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Government Scale as a Stabilizer: Effects on Output Volatility and Losses*

António Afonso† José Alves‡ Frederico Silva Leal§

July 2025

Abstract

We examine the impact of government size on economic fluctuations and the role of fiscal policy in promoting macroeconomic stability in the period 1980-2024. The results indicate that indirect taxes, capital taxes, and social security contributions (as a percentage of GDP) are associated with lower output volatility, whereas direct taxes tend to amplify it, particularly over longer horizons. On the expenditure side, current spending – especially public wages and interest payments – also exerts a stabilising influence. We further provide new estimates of output losses from the two most severe recent recessions in the EU27 – the Great Recession and the COVID-19 pandemic – and find evidence that the severity of these losses may be linked to the scale of the government, both before and after the crises.

Keywords: Government size; Fiscal policy, Macroeconomic stability; Output losses
JEL: E32; E62; H20

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1. Introduction

Looking back to the end of World War II, when European countries and the United States significantly expanded the size of their governments, the Atlantic nations experienced a decline in output volatility during the period known as the "Great Moderation" (Galí, 1994; Debrun et al., 2008). Afonso et al. (2023) provide an overview of the size and role of the government, notably in terms of what the government "should" do.

According to economic theory, the presence of automatic stabilisers, the relative stability of public spending, or the adoption of counter-cyclical discretionary measures – whether on the revenue or expenditure side – should lead to the expectation that a larger government sector contributes to lower output volatility (e.g. Andrés et al., 2008; Mohanty and Zampolli, 2009).

Nevertheless, there is no empirical consensus on whether the size of government is a decisive factor in reducing output volatility. A larger government may, in some cases, erode the fiscal space required for counter-cyclical interventions during downturns, or crowd out private sector responses.

The literature also suggests that governments are expected to play a key role in mitigating output losses during crises. From a Keynesian perspective, changes in government expenditure or revenue are expected to stimulate domestic consumption and GDP, triggering a cyclical dynamic through the so-called Keynesian multiplier effect, which would support economic recovery. However, once again, there is no clear empirical consensus regarding the extent of the government's contribution to reducing output losses during severe recessions.

Although the multiplier effect is generally assumed to be larger when countries face negative output gaps, it tends to be smaller in economies with high levels of public debt. In such cases, the positive impact of fiscal stimulus may be offset by rising debt servicing costs (Afonso and Leal, 2019). As a result, when fiscal buffers are eroded, pro-cyclical austerity measures may become unavoidable – even in the midst of economic downturns.

Indeed, the two most recent severe recessions in Europe illustrate contrasting patterns in terms of the government's role in mitigating output loss. During the Great Recession, the adoption of austerity measures significantly contributed to worsening output losses, creating a negative feedback loop between GDP, tax revenue, and the level of indebtedness (House et al., 2020). Indeed, authors like Ramey (2019) believe that policymakers were "flying blind," and that, had they had access to some of the knowledge emerging from the literature, they would not have relied on expenditure cuts.

In contrast, during the COVID-19 pandemic, government support – particularly in the form of unemployment assistance – appears to have played a clear and significant role in preserve jobs and cushioning output losses (Ari et al., 2022; Heimberger, 2025).

In this context, our aim is to assess the relationship between the size of Government and the output volatility, and whether larger Governments experienced smaller output loss during the last two severe crises in Europe: The Great Recession and the COVID-19 pandemic. In addition, we also contribute to the existing literature with new estimations for the output loss during the last crisis in the European Union, as this still a topic that has been little explored yet.

The paper is organised as follows. Section 2 presents the literature review. Section 3 provides a methodological identification of output losses during the last two severe recessions in the EU-27. Section 4 outlines the methodology and data, while Section 5 presents the empirical analysis. Finally, Section 6 concludes.

2. Literature Review

2.1. The Government's stabilizing ability

According to the literature, the automatic stabilizers appear to play a crucial role in the short-run stabilization of business cycle fluctuations, as they are designed to be independent of political decisions and free from delays in decision-making and implementation. In the context of the Economic and Monetary Union (EMU), which operates within a macroeconomic policy framework governed by fiscal rules, it is expected that automatic stabilizers – income-based taxes and social transfers – will operate independently of the fiscal position (Debrun et al., 2008). Their action is supposed to reduce the volatility of households' and firms' disposable income in the face of fluctuations in their gross income, thereby dampening the impact of economic shocks on output (Mohanty and Zampolli, 2009).

The fiscal rules have also been playing an important role in reducing the procyclicality of fiscal policy, particularly when a certain threshold of fiscal sustainability is reached (Bergman and Hutchison, 2015). Following episodes of large fiscal expansions and rising public debt, concerns often emerge regarding the potential impact on long-term sovereign debt solvency. Consequently, not only might the effectiveness of fiscal measures be compromised (e.g. Deb et al., 2021), but governments may also be forced to alter their fiscal strategies due to a loss of market confidence in new debt issuance, thereby jeopardising their macroeconomic stabilisation objectives (Bergman and Hutchison, 2015). Moreover, political factors may create policy distortions that can result in suboptimal fiscal outcomes, namely through pro-cyclical fiscal policies, that erode the fiscal space needed to stabilize the economy during downturns (Eyraud et al, 2017).

According to Mohanty and Zampolli (2009), the reduction in output instability in Europe has been associated with a reduction in the average share of government spending in GDP and with an increase in the share of taxes since the adoption of the Stability and Growth Pact. Furthermore, the size of government – particularly government spending – has a direct effect on output volatility through a "composition effect", as it represents the less volatile component of GDP, since it is politically determined (Andrés et al., 2008).

As argued in Debrun et al. (2008), governments also have the capacity to ensure economic stability because they face limited liquidity constraints, allowing them to behave as infinitely lived agents engaged in intertemporal optimization. In this sense, Government is often seen as the safe sector of the open economies, able to provide insurance against exogenous risks (Fuji, 2017). The alternative would be a self-insurance system in which households, having access to financing, manage their own budget to protect themselves against economic downturns or external shocks.

On the other hand, the size of government can also have supply-side effects, as taxation and government spending influence both the labour market and investment decisions. Some literature suggests that taxes may reduce labour productivity (Mohanty and Zampolli, 2009), although other authors, such as Auerbach and Feenberg (2000), argue that progressive taxation could have stabilising effects. The impact on the labour market is also unclear, as while several studies have found a positive relationship between government size and employment (Afonso et al., 2021; Moridian et al., 2025), others have shown that this relationship may turn negative when associated with social objectives, potentially reducing unemployment costs (Ahmet and Dokmen, 2011).

Additionally, Quadrini and Trigari (2007) identify a potential non-linear effect of public sector employment on macroeconomic fluctuations. Given the low cyclicality of public wages and employment, public jobs may become more attractive during recessions, thereby hindering the private sector's ability to fill vacancies and amplifying the impact of economic shocks. Moreover, they argued that if the government purses a procyclical employment policy – hiring more workers during expansions – it may reduce the output volatility due to a crowding-out effect.

In the context of economic crises, and from a Keynesian perspective, government spending increases are expected to be more effective—particularly during severe downturns—when a higher proportion of economic agents face liquidity constraints (Brinca et al., 2016; Afonso and

Leal, 2019; Gourinchas et al., 2021). According to this view, the size of government intervention should vary with the business cycle, being more necessary and effective during recessions than in expansions, thereby highlighting the importance of active fiscal policy in crowding in private demand during deep downturns (Auerbach and Gorodnichenko, 2011).

However, the neoclassical theory differs from the Keynesian one in terms of the role of the state, as private consumption and GDP have, on several occasions, increased simultaneously with a reduction in government spending, a phenomenon known as the non-Keynesian effects of fiscal policy (Blanchard and Perotti, 2002; Afonso and Leal, 2020).

2.2. Government size and macroeconomic stability: Empirical contributions

There are several contributions in the literature, based on different time-series and samples, exploring the relationship between government size and macroeconomic stability. However, there appears to be no clear consensus on the government's role in reducing output volatility, nor conclusive evidence regarding the extent to which government size can reduce the output losses during severe recessions.

Galí (1994) used a Real Business Cycles (RBC) model to assess the role of income taxes and government spending on economic stability in 22 OECD countries between 1960 and 1990. He found evidences of a negative relationship between government size and GDP volatility. However, the role of income taxes did not have the same effect, and was possibly a source of macroeconomic instability.

Andrés et al. (2008), analysing the OECD countries from 1960 to 2004, found that output volatility decreases with an increase in government size. However, they also found evidence that the negative correlation between government size and the volatility is due only to a composition effect, as no significant impact on private output volatility was observed.

Also, with regard to the OECD member States, Mohanty and Zampolli (2009) assessed the role of government size in explaining output volatility from 1960 to 2008, particularly in the context of the 2007-08 recession. They observed that, although modest, there are some evidences of a negative relationship between the share of public spending on GDP and the output instability (10 p.p. increase is associated with a reduction of 7-11% of output volatility), with this link being weakened since the mid-1980s. The results also showed that exposure to external shocks, i.e. factors such as trade openness, inflation or terms-of-trade changes, is relevant in explaining the severity of recessions.

