securities consisted of the main component of government liabilities, while loans had a much smaller share. For the period 2010-2018, loans became the dominant component of Greek public debt, due to financial assistance programs provided by ESM, EFSF, and IMF. For the period 2019-2025, we observe that the share of loans started to fall (standing at 70.85% of total), while the share of debt securities started to regain market access. Currency and deposits represent the smallest share of debt.

Overall, by 2025, Greece’s public debt continues to be mainly composed of official sector loans. Nevertheless, there is a gradual re-entry of Greece into international bond markets and thus a small return to bond issuance. In addition, the share of short-term liabilities remains relatively low.

3.2.3 Historical evolution of Greek public debt

Figure 7 & Figure 8: Historical evolution of Greek public debt and Debt as a percentage of GDP



Source: IMF (2026) (estimates after 2025), statistical processing by analyst

From the above graphs, we observe that Greece recorded a government debt-to-GDP of 146% of the country's GDP in 2025, reaching an all-time high of 209,9% of GDP in 2020 and a record low of 104,3% of GDP in 2003 for the period 2000-2025. The ratio is expected to drop by almost 35% points between 2025 and 2031 (IMF, datamaper,2026), showing a downward movement through this period.

From 1980 to 1995

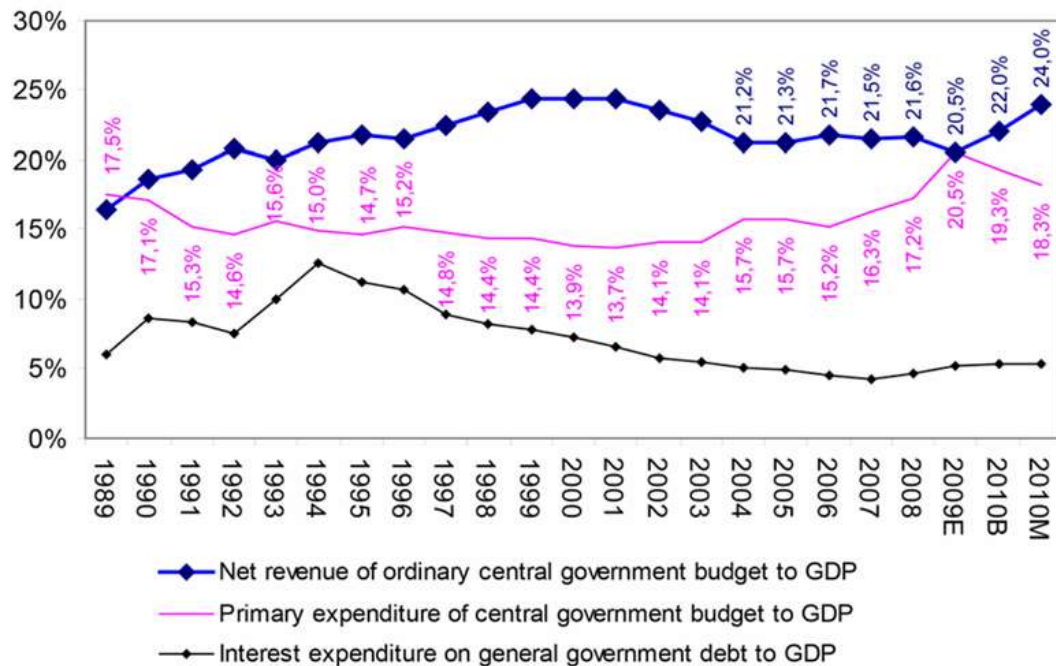
The debt-to-GDP ratio moved rapidly from 22,8% to almost 100%. This was driven by the expansion of the public sector, the rise of government spending, and social programs. B.Manessiotis (Bank of Greece, 2011) pointed out that for the 1989-1993 sub-period, a securing period for Greece's entry in the Eurozone, very high general deficits were recorded (13,6% of GDP on average) and thus the government relied on borrowing to decrease the gap between revenues and expenditures. Also, during this period, very high real and nominal interest rates were recorded, which in turn raised interest payments and led to the rapid accumulation of debt.

From 1999 to 2009

In 2001, Greece entered the Eurozone with two main weaknesses. The first was that the debt-to-GDP ratio was too high (more than 100% of GDP), which set limitations on fiscal policy. The second was a weak institutional fiscal framework, referred to as ineffective budget preparation, absence of numerical fiscal constraints (Fiscal monitoring), and

expenditure control. After 2003, primary expenditures of the central government started to rise.

Figure 9: Government Budget (1989-2010)



Source: Annual government budgets. E: estimate, B: budget, M: Stability and Growth Program update of budget with measures taken up to March 2010. Pelagidis(2015) pg.81

Between 2000 and 2004, Greece experienced economic growth, high consumption, favorable borrowing conditions, and revenues from privatizations. For instance, 63 privatizations took place between 1991 and 2008 (Marangos, 2023). However, despite these favorable conditions, the debt-to-GDP ratio remained stable, and the growth model relied on public borrowing to maintain a reasonable level of aggregate demand (Marangos, 2023). Furthermore, during 2004-2009, Greece lost its competitiveness for many reasons. One of them was the rapid rise of prices, which increased the cost of production for Greek enterprises. Also, according to Marangos (2024), loss of competitiveness was attributed not only to structural frictions and institutional anomalies, as attributed by Troika (Lapavitsas 2019), but also to lower and middle levels of technology and lower productivity performance.

