Bölüm 4

Government-Private Consumption Nexus in OECD Countries: Complementary or Substitution?

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Abstract

One of the main factors determining the effectiveness of fiscal policy is the interaction between government expenditures and private consumption. In particular, counter-cyclical fiscal policies aim to stimulate aggregate demand through government expenditures during periods of economic recessions. In this context, an exogenous increase in government expenditure, which generates a greater economic impact through the price and/or real income channel, is referred to in the literature as the multiplier mechanism. However, the magnitude of this multiplier effect is directly correlated to the response of private consumption to government expenditure. Consequently, a central debate in evaluating the effectiveness of fiscal policy revolves around whether government expenditures acts as a substitute for or a complement to private consumption. The primary aim of this study is to empirically examine the impact of government expenditure—considered one of the determinants of private consumption—on the effectiveness of fiscal policies. To this end, novel panel data analysis techniques are employed, using data from 38 OECD member countries between 2000 and 2023. The findings obtained from the CS-ARDL and AMG estimators indicate that both government final consumption expenditures and GDP have a positive and statistically

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significant effect on private consumption expenditures. These results suggest that government final consumption expenditures exhibit a complementary relationship with private consumption.

1. Introduction

Global crises have repeatedly reshaped the role of fiscal policy in ensuring economic stability. During the Great Depression, fiscal policy emerged as a pivotal tool for generating employment. In the 1950s, it became central to economic reconstruction efforts aimed at compensating for the devastation caused by World War II. However, during the stagflation of the 1970s, fiscal policy was sidelined for a considerable period as monetary policy took precedence (Ataç, 2016: 4). This trend reversed with the 2008 Global Financial Crisis and the approximately a decade subsequent COVID-19 pandemic, which once again altered the economic policy landscape. In these periods, fiscal policy regained prominence in the pursuit of economic stability (Pınar, 2019: 9). This transformation became an important scientific motivation for reexamining the effects of fiscal policy instruments in a more detailed manner.

Therefore, with the increasing interest in fiscal policies and their effectiveness, it is necessary to carry the debate one step further from conventional macroeconomic indicators such as public investment and budget deficits. In this context, examining the basic economic behaviors of individuals, especially their private consumption (hereafter PC) decisions, becomes essential. In this context, the nexus between government expenditures (hereafter GE) and PC is central to evaluating the effectiveness of fiscal policy. According to the Keynesian model, an increase in GE creates an effect that increases aggregate demand. To meet the increased demand, it is necessary to increase the level of production, and thus, more production factors are employed, stimulating economic activity. Conversely, the Neoclassical paradigm argues that such fiscal expansion in GE may lead to higher interest rates, which in turn may cause crowding out effects that negatively affect private investment and consumption (Ho, 2004: 162; Serin & Demir, 2023). As a result, it is necessary to examine the degree of substitutability between GE and PC as an important issue in the design of effective fiscal policies (Almosabbeh, 2020).

A widely used approach in literature to evaluate the effects of fiscal policy on aggregate demand is the multiplier mechanism, which is directly related to the substitutability and complementarity degree of the GE-PC nexus. According to this conventional Keynesian mechanism, an increase in GE stimulates economic activity through the general price level and/or real

income channels. This process results in an aggregate income effect that exceeds the initial increase in GE (Pınar, 2019). The multiplier mechanism provides both a theoretical and practical foundation for expansionary fiscal policies.

Shortly after the expansionary fiscal policy implementations, today's global macroeconomic conditions necessitate a careful reconsideration of public intervention through fiscal policy. By the end of 2023, the global public debt stock exceeds $97 trillion, serving as a significant threat signal for the current economic outlook (UNCTAD, 2024; Bozatli et al., 2024). Furthermore, the implementation of expansionary fiscal measures in response to the COVID-19 pandemic has led to the widespread emergence of substantial budget deficits across a wide range of countries. The rising public debt and growing deficits pose serious risks to public debt (Köse et al., 2020) and fiscal sustainability. This situation compels governments to strike a delicate balance between fostering economic growth and maintaining fiscal discipline. Mounting pressure on public finances narrows the fiscal spaces and brings resource allocation issues to the forefront, especially in financing social welfare expenditures, which are highly influential on PC. At the same time, it is essential to analyze the effects of fiscal policy not only on macroeconomic balances but also on individual consumption behavior at the micro level. In this regard, empirical findings on whether the effect of GE on PC is complementary or substitutive can offer a valuable theoretical perspective and play a crucial role in the design and effectiveness of fiscal policy.