Collard et al. (2017), using data from the United States, found evidence that the relationship between government size and macroeconomic stability is non-monotonic, either mitigating or amplifying the volatility depending on the type of shocks and how big the government actually is. For a government that is too large, the relationship could turn positive as government increases further.

Afonso and Carvalho (2022), using a time-varying measure of fiscal cyclicality in the EMU over the period 1995–2020, observed that fiscal policy becomes procyclical during recessions, despite the budget balance appearing more countercyclical. Moreover, their results show that government size reduces both countercyclicality and trade openness, while higher levels of indebtedness lead to greater countercyclicality in fiscal policy.

For the period 2000–2022, Chrysanthakopoulos et al. (2025), analysing a panel of 162 countries, examined the effect of government spending cyclicality on output growth volatility, economic uncertainty, and the cyclical component of real GDP. They found that, in contrast to advanced economies, real government spending is procyclical in developing economies, and that increased public spending cyclicality raises output growth volatility and heightens economic uncertainty. Meanwhile, an increase in public spending cyclicality has a negative effect on the cyclical component of real GDP over the medium term.

Assessing the government's role in reducing output loss specifically during the last Great Recession in Europe, House et al. (2020), using a multi-country DSGE model, observed that the austerity measures adopted between 2010 and 2014 substantially increased the output loss, especially in the GIIPS (Greece, Ireland, Italy, Portugal and Spain) economies. In the model, instead of falling by 17% during the crisis, the GIIPS would have grown by roughly 1% if it weren't for the austerity measures. However, several studies (e.g. Spilimbergo et al., 2009; Ilzetzki et al., 2013; Zubairy, 2014) indicate that, at the onset of the financial crisis, several European countries implemented expansionary fiscal measures to restore private demand and limit job losses, but the subsequent deterioration in confidence and financing conditions led to highly uncertain outcomes.

Regarding period of the COVID-19 pandemic in Europe, Ari et al. (2022) concluded that governments indeed played a key role in mitigating the effects of the pandemic, as countries that provided larger fiscal support experienced smaller output losses. The results varied across countries, reflecting the size of the policy support measures. Furthermore, Heimberger (2025) observed that social spending on unemployment made a strong contribution to stabilization during the pandemic crisis, despite cyclical behaviour of the remaining social spending (old age, sickness, etc.) being in line with de past. In the same vein, Gourinchas et al. (2021), using a sample of advanced and emerging economies, found that, in the absence of government support during the pandemic, the failure rate of SMEs would have increased by 9 percentage points, particularly in emerging markets. Also, Deb et al. (2021), employing high-frequency economic indicators for 52 countries in 2020, found that fiscal policy announcements were effective in stimulating economic activity by boosting confidence and reducing unemployment.

3. Government size and output loss during severe crisis

In this section, we measured the output losses from the most recent severe recessions in the European Union (27 countries) and examined whether there is evidence that government size contributes to reducing losses during such downturns.

There are two main ways to calculate output losses during a crisis. The first method, avoiding the use of a counterfactual, the output loss is calculated as the difference between the observed real GDP and it's the pre-crisis level, until the moment when the GDP reaches the initial level (e.g. Cecchetti et al., 2009).

In the second method, based on a counterfactual, losses are calculated as the sum of the differences between real GDP and its trend level, which might be computed using, for example, past and/or future average growth rates, the Hamilton filter or the Hodrick-Prescot (HP) filter, to diminish the influence of booms and busts on the growth trends (e.g. Kapp and Vega, 2014).

Kapp and Vega (2014), mention that the absence of a counterfactual does not consider the opportunity cost of foregone output growth and assumes that the output actually turns negative in the first year of a crisis. However, since the counterfactual is a non-observed variable, measuring output losses might lead to hypothetical scenarios rather than concrete losses.

Thus, we computed the output losses by summing the differences between the observed real GDP and its pre-crisis level up to the point at which it returned to the pre-crisis level, and then dividing by the pre-crisis real output. Therefore, the output loss is expressed in percentage points of the pre-crisis real GDP, depending on the duration and intensity of each crisis.

We considered two severe crises in our time sample, which were common to the majority of the Member States during the last decades: The Great Recession (financial and sovereign debt crisis) and the COVID-19 pandemic.

The onset of the Great Recession was considered to be the year in which a country recorded the first fall in real GDP, and the end of the crisis was defined as the year in which a country reached its pre-crisis real output. Since neither Italy nor Greece had recovered their pre-crisis real output before the pandemic, we considered 2019 as the end point of the Great Recession for those countries.

For the pandemic crisis, we considered the period between 2020-2021, due to the economic effects of the invasion of Ukraine by the Russian Federation from 2022 onwards. The values for the duration and output loss for each EU country in both crises are presented in Table 1.

Table 1. Output losses during the last severe crises in the EU-27

	Great Recession		***COVID-19 Pandemic***	
Country	*Years*	*Output Loss*	*Years*	*Output Loss*
Austria	2009-2010	-5.45	2020-2021	-8.16
Belgium	2009	-1.90	2020	-4.78
Bulgaria	2009-2010	-5.26	2020	-3.17
Croatia	2009-2017	-71.43	2020	-8.25
Cyprus	2009-2016*	-34.87	2020	-3.51
Czechia	2009-2013	-10.03	2020-2021	-6.79
Denmark	2008-2013	-16.16	2020	-1.78
Estonia	2008-2015	-68.87	2020	-2.85
Finland	2009-2016	-39.73	2020	-2.50
France	2009-2010	-3.70	2020-2021	-8.51
Germany	2009-2010	-7.17	2020-2021	-4.67
Greece	2009-2019**	-235.96	2020-2021	-10.55
Hungary	2009-2013	-24.94	2020	-4.34
Ireland	2008-2013	-39.51	:	0.00
Italy	2009-2019**	-70.50	2020-2021	-9.59
Latvia	2008-2017	-110.24	2020	-3.41
Lithuania	2009-2013	-44.23	:	0.00
Luxembourg	2008-2009	-3.70	2020	-1.00
Malta	2009	-1.35	2020	-3.73
Netherlands	2009-2014	-10.08	2020	-3.87
Poland	:	:	2020	-2.03
Portugal	2009-2017	-40.63	2020-2021	-11.30
Romania	2009-2013	-26.22	2020	-3.67
Slovakia	2009	-5.55	2020	-2.56
Slovenia	2009-2016	-51.73	2020	-4.21
Spain	2009-2016	-37.71	2020-2021	-15.93
Sweden	2008-2009	-6.06	2020	-2.00

Note: Output loss is expressed in percentage points of pre-crisis real GDP. (*) Cyprus recovered it pre-crisis (2009) output in 2011 but faced a new recession in 2012. The output loss is the cumulative value vis-a-vis 2009. (**) Did not recover pre-crisis (2009) output before the pandemic.

The output loss calculations revealed that, as expected, Greece was by far the most affected country by the Great Recession. By the end of 2019, Greece had not only failed to recover its pre-crisis output level, but had lost an amount equivalent to approximately 236% of its 2008 real GDP. The list of the largest losses is followed by Latvia (110%), Croatia (71%), Italy (71%), and Estonia (69%). Among the EU-27 Member States, only Poland did not experience a decline in real output.

Regarding the impact of the COVID-19 pandemic, Spain was the most affected country, with a cumulative output loss of almost 16% of its 2019 real GDP. The list of the largest losses also includes Portugal (11%), Greece (11%), Italy (10%), and France (9%). Both Hungary and Lithuania did not register output losses during the pandemic.

Then, to assess whether government size – using the share of primary government spending in GDP and the current tax burden as proxies – played a role in the scale of output losses, we conducted a brief statistical analysis to examine whether countries with larger governments before the crisis experienced higher or lower output losses. An additional analysis was carried out to assess whether more indebted countries prior to the crisis experienced higher or lower output losses. The results are in Figure 1, and the data is summarised in Appendix (Table A1).

Regarding the Great Recession, the analysis shows that the tax burden – measured by the share of current tax revenue in GDP – appears to have had a slightly negative correlation with the extent of output loss. In other words, EU countries where state revenue was higher prior to the crisis experienced less severe downturns. Indeed, the three countries with the highest current tax burdens in 2007 (Denmark, Sweden, and Belgium) recorded relatively small output losses: 16.2%, 6.1%, and 1.9%, respectively.

The size of pre-crisis current primary expenditure does not seem to have had any correlation with the extent of the output loss. Moreover, although gross public debt appears to have had a positive correlation with the severity of the output loss – and played a significant role in the transition from the financial crisis to the sovereign debt crisis – the result is heavily influenced by Greece, which was the most indebted country (104.6% of 2007 GDP) and experienced the highest output loss (236.0%). Without Greece, the correlation would become even slightly negative.