A pivot year was 2008, where GDP growth, although positive, decelerated, revenues fell (by 1,3% of GDP), and expenditures exceeded. Despite the deterioration of fiscal data, no measures were taken. Spreads began to rise, and the credit rating of Greece was in danger.

From 2009 to 2015

The global financial crisis of 2008 exposed Greece to severe fiscal imbalances. In 2009, the government announced the budget deficit was almost 12,7% of GDP, which led to a collapse in investor confidence, a high increase in borrowing costs, a contraction of GDP, and deterioration of economic sentiment. During this period, Greece accepted financial assistance from the European Union (EU), European Central Bank (ECB), and International Monetary Fund (IMF), all of them called "Troika". The Greek government signed 3 Economic Adjustment Programs (EAPs) (2010-2018), with a total bailout package of over €280 billion. In exchange for loans, Greece implemented severe austerity measures, such as rising of taxes, a decrease in government spending, salaries, and structural reforms (Pelagidis, 2015, pg 86-88). Due to the EAPs, the nature of Greek debt transformed from private into public debt (Stockhammer and Kohler, 2015; Marangos, 2024).

From 2016 to 2019

Economic growth returned to moderate levels during this period. In addition, economic sentiment and investor confidence gradually improved, but public debt remained high.

COVID-19 and Post-Pandemic period (2020-2025)

After a decade of intense fiscal austerity, at the end of the third EAP, the Covid-19 pandemic emerged, which caused a temporary increase in public borrowing to support the economy and health-care system. Greek debt continues to remain high. At the end of 2025, the Debt-to-GDP ratio for Greece is the largest (146%), compared to that of euro area countries. The general government gross debt to GDP ratio in the euro area (EA20) stood at 87.8% (EUROSTAT, Euro indicators, 2026).

Overall, although there is a descending tendency for Greece's public debt, this country continues to heavily rely on European loans, compared to other countries. The question that remains is whether Greek public debt is sustainable or not. According to Kyriakos Pierakakis (Minister of National Economy and Finance) (2025), a significant portion of

debt, amounting to almost €31,6% billion, will be repaid by 2031, and Greek debt has better prospects than other member states of the EU.

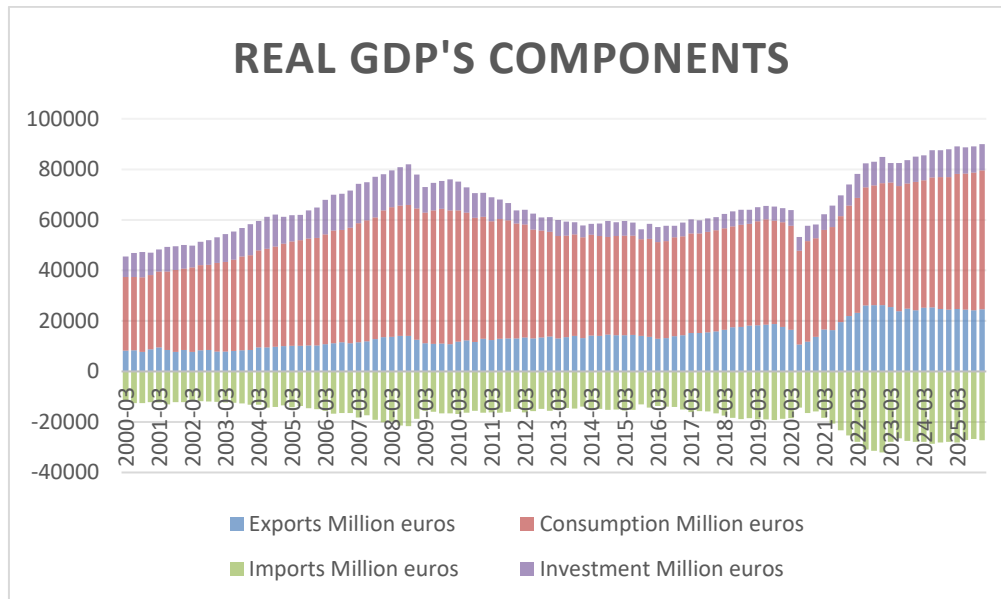
Economidis and Philippopoulos (2023) analyzed the sustainability of Greek public debt using arithmetic and fiscal sustainability analysis. They stated that debt sustainability depends not only on the level of debt but also on the relationship between economic growth, inflation, interest rates, and fiscal balances. They also referred to forward-looking behavior and emphasized the role of expectations and credibility in debt's sustainability. If a shock hits the Greek economy, then fiscal corrections are necessary for dynamic stability. If agents believe that these corrections are delaying, this can be costly even in the short run.

3.3 Economic Growth in Greece

The most common variable to measure economic activity is real GDP, which measures the total value of all goods and services at constant prices of some baseline. year. It does not measure the value of intermediate goods and services to avoid double-counting. GDP is measured in three equivalent ways: the Expenditure approach, the Production approach, and the Income approach.

An alternative way to measure economic activity is the growth rate of GDP, which is measured by the annual percentage change in real GDP. Sustained economic growth contributes to higher income, increased employment opportunities, improved public finances, and overall economic prosperity. Based on the expenditure approach, GDP is equal to the sum of final consumption (government and private), investment (government and private), and net exports (exports minus imports).