In this context, the intertemporal substitution relationship between PC and GE is among the prominent topics in literature. In the presence of such a relationship, an increase in GE may lead to a decline in PC. Accordingly, the question of whether these expenditures function as complements or substitutes has been the subject of extensive empirical investigation (Okubo, 2003). However, findings in this area remain inconclusive. While some researchers argue that increases in GE stimulate PC—suggesting a complementary relationship (Ihori, 1990; Karras, 1994; Okubo, 2003; Bouakez & Rebei, 2007)—others report a substitution effect, whereby GE tends to reduce PC (Almosabbeh, 2020; Kwan, 2006; Levaggi, 1999; Chiu, 2001; Sarı & Yıldırım, 2021). In light of these discussions, this study aims to analyze the effectiveness of fiscal policy over the period 2000–2023, with a specific focus on evaluating the impact of government final consumption expenditures (GFCE) on PC. In this respect, we believe that our study will make significant contributions to researchers and policymakers. By examining the impact of GE on PC, the study focuses on the question of

what kind of effects fiscal policies have on individuals' economic decision-making behavior. In this respect, unlike studies in the literature that primarily focus on macro indicators, it draws attention to micro-level dynamics and offers an original perspective in terms of policy design. (2) In addition, the study evaluates the effects of GFCE on PC over OECD countries using a data set covering the period 2000–2023 with up-to-date empirical panel data techniques. This analysis provides new evidence to the literature by comprehensively examining the effects of both global crises and fiscal policy transformations in OECD countries. (3) The study contrasts Keynesian and Neoclassical perspectives regarding the impact of GE on PC and empirically tests these theoretical claims. By bridging theory and data, the research contributes to clarifying the empirical validity of differing assumptions about the GE–CP relationship.

The remaining study sections are structured as follows: Section 2: Theoretical discussion on the subject is included. Section 3: It is devoted to the summary of empirical literature. The fourth section details the econometric approach adopted in this research. Section 5: The results of the empirical analysis are presented, and the findings are interpreted. Section 6 includes a general evaluation of the results and policy implications.

2. Government Expenditure and Private Consumption Nexus: Theoretical Background

Households' decisions about how much of their income they will allocate to consumption are primarily the subject of microeconomic research. However, PC not only constitutes the largest component of aggregate demand, it also plays an important role in macroeconomic analysis. This is because the remaining income that is not consumed by households is saved. These savings can be used to finance investment through loanable capital markets. For this reason, the impact of GE on PC has long been the subject of academic debate and has been interpreted through various theoretical frameworks.

The Keynesian consumption function posits that consumption depends directly on disposable income. However, this framework links consumption solely to current income, disregarding other factors that may influence consumption behavior (Yıldırım et al., 2016: 545). Within Keynesian theory, the explanation of consumption levels is grounded in the absolute income hypothesis. According to this hypothesis, consumption in period t is determined by the income received in the same period, assuming a linear

relationship between income and consumption demand (Dornbusch et al., 2016: 199).

Within the framework of the classical macroeconomic equity, the effects of key components are typically analyzed to determine the level of national income. Based on this structure, multiplier effects and marginal propensity to consumption or saving coefficients are also calculated. Thus, the impact of fiscal policy on aggregate output is examined through a simplified model. However, it is important to recognize that all these components interact with one another in shaping national income. In this context, for a fiscal policy to be considered effective in the traditional Keynesian sense, it is expected that these components function in a complementary manner. Conversely, it is undesirable for them to crowd each other out through substitution effects.

In the Keynesian approach, an increase in GE increases aggregate demand, stimulates production, and creates employment through this channel. Under the assumption of price stickiness, GE increases labor demand through the transmission mechanism mentioned above. Due to the union structure in the labor market, the increased labor demand ensures an increase in real wages. Accordingly, an increase in the income of households, according to the current income level, increases PC. If the share of this type of household in the economy is high, GE can also increase total PC (Bouakez & Rebei, 2007).

On the other hand, according to Neo-Classical and Real Business Cycle (RBC) theories, GE, when financed through tax increases or borrowing, create mainly an effect that crowds out PC. In other words, expenditures are financed through taxes, especially income taxes, reduce personal disposable income and thus reduce PC. On the other hand, expenditures financed through borrowing can suppress both private investment and consumption by increasing interest rates. In this context, GE replace PC; in other words, it is possible to consider a substitution relationship between the two types of expenditures (Barro, 1981; Baxter & King, 1993).

In addition, the substitution or complementarity relationship may depend on the nature of the goods and services the public provides (Karras, 1994). For example, services such as free school meals provided by the government can substitute for PC. At the same time, public investments in transportation infrastructure can create a complementary effect by encouraging private transportation. In some cases, both effects can coincide. Finally, the effects of GE on PC can differ at both the macroeconomic and microeconomic levels. While macro approaches emphasize the crowding-out effect through interest

rates, price level, and wealth effects, micro approaches analyze changes in PC through the responses of individuals to public services (Levaggi, 1999).

3. Empirical Literature Review

The empirical literature on the impact of GE on PC is extensive, although not as extensive as the theoretical discussions. In studies where researchers have examined the direction, strength, and context-dependent nature of this relationship, their findings vary across country samples, time periods, and methodologies.