During the pandemic crisis, the correlation between both the current tax burden and current primary expenditure in 2019 and the extent of the output loss shifted to slightly positive. This suggests that countries with larger governments appear to have been the ones that suffered the most during the pandemic.

In addition, there is a strong relationship between output loss and the size of public debt. Two main possible explanations for this correlation are: (i) the most indebted countries in 2019 (Greece, Italy, Portugal, and Spain) are among those more reliant on in-person economic activities, such as tourism; and (ii) the most indebted countries may have had less fiscal space to support the economy and employment during lockdowns.

We conducted a similar exercise to assess whether there is a correlation between the increase in government size and indebtedness during crises, and the extent of output loss. The results are presented in Figure 2, and the data are summarised in Appendix (Table A2).

Regarding the Great Recession, Figure 2 shows that the EU countries that recorded the highest output losses were those that underwent stronger fiscal consolidations – namely, increases in current tax revenues and cuts in current expenditures – because of the sovereign debt crisis. Indeed, several countries were subject to Economic Adjustment Programmes aimed at reducing fiscal imbalances.

There was a positive correlation between output loss and the increase in current tax revenue, despite the negative impact of the crisis on state revenue, due to the multiplier effect. Greece recorded the largest increase in the tax burden, 7.3 percentage points of GDP, followed by Finland (+3.1 p.p.) and Latvia (+2.7 p.p.). By contrast, Bulgaria, which experienced a relatively small output loss of 5.3% of pre-crisis GDP, recorded a 4.9 pp decrease in its current tax burden.

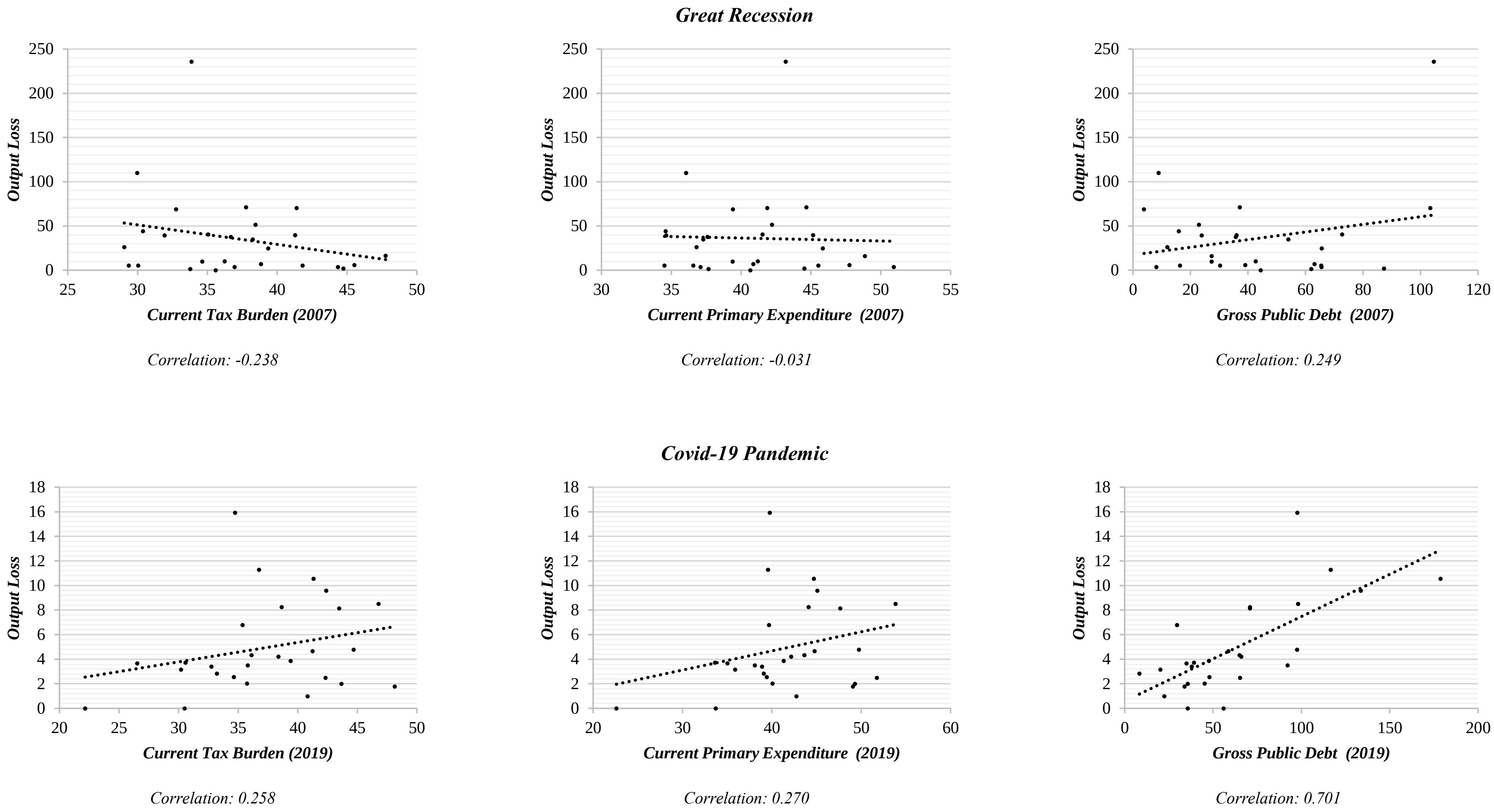
With regard to current primary expenditure, there was a negative correlation with output loss, despite the dominator effect (variables are presented as a percentage of GDP) and the rise in unemployment (reflecting the functioning of automatic stabilisers). The largest cut in government spending was observed in Slovenia, with a reduction of 4.8 percentage points of GDP, followed by Lithuania (-3.5 p.p.) and Romania (-3.1 p.p.). Greece, which experienced the highest output loss, recorded a reduction of 1.9 pp of GDP in primary current expenditure.

As for the level of indebtedness, and despite the fiscal consolidations implemented, there was a positive correlation between output loss and the variation in the public debt ratio. This was largely due to some falls on nominal GDP and the rising interest rates and their impact on debt dynamics – the so-called snowball effect.

Regarding the COVID-19 pandemic, there is a positive correlation between output loss and the variation in both current tax revenue and primary expenditure – the countries most severely affected in terms of economic activity appear to have experienced a greater increase in the size of government. However, it is not clear whether this was the result of the functioning of automatic stabilisers and the adoption of discretionary fiscal policies, or simply a denominator effect. Spain, which recorded the largest output loss during the pandemic, saw the greatest increase in the current tax burden (+2.9 p.p.), while Greece, with the third-largest output loss, had the highest increase in current primary expenditure (+9.6 p.p.). In addition, Cyprus – which had an output loss below the EU average (3.5% of 2019 GDP) – experienced the largest increase in public debt (21.4%). This was mainly due to a decrease of 0.3 p.p. in current tax revenues combined with an increase of 5.8 p.p. in current primary expenditure.

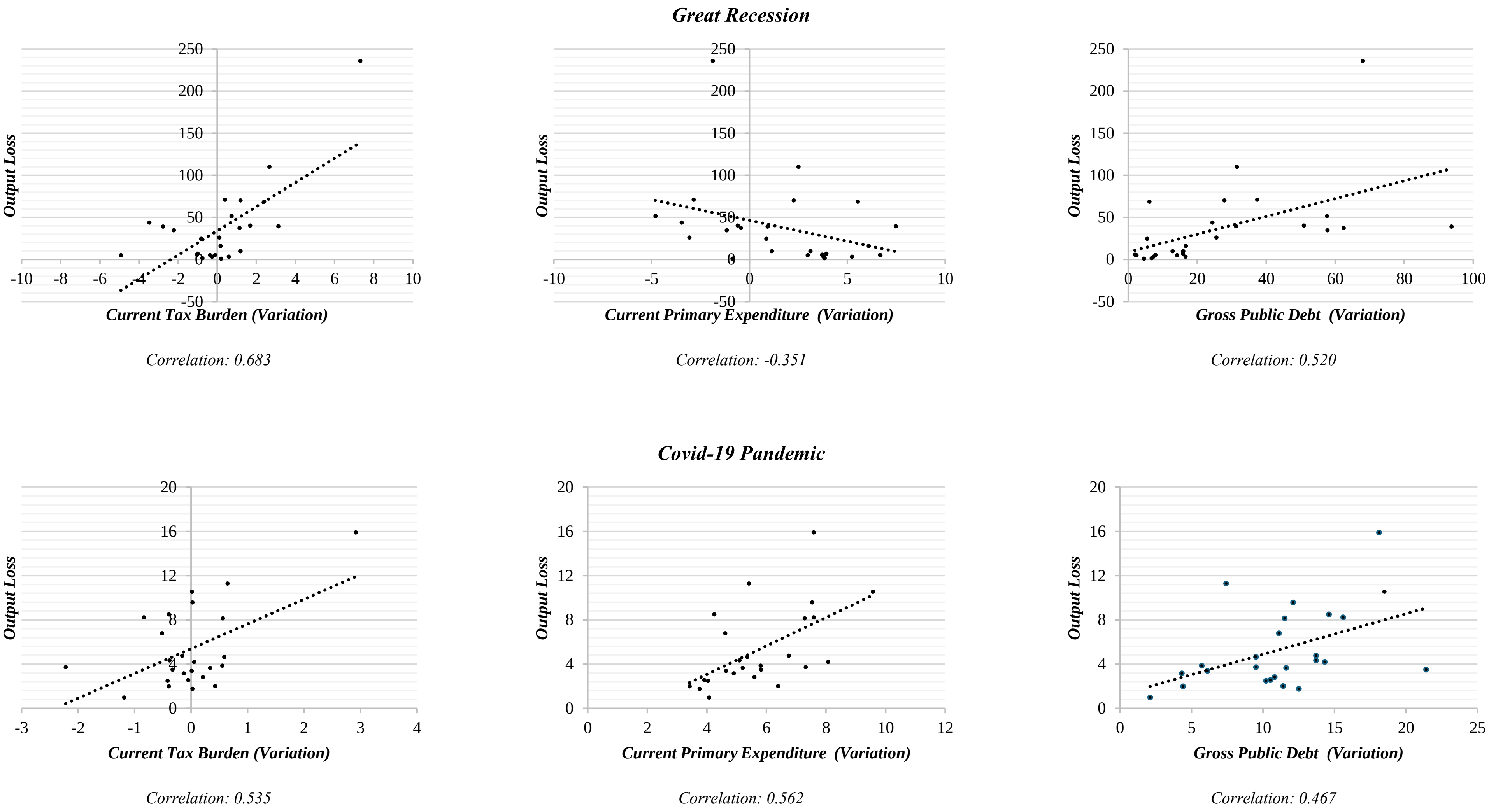
Still, this statistical exercise may be insufficient to reach robust conclusions regarding the role of government in promoting economic stability. Therefore, in section 4, we conduct an econometric analysis to gain a deeper understanding of the macroeconomic and fiscal channels through which government significantly influences economic volatility.