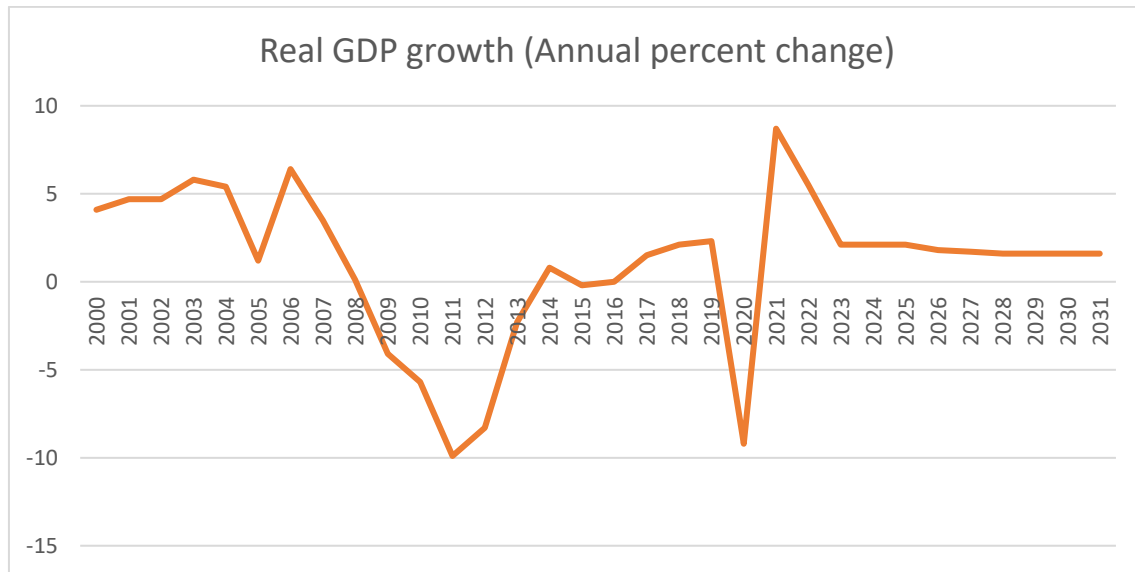
Figure 10: GDP, seasonally adjusted, in chain-linked volumes (2020 reference year)



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

From graph 10, we observe that consumption, during 2000-2025, is the largest component of GDP for Greece. During the crisis (2009-2015), consumption declined due to unemployment, fiscal austerity, and the reduction of wages. Investments also declined during the same period due to economic uncertainty and macroeconomic vulnerability, but after 2018 started to recover. As far as it concerns net exports(exports-imports) Greece had trade deficits, because imports exceeded exports. This indicates low competitiveness in this country.

Figure 11: Annual percent change in real GDP growth in Greece(2000-2025)



Source: IMF (2026) (estimates after 2025), statistical processing by analyst

Graph 10 shows the fluctuations in Greece’s economic performance. For the period 2000-2007, Greece experienced economic growth, combined with its entry to the Eurozone in 2001 due to favorable borrowing conditions, an increase in private and public consumption, and infrastructure investment. The organization of the 2004 Summer Olympic Games also led to higher investments. However, this growth model was public borrowing-driven and thus imbalances accumulated within the Greek economy.

During the financial crisis (2008-2015), the growth rate was negative, and Greece lost approximately a quarter of its GDP. After 2016, the growth rate returned to positive percentages, although at moderate levels compared to the pre-crisis levels. The Covid-19 pandemic caused another shock in 2020, but for a much shorter period, as it consisted of an external factor of economic fluctuations, which was accompanied by a decline in tourism revenues, consumption, and investments. According to the European Commission (2026), economic growth decelerated from 2,1% in 2025 to 1,8% in 2026, due to the energy price shock, which eroded households’ real income. The Commission’s projections about GDP growth refer to a slight decline to 1.6% for next year.

3.4 Economic Sentiment Indicator

The economic sentiment indicator is a composite indicator produced by the Directorate General for Economic and Financial Affairs (DGECFIN) of the European Commission and has been created to show us the track of GDP growth in member states (EU and Euro area). Apart from ESI, the Joint harmonized EU program of business and consumer surveys has established other indicators such as confidence indicators (CIs) and business climate indicator (BCI).

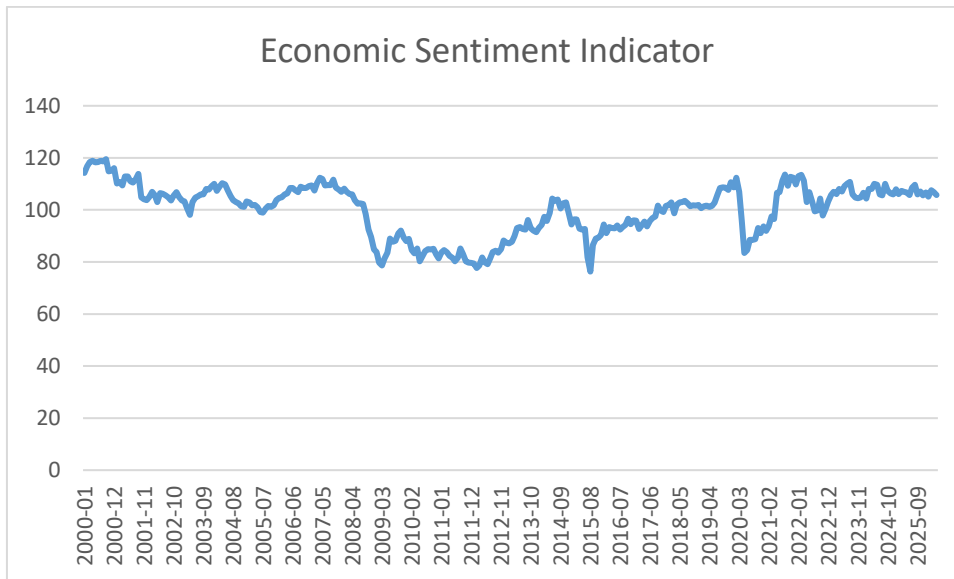
Table 1: The 15 sentiment components with their weights used in the construction of the European Economic Sentiment indicator

	Sentiment component	Component weight
	Business Survey in the Industrial Sector	40%
1.	Assessment of order-book levels	13.3%
2.	Assessment of stocks of finished products	13.3%
3.	Production expectations for the months ahead	13.3%
	Business Survey in the Services Sector	30%
4.	Business situation of recent months	10%
5.	Evolution of demand in recent months	10%
6.	Evolution of demand expected in the months ahead	10%
	Business Survey in the Retail trade Sector	5%
7.	Business activity over recent months	1.7%
8.	Assessment of stocks	1.7%
9.	Expected business activity	1.7%
	Business Survey in the Construction Sector	5%
10.	Assessment of order books	2.5%
11.	Employment expectations for the months ahead	2.5%
	Consumers' Survey	20%
12.	Financial situation over next 12 months	5%
13.	General economic situation over next 12 months	5%
14.	Unemployment expectations over next 12 months	5%
15.	Savings over next 12 months	5%

Source: DEPARTMENT OF DECISION SCIENCES AND INFORMATION MANAGEMENT (KBI)- Gelper and Croux(2007. Pg5)

ESI is a weighted average of 15 balance series of replies to selected questions addressed to firms in 5 sectors. The allocated weights per sector are Industry 40%, Services 30%, Consumers 20%, Construction 5%, and Retail trade 5%. The ESI is scaled to have a long-term mean of 100 and a standard deviation of 10, and it has a monthly frequency. Values above 100 indicate above-average economic sentiment.

Figure12: The evolution of ESI in Greece(2000-2025)



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

In Greece, the evolution of ESI has reflected economic fluctuations over the last two decades. During the early 2000's indicator's performance remained stable, indicating economic growth. The value of ESI was above the long-term average, reflecting the positive expectations of businesses and consumers. After the financial crisis of 2008, the values of ESI were below 100, and the indicator had a downward trend, reflecting austerity measures, economic uncertainty, and a reduction of output and income.

The ESI started to recover after 2014. It is worth mentioning that ESI took its lowest value in 2015-08(European Commission, 2026), which was 76.3. Since the Economic Sentiment Indicator is standardized to have a long-term average of 100, a value of 76.3(23.7 points below the historical average) indicates weak economic sentiment, reflecting that economic agents were highly pessimistic about current and future economic conditions during that period. The main reasons for the collapse of ESI in 2015 were political uncertainty, due to a risk of “Grexit” from discussions and renegotiations about bailout agreements with Greece's international creditors. Also at this time, Greek Banks were temporarily closed, and capital controls were imposed to prevent the collapse of the banking system. All these led to the deterioration of expectations of businesses and consumers and thus to the downturn of ESI. After that period, ESI started to have an upward trend, which was interrupted by the COVID-19 pandemic. However, this decline was for a short-term period. Nowadays, ESI has values above 100; in April stood at 105.7 (European Commission,2026).

Thus, it is a basic indicator of economic performance, reflecting the role of expectations and confidence.

The fluctuations in economic growth observed during the period under examination closely coincide with changes in public debt levels and economic sentiment. In particular, the sovereign debt crisis and the COVID-19 pandemic demonstrate how fiscal conditions and confidence can influence economic activity. Therefore, analyzing the interaction among public debt, economic sentiment, and economic growth is essential for understanding the dynamics of the Greek economy.

3.5 Descriptive statistics and time series visualization

For each series, measures of central tendency and variability were calculated for each of the four quarters

- *Measures of central tendency:* The arithmetic mean was utilized to suggest a typical central value that served as the representative value of the quarter/year. The median was calculated, indicating the value in the middle for the dataset with data items arranged in ascending order. If extreme values between the 4 quarters were to be detected, they would not affect the median,
- *Measures of variability:* Range was estimated to measure the total spread in the datasets. Variance and Standard deviation were calculated to estimate the overall variability and the typical distance of observations from the mean to investigate the fluctuations of the data that would indicate macroeconomic volatility. The coefficient of variation was calculated for each series to capture the volatility across the whole of the series.

Table2. Measures of central tendency and variability of Growth rate

Real Growth Rate	
Mean	0,911572987
Standard error	0,51156552
Median	1,778991097
Variance	27,21672522
Kurtosis	1,054512231
Skewness	-0,769661423
Range	30,98514771
Minimum	-15,96712371
Maximum	15,01802399
Count	104
Coefficient of variation	5,723036125

Source: own calculations.

Table 2 presents the main descriptive statistics of GDP at constant 2020 prices. During 2000-2025, the average growth rate is approximately 0.91% with a standard deviation of 5.21, indicating volatility in the economic performance of Greece.

The minimum value of GDP growth reached approximately -15.96% , reflecting the severe economic contraction observed during periods of crisis, while the maximum value was approximately 15% , reflecting periods of expansion. The wide range between the minimum and maximum values indicates the instability and cyclical behavior of the Greek economy during the period 2000–2024.