Figure 1. Correlations between output loss and (i) current tax burden, (ii) current primary expenditure and (ii) indebtedness



Notes: Authors' elaboration.

Figure 2. Correlations between output loss and (i) current tax burden, (ii) current primary expenditure and (ii) indebtedness



Notes: Authors' elaboration.

4. Methodology and Data

4.1. Baseline Specification

There are two main variables to measure the size of government in the economy: the share of government spending on GDP and the tax burden, i.e., the share of taxation on GDP (including social contributions), representing two different channels through which the government can affect output volatility and reduce the output loss (e.g. Mohanty and Zampolli, 2009).

In this article, we intend to distinguish the size of each type of expenditure or revenue on GDP. We use a fixed-effects model to assess the impact of fiscal variables throughout time, assuming that the time invariant characteristics are country specific. In addition, since the country sample includes all the EU-27 Member States, and not a random sample from a bigger set of countries, the fixed-effects model seems to be a suitable choice. The baseline specification is modelled via the following reduced form regression:

$$Volatility_{it} = \propto + \beta Fiscal_{it} + \delta X_{it} + \gamma IntRate_{it} + \tau_i + u_{it} \qquad (1)$$

where i and t identify the country and period, and the output volatility ($Volatility_{it}$) was computed using a five-year rolling window standard deviation of the real GDP growth rates.

Fiscal reflects the government's current revenue and expenditure variables as a percentage of GDP. The fiscal expenditure was broken down into compensation of employees, intermediate consumption, public investment (GFCF) and other current expenditure. On the revenue side, we distinguished direct taxes (income, wealth, etc.), indirect taxes (production and imports), capital taxes and the net social contributions.

As additional control variables (*X*), we included factors related to both output and government size, as well as potential determinants of output volatility, such as the degree of trade openness (exports plus imports as a percentage of GDP), the gross public debt-to-GDP ratio, and the inflation rate (measured as the annual growth rate of GDP deflator).

Furthermore, to control for financing conditions (*IntRate*), we included the long-term nominal interest rate in the baseline specification – since government bonds are typically issued with long maturities – and used the short-term nominal interest rate and the yield curve for more in-depth analysis and robustness checks. Finally, α is the constant term, τ_i captures country-fixed effects and u_{it} is the error term.

Additionally, and for robustness purposes, we also conduct additional estimations using the output gap (difference between actual output and potential output) as a proxy for volatility.

4.2. Data

The sample consists of annual data for the 27 European Union Member States, covering the period from 1980 to 2024 (data sourced from the AMECO database).

All explanatory variables are presented as five-year rolling window averages, lagged by one year, and expressed as a percentage of GDP. The summary statistics are presented in Table 2, and the correlation matrix is provided in the Appendix (Table A3).

Table 2. Summary statistics, full panel, 1980–2024.

Variable	*Mean*	*Std. Dev.*	*Min.*	*Max.*	*Obs.*
GDP growth rate S.D.	2.280	1.793	0.224	13.057	951
Output gap S.D.	1.838	1.315	0.000	9.778	933
Total Revenues	42.912	6.676	22.934	58.852	838
Indirect Taxes	13.765	2.778	6.445	23.050	838
Direct Taxes	11.195	4.995	4.759	30.864	838
Capital Taxes	0.151	0.173	0.000	0.896	838
SS. Contrib.	10.937	3.961	0.651	18.390	838
Current Tax	36.843	6.060	20.201	48.851	838
Other Current Rev.	2.337	0.950	0.478	9.635	838
Total Current Exp.	45.657	6.821	23.483	69.516	838
Public Wages	11.129	2.006	6.086	16.899	838
Inter. Public Consumption	19.942	2.993	11.753	27.416	838
Other Current Exp.	2.236	1.074	0.105	6.899	809
Interest Exp.	2.558	1.904	0.046	12.712	838
Public GFCF.	3.787	0.989	0.560	6.343	838
Openness	86.134	61.736	0.126	463.251	985
Debt	57.566	34.330	4.540	189.960	825
Inflation	12.502	46.588	-0.985	585.447	962
Short Term IR.	5.433	7.385	-0.380	66.860	919
Long Term. IR.	5.621	4.050	-0.080	27.700	881
Yield	1.177	1.649	-6.100	12.500	859

Note: All variables are expressed as a percentage of GDP, except for short- and long-term interest rates and yield curves. The values for the government revenues and expenditures items are 5-years centred averages.

5. Empirical Analysis

5.1. Baseline Specification

The empirical results presented in Tables 3 and 4 provide robust evidence on the relationship between government size and macroeconomic stability, proxied by the volatility of real GDP growth EU-27 countries. While Table 3 focuses the analysis on the government revenues side, Table 4 analyses the role of government expenditure and its subcomponents on growth volatility.

On the revenue side, whose results are shown in Table 3, the findings suggest that the average current revenue-to-GDP ratio in EU member states appears to reduce economic volatility. In particular, a one percentage point increase in the average share of total revenue in GDP reduces real output volatility by 0.108 percentage points. However, only tax revenue is statistically significant in explaining economic volatility. This result is consistent with the theoretical expectation that automatic stabilisers embedded in the tax system can smooth economic fluctuations (Debrun et al., 2008; Mohanty and Zampolli, 2009).

Among the tax components, indirect taxes (-0.239), capital taxes (-2.649), and social security contributions (-0.159) have a statistically significant negative impact on the standard deviation of real GDP, thereby contributing to economic stability suggesting that such taxes may be less distortionary in the short run and more effective in financing counter-cyclical fiscal policies. In contrast, direct taxes display a positive and, in some specifications, statistically significant relationship with output volatility. This finding aligns with Galí (1994), who argues that income taxes may amplify macroeconomic fluctuations by increasing the elasticity of labour supply, thereby making employment and output more sensitive to shocks.

Turning to the expenditure side, Table 4 reveals that government spending also contributes for the reduction of economic volatility, albeit with important distinctions across expenditure categories. Total current expenditure is negatively associated with output volatility, with public wages and interest payments emerging as the most stabilising components. The negative coefficient on public wages (-0.183) supports the view that stable public sector employment and compensation can help households smooth consumption during downturns, consistent with the findings of Afonso et al. (2021) and Brinca et al. (2016). The significant negative effect of interest expenditure (-0.405) is less intuitive but may reflect the role of debt servicing in anchoring fiscal credibility and reducing uncertainty, particularly in high-debt contexts (Afonso and Leal, 2019).

Public investment (GFCF), by contrast, does not exhibit a statistically significant effect on volatility in the baseline specification. This result may reflect the pro-cyclicality of investment spending or implementation lags that limit its effectiveness as a stabilisation tool (Blanchard and Perotti, 2002). Public investment (GFCF), by contrast, does not exhibit a statistically significant effect on volatility in the baseline specification. This result may reflect the pro-cyclicality of investment spending or implementation lags that limit its effectiveness as a stabilisation tool (Blanchard and Perotti, 2002).