The coefficient of variation (CV) is approximately 5.72, suggesting a relatively high degree of dispersion around the mean value of GDP growth, indicating that economic growth in Greece was sensitive to both domestic and international economic shocks.

The skewness coefficient is approximately -0.76 , indicating a negatively skewed distribution. This means that the distribution contains more extreme negative growth observations, mainly associated with downturn periods.

The kurtosis coefficient is approximately 1.05, indicating a slightly leptokurtic distribution. This suggests the presence of some relatively extreme observations, although not excessively large.

The findings show the vulnerability and fiscal instability of Greek economic performance during the sample period and its sensitivity to financial crisis and shocks.

Table3. Measures of central tendency and variability of ESI

ESI	
Mean	99,99903846
Standard error	0,971507355
Median	102,35
Mode	104,7
Variance	98,15796023
Kurtosis	-0,67553275
Skewness	-0,506445358
Range	40,43333333
Minimum	78,56666667
Maximum	119
Count	104
Coefficient of variation	0,099075652

Source: own calculations.

Table 3 presents the main descriptive statistics for ESI during the period 2000-2025. The mean value of the variable is approximately 99.9 points with a standard deviation of 9.9, showing that the average level of economic confidence remained close to the long-term European benchmark of 100. The maximum value of ESI was 119 points, while the minimum value was 78.5 points, indicating the deterioration of economic sentiment during the sovereign debt crisis.

The skewness coefficient of ESI is approximately -0.5 , indicating a slightly negatively skewed distribution ($\text{Mean} < \text{Median}$). This indicates that lower ESI observations occurred during periods of economic distress and uncertainty, especially during crisis periods, pulling the distribution to the left. However, the magnitude of skewness remains relatively moderate, implying that the distribution of the variable does not deviate substantially from normality.

The coefficient of variation (CV) is the ratio of the standard deviation to the mean and shows the variation relative to the mean. Here $\text{CV} = 9.9\%$. The higher the coefficient of variation, the greater the level of dispersion around the mean.

The kurtosis coefficient is approximately -0.67 , showing a platykurtic distribution, which means that the variable exhibits fewer extreme observations compared to a normal distribution.

Table4. Measures of central tendency and variability of Public Debt (% of GDP)

Debt as a percentage of GDP	
Mean	149,4224327
Median	157,841
Variance	1246,23046
Kurtosis	-1,5422269
Skewness	-0,065456253
Range	110,143
Minimum	102,786
Maximum	212,929
Sum	15539,933
Count	104
Coefficient of variation	0,236256289

Source: own calculations.

Based on results from Table 4, we observe that the main value of public debt is approximately 149% of GDP with a standard deviation of 35.3%, indicating high debt levels during the sample period. Similarly, the value of variance confirms the fluctuations in levels of debt due to the implementation of fiscal measures by the Greek government. It is worth mentioning the substantial range between minimum and maximum values, indicating the high increase in debt, especially after fiscal adjustments.

The coefficient of variation shows a moderate degree of variability. The skewness is -0.06, indicating that the distribution of public debt is nearly symmetric, while the kurtosis coefficient is -1.54, presenting a platykurtic distribution.

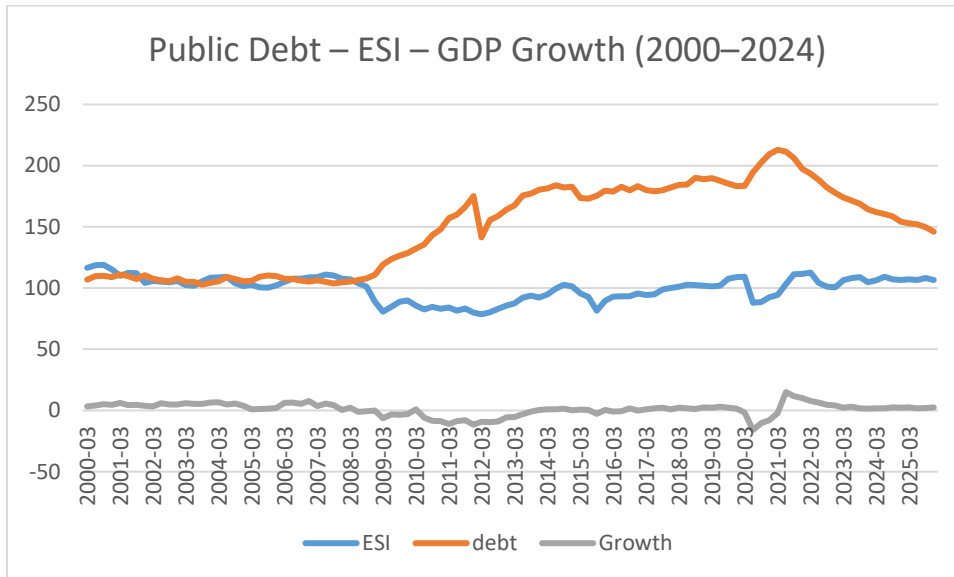
Thus, the descriptive statistics support that public debt remained at high levels through the sample period and emphasize the importance of fiscal sustainability issues in the Greek economy.

3.6 Comparative Analysis between Public Debt, Economic Sentiment, and Economic Growth

In previous paragraphs, data were presented and analyzed that referred to public debt, growth rate, and ESI for Greece through 2000-2025. In the comparative analysis that follows, there is a holistic approach to the relationship between these three main macroeconomic variables, to draw policy implications and proposals for reforms in the case of Greece, that follow to the next chapter.

Graph 13 below combines the three variables in the form of lines and presents their evolution during the sample period. We observe that the relationship among them is not constant over time but varies significantly across different macroeconomic regimes and crisis periods.

Figure13: Debt-ESI-GDP Growth in Greece(2000-2024)



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

The relationship between them could be summarized in the following theoretical diagram:

Public Debt

↓ (-)

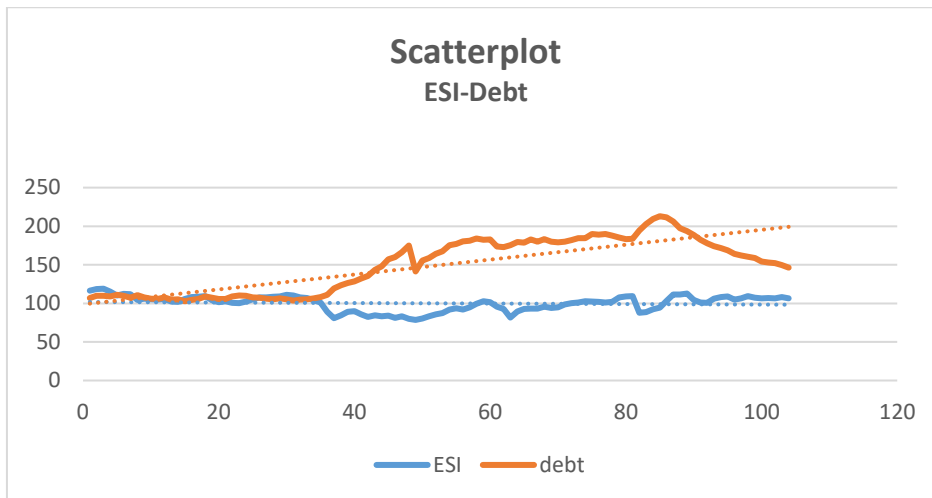
Economic Sentiment (ESI)

↓ (+)

GDP Growth

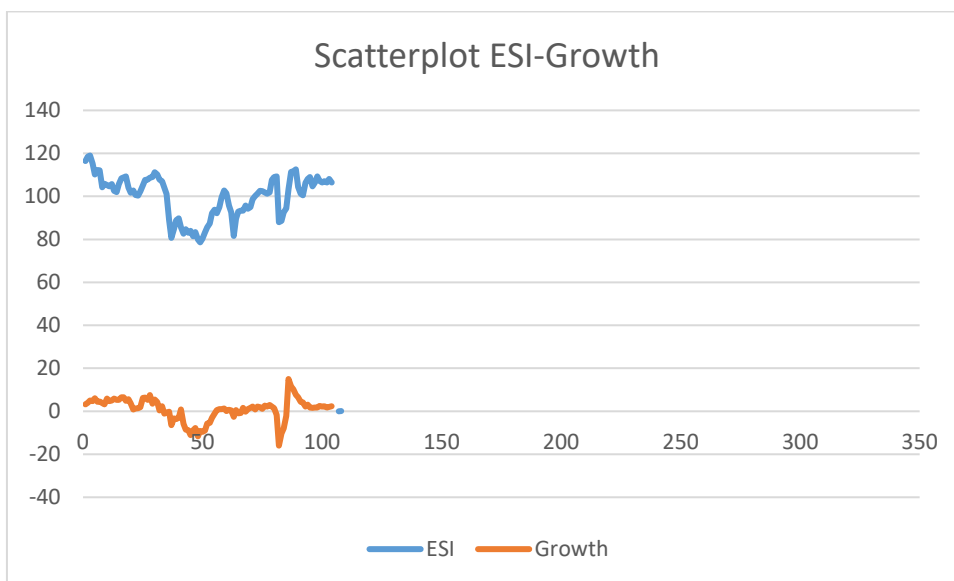
indicating that there is a negative correlation between public debt and ESI and a positive correlation between ESI and Growth. This can be supported by the following scatterplots:

Figure 14: Scatter Plot: Public Debt versus ESI



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

Figure 15: Scatter Plot: ESI versus Growth



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

The two scatterplots provide evidence that there is a negative correlation between debt and ESI and a positive correlation between ESI and Growth rate. Nevertheless, this correlation analysis alone does not support and a causality.

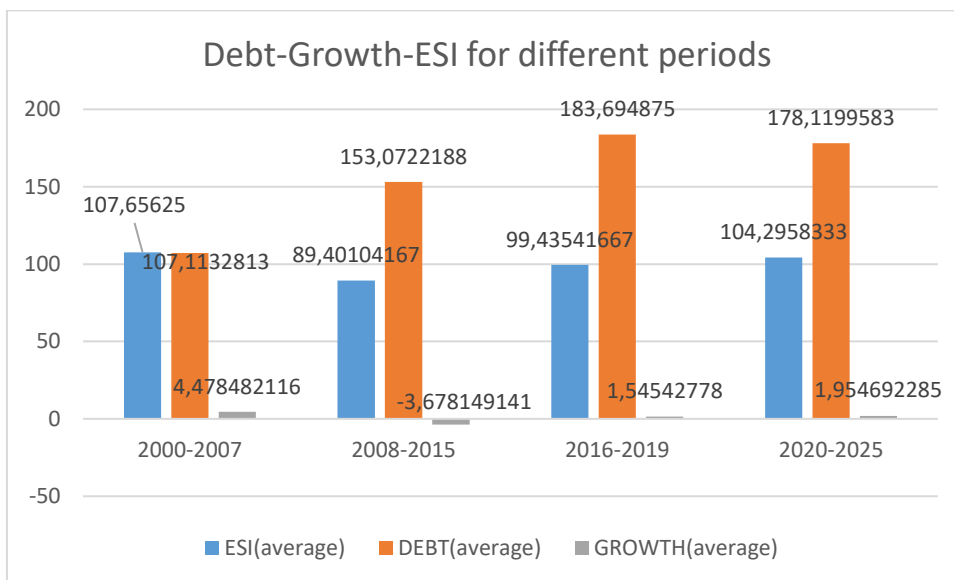
Now, dividing the sample into distinct economic periods allows for a more detailed examination of the relationship between public debt, economic sentiment, and economic