Concerning the macroeconomic control variables, the average level of openness—although less statistically significant in the expenditure estimations – is negatively correlated with the output volatility, where a one percentage point increase leads to a 0.04 reduction in standard deviation of economic growth. While greater openness increases exposure to external risks (Mohanty and Zampolli, 2009), this negative correlation may reflect an economy's capacity to offset potential fluctuations in domestic demand through external demand, thereby reducing economic volatility.

As expected, the average inflation rate is associated with greater economic volatility (0.100, approximately), as it constitutes a source of uncertainty and instability. Similarly, higher levels of indebtedness may contribute to volatility (around 0.030) by prompting pro-cyclical fiscal consolidations, which can further intensify economic downturns (e.g. Afonso and Carvalho, 2022).

Regarding financing costs, the average long-term nominal interest rate increases economic volatility (coefficient between 0.103 and 0.174), as it may raise the ultimate costs of government spending, affect public debt dynamics, and consequently encourage restrictive fiscal policies.

The results using short-term nominal interest rates and the yield curve indicate that both short-term financing costs and the term structure of interest rates positively influence economic volatility. Lastly, these findings provide robustness to the baseline estimation, as they are consistent both in the signs of the coefficients and in statistical significance.

Table 3. Relationship between government revenues and real GDP Growth S.D.

	Short Term			*Long Term*			*Yield Curve*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Indirect\ Taxes_{t-1}$			-0.236***			-0.239***			-0.239***
			(0.066)			(0.069)			(0.068)
$Direct\ Taxes_{t-1}$			0.107**			0.027			0.029
			(0.047)			(0.057)			(0.057)
$Capital\ Taxes_{t-1}$			-2.161***			-2.649***			-2.341***
			(0.551)			(0.572)			(0.570)
$SS.Contrib._{t-1}$			-0.155**			-0.159**			-0.149**
			(0.067)			(0.078)			(0.075)
$Current\ Tax_{t-1}$		-0.084**			-0.120***			-0.123***	
		(0.038)			(0.042)			(0.043)	
$Other\ Current\ Rev._{t-1}$		0.020			0.113			0.080	
		(0.123)			(0.120)			(0.126)	
$Total\ Revenue_{t-1}$	-0.080**			-0.108***			-0.107***		
	(0.037)			(0.040)			(0.041)		
$Openness_{t-1}$	-0.005***	-0.005**	-0.006***	-0.004*	-0.004**	-0.004**	-0.003	-0.003	-0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$Debt_{t-1}$	0.025***	0.025***	0.022***	0.026***	0.028***	0.026***	0.027***	0.027***	0.026***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
$Inflation_{t-1}$	-0.003	-0.001	-0.008***	0.103***	0.099***	0.101***	0.171***	0.166***	0.149***
	(0.003)	(0.003)	(0.003)	(0.038)	(0.037)	(0.038)	(0.043)	(0.041)	(0.039)
$Short\ Term\ IR._{t-1}$	0.038***	0.041***	0.035***						
	(0.009)	(0.010)	(0.009)						
$Long\ Term\ IR._{t-1}$				0.150***	0.113**	0.103**			
				(0.057)	(0.053)	(0.050)			
$Yield_{t-1}$							0.123***	0.126***	0.080*
							(0.045)	(0.044)	(0.043)
$Constant$	2.727*	2.454*	2.950**	1.476	1.880	1.850	2.752*	2.980**	2.706*
	(1.434)	(1.346)	(1.255)	(1.612)	(1.570)	(1.538)	(1.508)	(1.474)	(1.378)
Obs.	689	721	721	656	678	678	647	667	667
R^2	0.609	0.607	0.626	0.632	0.632	0.646	0.633	0.634	0.645

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

Table 4. Relationship between government spending and real GDP Growth S.D.

	Short Term			*Long Term*			*Yield Curve*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Public\ Wages_{t-1}$			-0.202**			-0.183**			-0.167**
			(0.078)			(0.081)			(0.083)
$Inter.Public\ Consumption_{t-1}$			-0.014			-0.138			-0.111
			(0.077)			(0.091)			(0.094)
$Other\ Current\ Exp_{t-1}$			0.078			0.228			0.117
			(0.191)			(0.189)			(0.197)
$Interest\ Exp_{t-1}$			-0.312***			-0.405***			-0.342***
			(0.047)			(0.074)			(0.070)
$Total\ Current\ Exp_{t-1}$		-0.078***			-0.085***			-0.057*	
		(0.030)			(0.030)			(0.030)	
$Public\ GFCF_{t-1}$		0.014			0.030			-0.035	
		(0.087)			(0.093)			(0.091)	
$Total\ Expenditure_{t-1}$	-0.045*			-0.069**			-0.047*		
	(0.027)			(0.028)			(0.028)		
$Openness_{t-1}$	-0.005**	-0.004*	-0.000	-0.004*	-0.003	0.001	-0.003	-0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
$Debt_{t-1}$	0.024***	0.028***	0.032***	0.024***	0.030***	0.034***	0.025***	0.027***	0.035***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)
$Inflation_{t-1}$	-0.003	-0.002	0.000	0.098**	0.088**	0.123***	0.164***	0.153***	0.170***
	(0.002)	(0.003)	(0.002)	(0.038)	(0.037)	(0.043)	(0.043)	(0.041)	(0.045)
$Short\ Term\ IR_{t-1}$	0.039***	0.045***	0.037***						
	(0.009)	(0.010)	(0.010)						
$Long\ Term\ IR_{t-1}$				0.174***	0.147***	0.165***			
				(0.058)	(0.054)	(0.052)			
$Yield_{t-1}$							0.107**	0.103**	0.057
							(0.045)	(0.043)	(0.043)
$Constant$	1.239	1.767	1.510	-0.446	-0.161	-1.181	0.295	0.488	0.307
	(1.115)	(1.124)	(1.050)	(1.243)	(1.336)	(1.294)	(1.182)	(1.227)	(1.198)
Obs.	689	721	697	656	678	654	647	667	643
R^2	0.606	0.607	0.616	0.629	0.628	0.638	0.628	0.627	0.633

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

5.2. Robustness Analysis

Tables 5 and 6 present the regressions for the robustness analysis, using the standard deviation of the output gap (calculated over a five-year rolling window) as a proxy for economic stability, largely confirm the baseline findings. The Tables 5 and 6 report estimations for government revenue and government expenditure, respectively.

Once again, the results prove robust across different model specifications. Regarding government revenue (Table 5), when using the standard deviation of the output gap as the dependent variable, both the average of total revenue-to-GDP ratio and of the current tax burden continue to exhibit a negative correlation with economic volatility. In addition, average indirect taxes and capital taxes remain statistically significant in explaining economic volatility.

However, although Social Security contributions still show a negative sign, they are no longer statistically significant. Direct taxes, in contrast, become positively significant in both the short- and long-term estimations. A similar result is found in Galí (1994), who argues that the destabilising effects of income taxes are primarily driven by an increase in the elasticity of labour supply induced by higher tax rates. This rise in elasticity reduces steady-state employment and makes labour more responsive to shocks. As a result, fluctuations in employment become more pronounced, leading to greater variations in output and investment—and consequently, in output as well.

Lastly, the average inflation rate lost its statistical significance in the estimation using the long-term nominal interest rate, and the short-term nominal interest rate was no longer significant in explaining economic volatility. In contrast, the openness level, the debt-to-GDP ratio, the long-term interest rate, and the yield curve retained both the sign and statistical significance of their coefficients.

Regarding government expenditure (Table 6), the negative impact of average public wages and interest expenditure remained robust. However, despite retaining a negative sign, total expenditure lost statistical significance in the short-term and yield curve estimations, as did total current expenditure in the yield curve estimation. Once again, the average inflation rate lost statistical significance in the long-term interest rate estimation, as did the short-term interest rate in explaining economic volatility. These results underscore the importance of the composition of fiscal policy, rather than its aggregate size, in achieving macroeconomic stability.

Table 5. Relationship between government revenues and the standard deviation of the output gap.

	Short Term			*Long Term*			*Yield Curve*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Indirect\ Taxes_{t-1}$			-0.208***			-0.177***			-0.200***
			(0.050)			(0.051)			(0.054)
$Direct\ Taxes_{t-1}$			0.077**			0.070*			0.060
			(0.037)			(0.043)			(0.041)
$Capital\ Taxes_{t-1}$			-2.425***			-2.611***			-2.140***
			(0.467)			(0.469)			(0.481)
$SS.Contrib_{t-1}$			-0.089			-0.054			-0.073
			(0.054)			(0.061)			(0.061)
$Current\ Tax_{t-1}$		-0.070**			-0.059*			-0.082**	
		(0.028)			(0.032)			(0.033)	
$Other\ Current\ Rev_{t-1}$		-0.125			-0.094			-0.114	
		(0.098)			(0.104)			(0.111)	
$Total\ Revenue_{t-1}$	-0.056**			-0.056*			-0.073**		
	(0.028)			(0.030)			(0.031)		
$Openness_{t-1}$	-0.004**	-0.003**	-0.005***	-0.004***	-0.005***	-0.005***	-0.004**	-0.004**	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
$Debt_{t-1}$	0.022***	0.025***	0.020***	0.015***	0.018***	0.014***	0.016***	0.018***	0.014***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$Inflation_{t-1}$	0.012***	0.014***	0.008*	0.010	-0.002	0.005	0.092***	0.083***	0.071**
	(0.004)	(0.004)	(0.004)	(0.027)	(0.027)	(0.027)	(0.033)	(0.030)	(0.029)
$Short\ Term\ IR._{t-1}$	0.005	0.003	-0.000						
	(0.007)	(0.007)	(0.008)						
$Long\ Term\ IR_{t-1}$				0.188***	0.147***	0.139***			
				(0.058)	(0.049)	(0.048)			
$Yield_{t-1}$							0.173***	0.173***	0.130***
							(0.051)	(0.049)	(0.049)
$Constant$	1.598	1.932*	2.044**	-0.435	0.142	-0.218	2.126	2.343*	1.793
	(1.170)	(1.101)	(1.027)	(1.293)	(1.270)	(1.185)	(1.295)	(1.273)	(1.158)
Obs.	689	720	720	656	678	678	647	667	667
R^2	0.549	0.561	0.586	0.567	0.566	0.591	0.563	0.567	0.586

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

Table 6. Relationship between government spending and the standard deviation of the output gap.

	Short Term			*Long Term*			*Yield Curve*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Public\ Wages_{t-1}$			-0.154**			-0.194***			-0.198***
			(0.069)			(0.071)			(0.070)
$Inter.Public\ Consumption_{t-1}$			0.003			-0.057			-0.057
			(0.065)			(0.073)			(0.077)
$Other\ Current\ Exp_{t-1}$			0.079			0.209			0.099
			(0.163)			(0.171)			(0.181)
$Interest\ Exp_{t-1}$			-0.158***			-0.342***			-0.278***
			(0.049)			(0.064)			(0.068)
$Total\ Current\ Exp_{t-1}$		-0.049*			-0.059**			-0.043	
		(0.027)			(0.027)			(0.027)	
$Public\ GFCF_{t-1}$		-0.001			0.022			-0.051	
		(0.075)			(0.082)			(0.084)	
$Total\ Expenditure_{t-1}$	-0.033			-0.048**			-0.040		
	(0.024)			(0.024)			(0.024)		
$Openness_{t-1}$	-0.004**	-0.003*	-0.001	-0.004***	-0.005***	-0.002	-0.004**	-0.004**	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
$Debt_{t-1}$	0.021***	0.025***	0.026***	0.015***	0.020***	0.024***	0.015***	0.016***	0.023***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
$Inflation_{t-1}$	0.013***	0.014***	0.015***	0.006	-0.003	0.020	0.087***	0.077**	0.087**
	(0.004)	(0.004)	(0.005)	(0.027)	(0.027)	(0.031)	(0.033)	(0.031)	(0.035)
$Short\ Term\ IR_{t-1}$	0.005	0.004	-0.003						
	(0.008)	(0.009)	(0.010)						
$Long\ Term\ IR_{t-1}$				0.206***	0.167***	0.186***			
				(0.059)	(0.052)	(0.049)			
$Yield_{t-1}$							0.164***	0.155***	0.122**
							(0.050)	(0.049)	(0.053)
$Constant$	0.621	0.826	0.832	-1.010	-0.512	-0.739	0.732	0.817	1.309
	(0.951)	(1.021)	(0.954)	(1.077)	(1.164)	(1.154)	(1.035)	(1.129)	(1.058)
Obs.	689	720	696	656	678	654	647	667	643
R^2	0.547	0.558	0.559	0.568	0.568	0.583	0.559	0.563	0.571

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

5.3. Dynamic Analysis

The dynamic analysis in Tables 7 and 8 further enriches the empirical narrative by examining the lagged effects of fiscal variables. The stabilising impact of indirect and capital taxes persists up to three years, after which the magnitude and significance of the coefficients decline. This pattern suggests that the effectiveness of these instruments is strongest in the short to medium term. Conversely, the destabilising effect of direct taxes intensifies over time, with the coefficient rising from 0.111 at two lags to 0.246 at five lags. This finding reinforces the argument that income taxation may introduce long-term distortions that amplify economic fluctuations (Galí, 1994).

On the expenditure side, interest payments consistently reduce volatility across all lag structures, while the effects of public wages and other current expenditures weaken over time. Notably, public investment becomes significantly negative at longer lags (−0.515 at lag 5), indicating that capital spending may contribute to macroeconomic stability in the long run, even if its short-term effects are muted. This result aligns with the view that public investment can enhance potential output and reduce the amplitude of future business cycles (Auerbach and Gorodnichenko, 2011).

Finally, the control variables behave largely as expected. Trade openness is negatively associated with volatility, suggesting that more open economies may benefit from diversification and external demand smoothing (Fuji, 2017). Inflation and public debt are positively correlated with volatility, reflecting the destabilising effects of macroeconomic imbalances and the constraints they impose on fiscal policy (Afonso and Carvalho, 2022). Long-term interest rates and the yield curve also exhibit positive coefficients, indicating that tighter financing conditions may exacerbate economic fluctuations.

To ensure robustness, additional estimations were performed using the output gap as a proxy for volatility. The results are reported in the Appendix (Tables A4 and A5)

In sum, the empirical evidence presented in Tables 3 through 8 supports the hypothesis that government size, particularly through its composition and timing, can play a meaningful role in reducing output volatility. The results highlight the importance of automatic stabilisers, the structure of taxation, and the nature of public spending in shaping macroeconomic outcomes. These findings contribute to the ongoing debate on the optimal design of fiscal policy in the context of economic stabilisation and crisis management.

Table 7. Relationship between government revenues and real GDP Growth S.D., up to 5 lags.

	2 Lags		*3 Lags*		*4 Lags*		*5 Lags*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Indirect\ Taxes$		-0.239***		-0.232***		-0.205**		-0.146*
		(0.070)		(0.074)		(0.080)		(0.086)
$Direct\ Taxes$		0.111*		0.167***		0.205***		0.246***
		(0.057)		(0.060)		(0.063)		(0.066)
$Capital\ Taxes$		-2.826***		-2.521***		-1.844***		-0.711
		(0.623)		(0.669)		(0.695)		(0.697)
$SS.Contrib.$		-0.255***		-0.266***		-0.226**		-0.146
		(0.085)		(0.096)		(0.113)		(0.128)
$Current\ Tax$	-0.108**		-0.091**		-0.068		-0.026	
	(0.042)		(0.043)		(0.044)		(0.046)	
$Other\ Current\ Rev.$	-0.008		-0.163		-0.275**		-0.338**	
	(0.125)		(0.120)		(0.124)		(0.135)	
$Openness$	-0.006***	-0.005***	-0.008***	-0.007***	-0.012***	-0.010***	-0.015***	-0.013***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
$Debt$	0.031***	0.029***	0.032***	0.028***	0.028***	0.023***	0.020***	0.015*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
$Inflation$	0.123***	0.126***	0.107***	0.111***	0.050	0.053	-0.021	-0.022
	(0.039)	(0.038)	(0.036)	(0.036)	(0.037)	(0.038)	(0.041)	(0.042)
$Long\ Term\ IR$	0.039	0.020	-0.027	-0.047	-0.053	-0.071	-0.059	-0.075
	(0.051)	(0.050)	(0.049)	(0.049)	(0.050)	(0.053)	(0.053)	(0.057)
$Constant$	1.713	2.173	2.312	2.767*	3.200**	3.301**	2.880*	2.536
	(1.535)	(1.514)	(1.524)	(1.543)	(1.595)	(1.654)	(1.714)	(1.792)
Obs.	652	652	626	626	600	600	574	574
R^2	0.630	0.653	0.626	0.651	0.612	0.632	0.604	0.619

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

Table 8. Relationship between government spending and real GDP Growth S.D., up to 5 lags.