growth under different macroeconomic conditions, since Greece experienced sharp fluctuations during the sample period.

For this reason, the sample period is divided into 4 sub-periods, and then the mean value was estimated for each value for the corresponding period, as seen in table5. After, based on the examined data, a combined graph was designed (Graph 16).

	ESI(average)	DEBT(average)	GROWTH(average)
2000-2007	107,65625	107,1132813	4,478482116
2008-2015	89,40104167	153,0722188	-3,678149141
2016-2019	99,43541667	183,694875	1,54542778
2020-2025	104,2958333	178,1199583	1,954692285

Figure 16: Average Public Debt, Economic Sentiment (ESI), and Economic Growth across Selected Time Periods



Source: Eurostat, Hellenic Statistical Authority (ELSTAT), statistical processing by analyst

Period	Interpretation
Pre-crisis (2000-2007)	moderate debt (but at relatively high levels), positive growth rates, and economic sentiment remained relatively strong

Debt crisis (2008-2015)	substantial increase in debt levels, decline in ESI, economic contraction
Recovery (2016-2019)	improvement of sentiment and growth, although debt remained at high levels
2020-2025	improvement of sentiment and growth, decline of debt-to-GDP ratio, but still persistent (including a temporary shock of the Covid-19 pandemic)

4. Policy Implications and Recommendations

4.1 Summary of findings

Taking all the above into consideration, the descriptive analysis as well as the combined graphical analysis, findings support the theoretical framework of the study, according to which public debt influences economic growth both directly and indirectly through economic sentiment and confidence channels. The findings indicate the way in which public debt, economic sentiment, and economic growth in Greece are closely related during the period 2000–2024 in the case of the Greek economy. The study suggests that periods that are characterized by weak economic sentiment and uncertainty are associated with fiscal instability and low economic performance, while improvements in economic sentiment are associated with economic recovery and growth.

The experience of Greece offers valuable lessons for managing public debt and economic growth. It points out the importance of detecting earlier unsustainable debt levels, measures to address fiscal imbalances, confidence-building measures, and long-term economic growth strategies. In addition, the case of Greece shows the significance of structural reforms to enhance competitiveness and improve governance. Since the turning point of the crisis, Greece has made progress in implementing reforms, ensuring economic stability, and reducing its debt burden. However, the long-term impact of the crisis on Greece's economy and society remains crucial, emphasizing the challenges and complexities involved in balancing public debt and economic growth. The Greek economy faces the phenomenon of hysteresis as the repercussions of the crisis and austerity persist into the future (Marangos,

2023). It would take up to 2034 for Greece to come back to the level of economic activity before the crisis if the shocks related to the pandemic crisis (Katsanidou and Lefkofridi 2020) and the Ukraine war are ignored.

4.2 Policy implications-recommendations

Fiscal Sustainability and Debt Management

The economic crisis showed that high government debt levels created fiscal inequalities in the Greek economy because when government debt levels are high, there is a perception from investors as being speculative. Thus, difficulties in lending from financial markets emerge, leading to fiscal austerity measures and economic downturns. For the private sector to be willing to hold public debt, especially in the longer term, the government must be perceived as being capable of meeting its debt obligations and repaying its debt in real terms. In this case, public debt is believed to be sustainable or, equivalently, the government is solvent. On the contrary, if public debt sustainability is believed to be violated, sovereign risk premia emerge, and nominal interest rates start rising, reflecting the uncertainty to repay public debt (Marangos, 2023), leading to recession. As a result, enhancing fiscal governance is vital for improving the market's expectations over fiscal sustainability (Pegkas, 2017).

Fiscal consolidation, adjustment, and discipline, although essential, are not alone sufficient conditions for economic growth and social welfare, but should be accompanied by growth-enhancing structural reforms (Pegkas, 2017). The examination of the determinants of large public deficits and, consequently, the drivers of the accumulation of the Greek public debt may indicate the appropriate policies that should be implemented.

Thus, public debt sustainability analysis requires the use of structural macroeconomic models where key variables, such as the real interest rate on sovereign bonds, the economy's growth rate, and the fiscal primary balances, plus other macroeconomic variables, like consumption, investment, current account balances, etc. For example, efficiency in public spendings improvement of tax collection systems are necessary to maintain fiscal sustainability.

In addition, it is important to determine the threshold level of general government debt above which debt becomes unsustainable and poses serious threats to the economy's agents. The government should analyze the economic condition of the country by considering the

purposes of the borrowings, the sources of the borrowings, and refinancing debt to take advantage of low interest rates. In addition, the affordability of debt obligations should be considered, thus the ability of the country to pay back.