	2 Lags		*3 Lags*		*4 Lags*		*5 Lags*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Public\ Wages$		-0.118		-0.081		-0.082		-0.089
		(0.093)		(0.111)		(0.129)		(0.136)
$Inter.Public\ Consumption$		-0.102		-0.040		0.053		0.173
		(0.091)		(0.095)		(0.107)		(0.115)
$Other\ Current\ Exp.$		0.196		0.006		-0.322		-0.706***
		(0.179)		(0.197)		(0.234)		(0.255)
$Interest\ Exp.$		-0.380***		-0.318***		-0.223***		-0.088
		(0.072)		(0.070)		(0.072)		(0.075)
$Total\ Current\ Exp.$	-0.073**		-0.053*		-0.029		0.010	
	(0.030)		(0.032)		(0.036)		(0.038)	
$Public\ GFCF$	-0.029		-0.158		-0.337***		-0.515***	
	(0.097)		(0.108)		(0.126)		(0.144)	
$Openness$	-0.005**	-0.001	-0.007***	-0.003	-0.010***	-0.007***	-0.013***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
$Debt$	0.031***	0.037***	0.027***	0.035***	0.018***	0.029***	0.006	0.019***
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.007)	(0.007)
$Inflation$	0.117***	0.154***	0.106***	0.135***	0.052	0.062	-0.017	-0.036
	(0.039)	(0.042)	(0.036)	(0.038)	(0.038)	(0.042)	(0.041)	(0.047)
$Long\ Term\ IR$	0.059	0.077	-0.032	-0.008	-0.089*	-0.054	-0.128**	-0.076
	(0.054)	(0.052)	(0.052)	(0.050)	(0.054)	(0.050)	(0.055)	(0.051)
$Constant$	0.010	-1.676	1.263	-0.572	3.171*	1.707	4.209**	3.662**
	(1.360)	(1.374)	(1.495)	(1.539)	(1.668)	(1.744)	(1.756)	(1.821)
Obs.	652	629	626	604	600	579	574	554
R^2	0.628	0.635	0.625	0.627	0.617	0.612	0.620	0.613

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

6. Conclusion

This study provides robust empirical evidence on the role of government size in mitigating output volatility and economic losses during severe downturns, with a focus on the EU-27 between 1980 and 2024, revealing that the composition and timing of fiscal policy are critical determinants of macroeconomic stability.

The findings suggest that larger governments (as a percentage of GDP) – measured through higher tax revenues and public expenditures – can, under certain conditions, contribute to lower output volatility. Specifically, indirect taxes, capital taxes, and social security contributions are associated with reduced volatility, likely due to their automatic stabilizing properties and lower short-run distortionary effects. Conversely, direct taxes appear to amplify volatility, particularly over longer horizons, consistent with theoretical predictions regarding labour supply elasticity and investment sensitivity.

On the expenditure side (as a percentage of GDP), current spending – especially public wages and interest payments – exerts a stabilizing influence. Public sector compensation, due to its low cyclicality, supports household consumption during downturns, while interest payments may signal fiscal credibility in high-debt contexts. However, public investment does not exhibit significant short-term stabilizing effects, likely due to implementation lags and procyclicality, though its long-term benefits emerge in lagged specifications.

Additionally, the analysis of output losses during the Great Recession and the COVID-19 pandemic further underscores the nuanced role of government size. During the former period, countries with higher pre-crisis tax burdens appear to have experienced smaller output losses, suggesting that fiscal capacity and automatic stabilizers played a protective role. On the other hand, EU countries that recorded the greatest output losses were those that underwent more substantial fiscal consolidations in the subsequent years.

In contrast, during the pandemic, countries with larger governments suffered greater losses, potentially reflecting structural vulnerabilities (e.g., reliance on contact-intensive sectors) and limited fiscal space due to high government debt levels. Nevertheless, the countries most severely affected in terms of economic activity were also those that implemented the largest increases in government size following the beginning of the crisis.

These findings carry several important policy implications. First, the design of fiscal policy should prioritize the composition of revenue and expenditure over aggregate size. Policymakers should strengthen automatic stabilizers – particularly indirect taxation and social contributions – while avoiding excessive reliance on direct taxes that may exacerbate cyclical fluctuations.

Second, the stabilizing role of public wages and interest payments suggests that preserving the stability of these components during crises can support aggregate demand. However, the limited short-term impact of public investment highlights the need for institutional reforms that enhance the timeliness and counter-cyclicality of capital spending.

Hence, the heterogeneity in crisis responses across EU countries underscores the importance of institutional quality, fiscal governance, and structural characteristics. A one-size-fits-all approach to fiscal policy may be suboptimal; instead, tailored strategies that account for country-specific constraints and capacities are warranted.

Therefore, maintaining fiscal space is essential for effective counter-cyclical fiscal policy. High government debt levels not only constrain discretionary responses but may also necessitate pro-cyclical consolidations, as observed during the euro area sovereign debt crisis. Thus, fiscal frameworks should incorporate mechanisms that preserve buffers in good times to enable effective intervention during downturns.

While this study advances the understanding of the stabilizing role of the size of the government, several avenues for future research remain. Extending the analysis to include non-EU advanced and emerging economies could enhance external validity and allow for cross-regional comparisons. In addition, incorporating measures of fiscal policy credibility and institutional quality may help explain the heterogeneity in fiscal effectiveness across countries. Another future work avenue could also explore the interaction between monetary and fiscal policy in shaping macroeconomic stability, particularly in the context of the zero lower bound and unconventional monetary interventions. Finally, the role of fiscal policy in addressing structural transformations – such as digitalization, climate transition, and demographic change – warrants further investigation, especially in light of their potential to alter the volatility-stabilization trade-off.

In sum, this paper contributes to the ongoing debate on the optimal size and structure of government in modern economies. By highlighting the conditional and compositional nature of fiscal stabilization, it offers a nuanced perspective that can inform both academic inquiry and policy design.

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Appendix

Table A1. Pre-crisis current tax revenue, current expenditure, and gross public debt as a percentage of GDP.

	Great Recession (2007)			***COVID-19 Pandemic (2019)***		
Country	*Current Tax Revenue*	*Current Primary Expenditure*	*Gross Public Debt*	*Current Tax Revenue*	*Current Primary Expenditure*	*Gross Public Debt*
Austria	41.8	45.5	65.4	43.5	47.6	70.9
Belgium	44.7	44.5	87.3	44.7	49.7	97.5
Bulgaria	30.0	36.6	16.3	30.2	35.9	20.1
Croatia	37.8	44.7	37.1	38.6	44.1	70.9
Cyprus	38.3	37.3	54.0	35.8	38.1	92.2
Czechia	34.6	39.4	27.3	35.4	39.7	29.6
Denmark	47.8	48.9	27.3	48.1	49.1	33.8
Estonia	32.8	39.4	3.8	33.2	39.1	8.3
Finland	41.3	45.2	36.0	42.3	51.7	65.2
France	44.3	50.9	65.5	46.8	53.8	98.1
Germany	38.8	40.9	63.1	41.2	44.8	58.6
Greece	33.9	43.2	104.6	41.3	44.7	178.8
Hungary	39.4	45.9	65.6	36.1	43.6	65.0
Ireland	31.9	34.6	23.9	22.2	22.6	55.9
Italy	41.4	41.9	103.4	42.4	45.1	133.6
Latvia	30.0	36.1	8.9	32.8	38.9	37.9
Lithuania	30.4	34.6	15.9	30.5	33.7	35.6
Luxembourg	37.0	37.1	8.1	40.8	42.7	22.4
Malta	33.8	37.7	62.0	30.6	33.6	39.2
Netherlands	36.2	41.2	42.7	39.4	41.3	47.6
Poland	35.6	40.7	44.4	35.7	40.1	45.2
Portugal	35.1	41.5	72.7	36.7	39.6	116.5
Romania	29.0	36.8	11.9	26.5	35.0	35.0
Slovakia	29.4	34.5	30.3	34.6	39.4	47.9
Slovenia	38.4	42.2	22.9	38.4	42.2	65.9
Spain	36.7	37.6	35.7	34.7	39.8	97.6
Sweden	45.5	47.8	39.0	43.7	49.3	35.7

Table A2. Variation on current tax revenue, current expenditure, and gross public debt, as a percentage of GDP.

	Great Recession				*COVID-19 Pandemic*			
Country	*Years*	*Current Tax Revenue*	*Current Primary Expenditure*	*Gross Public Debt*	*Years*	*Current Tax Revenue*	*Current Primary Expenditure*	*Gross Public Debt*
Austria	2009-2010	-0.4	3.0	14.1	2020-2021	0.6	7.3	11.5
Belgium	2009	-0.8	3.8	6.7	2020	-0.2	6.7	13.7
Bulgaria	2009-2010	-4.9	6.7	2.3	2020	-0.1	4.9	4.3
Croatia	2009-2017	0.4	-2.9	37.3	2020	-0.8	7.6	15.6
Cyprus	2009-2016*	-2.2	-1.2	57.7	2020	-0.3	5.8	21.4
Czechia	2009-2013	1.2	1.1	15.9	2020-2021	-0.5	4.6	11.1
Denmark	2008-2013	0.2	6.1	16.6	2020	0.0	3.8	12.5
Estonia	2008-2015	2.4	5.5	6.1	2020	0.2	5.6	10.8
Finland	2009-2016	3.1	7.5	31.2	2020	-0.4	4.0	10.2
France	2009-2010	-0.3	3.8	16.5	2020-2021	-0.4	4.2	14.6
Germany	2009-2010	-1.0	3.9	15.8	2020-2021	0.6	5.3	9.5
Greece	2009-2019**	7.3	-1.9	67.9	2020-2021	0.0	9.6	18.5
Hungary	2009-2013	-0.8	0.9	5.4	2020	-0.4	5.1	13.7
Ireland	2008-2013	-2.8	0.9	93.6	:	:	:	:
Italy	2009-2019**	1.2	2.3	27.8	2020-2021	0.0	7.5	12.1
Latvia	2008-2017	2.7	2.5	31.4	2020	0.0	4.6	6.1
Lithuania	2009-2013	-3.5	-3.5	24.3	:	:	:	:
Luxembourg	2008-2009	0.6	5.2	7.2	2020	-1.2	4.1	2.1
Malta	2009	0.2	-0.9	4.5	2020	-2.2	7.3	9.5
Netherlands	2009-2014	1.2	3.1	12.8	2020	0.6	5.8	5.7
Poland	:	:	:	:	2020	0.4	6.4	11.4
Portugal	2009-2017	1.7	-0.6	50.8	2020-2021	0.6	5.4	7.4
Romania	2009-2013	0.1	-3.1	25.5	2020	0.3	5.2	11.6
Slovakia	2009	-0.1	6.7	7.8	2020	-0.1	3.9	10.5
Slovenia	2009-2016	0.7	-4.8	57.5	2020	0.1	8.1	14.3
Spain	2009-2016	1.1	-0.4	62.4	2020-2021	2.9	7.6	18.1
Sweden	2008-2009	-1.0	3.7	1.9	2020	-0.4	3.4	4.4