The implementation of fiscal consolidation measures is crucial to address high levels of public debt by reducing budget deficits, monitoring public spending, and increasing revenue through measures such as taxation reforms. However, excessive austerity measures should be avoided, which can hamper economic growth. Prioritization of public spending is also essential, reallocating expenditures from inefficient areas to productive sectors, such as education, infrastructure, innovation, research, and development. This will have a multiplier effect on economic activity and positively affect productivity.

Promoting Investment and Productivity- Structural reforms

For policymakers, it is particularly important to select the appropriate macroeconomic tools to improve the situation of the Greek economy. Implementing structural reforms to improve competitiveness and enhancing them are important. This can include measures to improve the business environment, promote innovation, enhance labor market flexibility, invest in human capital, and foster entrepreneurship (Mitsi, 2023). Structural reforms can help the economy generate revenue and thus reduce its dependence on excessive borrowing. Furthermore, considering that economic conditions continuously change, for example, during the COVID-19 pandemic, the government should respond with flexibility in its fiscal policies and regulations to mitigate the adverse effects of economic shocks. Also, it is critical to improve the public sector's productivity by reconstructing its bureaucratic mode of production, improving its organization methods, via the use of new technology and administration methods, and labor (education, retraining, and specialization of public employees).

Strengthening Economic Confidence

The positive relationship between the Economic Sentiment Indicator and GDP growth points out the importance of economic sentiment and confidence in economic performance, because it affects investment decisions, household consumption, and economic expectations. Even if debt does not harm growth directly in the short term, very high debt levels can make governments vulnerable to shifts in market sentiment or increases in interest

rates. Therefore, policymakers should focus on reducing political uncertainty, improving policy transparency, and enhancing institutional credibility.

Shadow economy

The shadow economy, which has been a structural phenomenon in Greece for decades and constitutes a challenge for the Greek economy, has a major impact on the country's fiscal policy, public revenues, competitiveness, and growth. One of the main reasons for the existence of the shadow economy is tax evasion and the existence of informal activities, which were persistent during periods of crisis in Greece. This led to a reduction in revenues, further taxation, reduced incomes, and economic uncertainty.

Thus, economic policy makers, and in particular state governments, are involved in a loop, since the lower the tax base due to the shadow economy, the greater the tax burden on the official economy to collect a given amount of taxes. Some proposals on controlling the shadow economy would be to improve the effectiveness of the tax system, improve its structure and its transparency, improve the system of tax confirmation and collection, and improve the level of business accounting.

In addition, Marangos (2023) referred to Post-Keynesian policy implications. According to him, Greek authorities must focus on policies that boost economic output, such as increasing technological levels, creating a more equitable and stable democratic economic order; reduce unemployment.

Policy recommendations for Greece

Based on the above analysis, the following policy recommendations can be suggested in the case of Greece to promote a balance between debt, growth, and economic climate. First, fiscal consolidations are essential through the improvement of revenue collection and efficiency of public expenditures. Also, enhancing transparency, reducing corruption, simplifying business regulations, and improving the public sector's productivity are essential to strengthening effective demand and promoting growth.

4.3 Conclusions

Overall, the present study demonstrates that public debt, economic sentiment, and economic growth are three macroeconomic variables that are highly interconnected in the Greek economy. The findings suggest that high levels of public debt may weaken economic

confidence and negatively affect growth performance, while improvements in economic sentiment can boost economic performance and macroeconomic stability.

Therefore, effective economic policy should not focus exclusively on debt reduction but also on enhancing confidence, promoting investment, and boosting economic output, which is a key factor to keep debt sustainable. Greece is vulnerable to economic and political shocks. Although exogenous factors cannot be controlled for, the country should not repeat ineffective policies that have created uncertainty. A balanced combination of fiscal sustainability, structural reforms, and confidence-enhancing policies is vital for achieving sustainable long-term economic growth in Greece.

Limitations of the study

Despite giving insights into the relationship between public debt, economic sentiment, and economic growth in Greece, this study has several limitations that should be acknowledged. First, the study focuses mainly on the three macroeconomic variables, while excluding other macroeconomic determinants of growth, such as foreign direct investment, inflation, and unemployment.

Second, the analysis is based on data of quarterly frequency (and in some graphs of annual frequency) for the period 2000–2024. Although this can improve comparability among variables, they may not fully capture fluctuations in the short run, as ESI was originally published on a monthly frequency.

Finally, the study focuses only on Greece, a country whose economic characteristics are different from those of other countries, and the interpretation of the results is within this country and has not examined any causal relationships, such as, for example, whether low economic growth can lead to an increase in public debt.

Future Research Directions

Future research directions are necessary on the examination of the relationship between public debt, growth, and economic sentiment. One important direction is to explore, using advanced econometric methods, the potential linear or non-linear relationship between them, or to employ threshold models. In addition, Dynamic Analysis should be conducted (Mitsi, 2023) to examine the long-term effects of public debt on economic growth, using time-varying data to explain how debt-growth evolves. Investigation of transmission

mechanisms is also essential, as done in this study through economic sentiment, considering the behavioral dimensions of macroeconomic performance. Finally, causal relationships should be examined employing econometric techniques, such as instrumental variable approaches (Mitsi, 2023). Exploring these future research directions may contribute to a better understanding of the complex relationship between public debt and economic growth, providing valuable insights for policymakers.

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