Notes: * Cyprus recovered it pre-crisis (2009) output in 2011, but faced a new recession in 2012. The output loss is the cumulative value vis-a-vis 2009; ** Did not recover pre-crisis (2009) output before the pandemic.

Table A3. Correlation matrix, full panel, 1980–2024.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***	***(9)***	***(10)***	***(11)***	***(12)***	***(13)***	***(14)***	***(15)***	***(16)***	***(17)***	***(18)***	***(19)***	***(20)***	***(21)***
(1) GDP growth rate S.D.	1																				
(2) Output gap S.D.	0.661	1																			
(3) Total Revenues	-0.287	-0.233	1																		
(4) Indirect Taxes	-0.136	-0.104	0.629	1																	
(5) Direct Taxes	-0.158	-0.157	0.65	0.291	1																
(6) Capital Taxes	-0.237	-0.206	0.335	-0.094	0.327	1															
(7) SS. Contrib.	-0.128	-0.098	0.206	-0.181	-0.422	0.159	1														
(8) Current Tax	-0.294	-0.255	0.973	0.562	0.691	0.385	0.231	1													
(9) Other Current Rev.	-0.04	0.004	0.27	0.363	0.101	-0.083	-0.175	0.095	1												
(10) Total Current Exp.	-0.238	-0.201	0.91	0.578	0.485	0.325	0.29	0.876	0.242	1											
(11) Public Wages	-0.124	-0.102	0.601	0.576	0.499	0.176	-0.26	0.532	0.382	0.595	1										
(12) Inter. Public Consumption	-0.12	-0.161	0.74	0.571	0.462	0.252	0.11	0.703	0.292	0.746	0.532	1									
(13) Other Current Exp.	-0.085	-0.063	0.584	0.627	0.543	0.047	-0.156	0.552	0.102	0.494	0.331	0.412	1								
(14) Interest Exp.	-0.276	-0.156	0.13	0.025	0.076	0.256	0.056	0.148	0.071	0.308	0.069	-0.005	-0.097	1							
(15) Public GFCF.	0.048	0.089	0.019	0.263	-0.245	-0.248	0.047	-0.08	0.155	0.039	0.147	0.097	0.246	-0.366	1						
(16) Openness	0.226	0.169	-0.192	-0.181	0.005	-0.035	-0.128	-0.157	-0.295	-0.276	-0.174	-0.2	0.133	-0.407	0.043	1					
(17) Debt	-0.078	0.009	0.3	0.109	0.122	0.382	0.17	0.332	-0.136	0.463	0.149	0.143	0.093	0.623	-0.4	-0.12	1				
(18) Inflation	0.243	0.074	-0.226	-0.148	-0.113	-0.122	-0.068	-0.227	0.186	-0.223	-0.234	-0.112	-0.215	0.111	-0.171	-0.23	-0.127	1			
(19) Short Term IR.	-0.051	-0.113	-0.168	-0.094	-0.121	-0.156	0.006	-0.159	0.093	-0.096	-0.167	-0.194	-0.24	0.285	-0.037	-0.498	-0.221	0.459	1		
(20) Long Term. IR.	-0.167	-0.084	-0.043	0.016	-0.134	-0.086	0.014	-0.082	0.262	0.081	0.161	-0.078	-0.207	0.499	0.172	-0.599	-0.002	0.658	0.914	1	
(21) Yield	0.147	0.22	-0.027	-0.004	-0.063	-0.038	-0.043	-0.052	0.073	0.052	0.065	-0.02	-0.048	0.014	-0.098	0.108	0.359	-0.405	-0.483	-0.119	1

Table A4. Relationship between government revenues and the S.D. of the output gap , up to 5 lags.

	2 Lags		3 Lags		4 Lags		5 Lags	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Indirect Taxes		-0.193***		-0.194***		-0.188***		-0.174**
		(0.057)		(0.063)		(0.071)		(0.078)
Direct Taxes		0.129***		0.176***		0.209***		0.241***
		(0.047)		(0.051)		(0.054)		(0.056)
Capital Taxes		-2.607***		-2.511***		-1.981***		-0.997*
		(0.521)		(0.560)		(0.575)		(0.579)
SS. Contrib.		-0.097		-0.114		-0.055		0.045
		(0.072)		(0.082)		(0.090)		(0.095)
Current Tax	-0.053		-0.041		-0.022		0.004	
	(0.036)		(0.038)		(0.041)		(0.043)	
Other Current Rev.	-0.172		-0.201*		-0.237**		-0.314***	
	(0.112)		(0.117)		(0.119)		(0.118)	
Openness	-0.006***	-0.006***	-0.008***	-0.008***	-0.011***	-0.011***	-0.014***	-0.013***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Debt	0.020***	0.016***	0.020***	0.015***	0.018***	0.011**	0.015***	0.006
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Inflation	0.035	0.041	0.058*	0.061**	0.037	0.035	-0.008	-0.014
	(0.031)	(0.031)	(0.031)	(0.031)	(0.028)	(0.029)	(0.027)	(0.027)
Long Term IR	0.037	0.025	-0.053	-0.065	-0.094*	-0.100*	-0.099*	-0.100**
	(0.049)	(0.048)	(0.053)	(0.051)	(0.054)	(0.051)	(0.051)	(0.049)
Constant	1.041	0.955	1.876	1.937	3.065*	2.818*	3.847**	3.081*
	(1.463)	(1.371)	(1.606)	(1.495)	(1.697)	(1.577)	(1.747)	(1.624)
Obs.	652	652	626	626	600	600	574	574
R^2	0.558	0.588	0.560	0.595	0.561	0.591	0.566	0.589

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.

Table A5. Relationship between government spending and the S.D. of the output gap, up to 5 lags.

	2 Lags		3 Lags		4 Lags		5 Lags	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public Wages		-0.143*		-0.140*		-0.187**		-0.231**
		(0.079)		(0.084)		(0.087)		(0.090)
Inter Public Consumption		-0.014		0.052		0.138		0.237**
		(0.078)		(0.081)		(0.088)		(0.095)
Other Current Exp.		0.092		-0.087		-0.334**		-0.618***
		(0.164)		(0.146)		(0.155)		(0.190)
Interest Exp.		-0.339***		-0.337***		-0.313***		-0.236***
		(0.066)		(0.065)		(0.067)		(0.068)
Total Current Exp.	-0.041		-0.030		-0.015		0.005	
	(0.029)		(0.031)		(0.031)		(0.031)	
Public GFCF	-0.083		-0.245***		-0.411***		-0.546***	
	(0.082)		(0.081)		(0.086)		(0.098)	
Openness	-0.006***	-0.002	-0.007***	-0.003*	-0.010***	-0.006***	-0.013***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Debt	0.018***	0.026***	0.015***	0.027***	0.009*	0.025***	0.003	0.020***
	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
Inflation	0.036	0.060	0.059*	0.077**	0.037	0.040	-0.006	-0.024
	(0.032)	(0.038)	(0.032)	(0.037)	(0.029)	(0.032)	(0.027)	(0.032)
Long Term IR	0.039	0.063	-0.075	-0.037	-0.141**	-0.085	-0.170***	-0.097*
	(0.052)	(0.047)	(0.057)	(0.050)	(0.059)	(0.052)	(0.056)	(0.050)
Constant	0.600	-0.020	2.441**	1.497	4.818***	4.235***	6.662***	6.824***
	(1.150)	(1.194)	(1.154)	(1.225)	(1.208)	(1.314)	(1.244)	(1.406)
Obs.	652	629	626	604	600	579	574	554
R^2	0.557	0.570	0.566	0.574	0.580	0.580	0.597	0.593

Note: * indicates the level of significance of 10%, ** a level of 5% and *** a level of 1%. In brackets we report the robust standard errors. Obs. are the observations for each regression.