Kormendi (1983) has conducted a time series analysis for the United States covering the period 1929–1976 and found that GE had a negative effect on PC. Similarly, Aschauer (1985), using U.S. data from 1948:Q1 to 1981:Q4, argued that GE could reduce PC by as much as 23–42%. In contrast, Ihori (1990), employing a general equilibrium model, suggested that if public and private goods are Edgeworth complements and/or independent, an increase in GE may lead to higher PC.

Karras (1994), using panel data from 30 countries between 1950 and 1985, has found that GE and PC are complementary, although this relationship weakens as the size of government increases. Devereux et al. (1996), applying a dynamic general equilibrium model to U.S. data for the 1960–1989 period, showed that GE can stimulate PC by enhancing productivity and real wages. Using the Nested LES model for Italy from 1960 to 1993, Levaggi (1999) demonstrated that GE can crowd out PC depending on the targeted sector. Similarly, Chiu (2001), employing Johansen cointegration and VECM techniques with data from 1961:Q1 to 1999:Q4 for Taiwan, concluded that real GE act as substitutes for PC.

Okubo (2003), using the GMM method for Japan during the 1971:Q1–1997:Q4 period, has found evidence of complementarity between GFCE and PC. However, Ho (2004), utilizing GMM and nonparametric cointegration analyses with data from 1961:Q1 to 1999:Q4 for Japan, found that GE are substitutable with PC. García and Ramajo (2005), applying the ARDL method to Spanish data from 1955 to 2000, concluded that GE crowds out PC in the long run. Likewise, Kwan (2006), using a panel cointegration method for nine East Asian countries covering 1960–2002, identified a substitution relationship between GE and PC.

Nieh and Ho (2006) analyzed data from 23 OECD countries between 1981 and 2000 using panel cointegration techniques and has concludes that GE serves as an Edgeworth-Pareto substitute for PC due to high intertemporal substitution elasticity. On the other hand, Bouakez and

Rebei (2007), using the maximum likelihood method for U.S. data from 1948:Q1 to 2005:Q4, reported a complementary relationship between GE and PC. Düzgün and Bilgili (2008), in their panel data study of six Central Asian countries from 1990 to 2003, found that GE reduces PC. Tagkalakis (2008), analyzing data from 19 OECD countries from 1970 to 2002 using panel data methods, concluded that GE increases PC, while tax increases reduce it—highlighting the Keynesian effects of fiscal policy.

Addedeji and Adegboye (2013), using time series data for Nigeria from 1981 to 2010, reported a negative effect of GE on PC. Additionaly, Almosabbeh (2020), applying ARDL and NARDL methods, found that a 1% increase in GE led to a 0.86% decrease in PC. Similarly, Sarı and Yıldırım (2021), using ARDL and Fourier-Shin methods for Türkiye over the period 2000:Q3–2020:Q2, observed that a 1% increase in GE resulted in a 0.34% reduction in PC.

These differences in the empirical literature are mostly shaped by structural factors such as the composition of GE (consumption or investment), the financing method (tax, borrowing or money supply), the cyclical state of the economy (recession or expansion), whether households are under liquidity constraints and the degree of substitution/complementarity between public and private goods. In developing countries, the crowding-out effects of GE on PC are more pronounced, especially due to high marginal propensity to consume, narrow credit markets, and high public deficits.

Table 1: Empirical Literature Review

Author (Year)	Sample	Period	Method	GE effects on PC
Kormendi (1983)	USD	1929-1976	Time Series Analysis	Negative
Aschauer (1985)	USD	1948:Q1-1981Q4	OLS	Negative
Ihori (1990)	Hypothetic	Hypothetic	General Equilibrium Model	Positive
Karras (1994)	30 Developed & Developing C.	1950-1985	Panel Data Analysis	Positive
Devereux et al. (1996)	USD	1960-1989	Dynamic General Equilibrium Model	Positive
Levaggi (1999)	Italy	1960-1993	Nested LES	Negative

Chiu (2001)	Taiwan	1961:Q1-1999:Q4	Panel Data Analysis	Negative
Okubo (2003)	Japan	1971Q1-1997Q4	GMM	Positive
Ho (2004)	Japan	1961:Q1-1999:Q4	Panel Data Analysis	Negative
García & Ramajo (2005)	Spain	1955-2000	ARDL	Negative
Kwan (2006)	9 East-Asia C.	1960-2002	Panel Data Analysis	Negative
Nieh & Ho (2006)	23 OECD C.	1981-2000	Panel Data Analysis	Negative
Bouakez & Rebei (2007)	USD	1948Q1-2005q4	Maximum-Likelihood	Positive
Düzgün & Bilgili (2008)	6 Middle Asia C.	1990-2003	Panel Data Analysis	Negative
Tagkalakis (2008)	19 OECD C.	1970-2002	Panel Data Analysis	Positive
Addedeji & Adegboye (2013)	Nigeria	1981-2010	Time Series Analysis	Negative
Almosabbeh (2020)	Egypt	1970-2016	ARDL/ NARDL	Negative
Sarı & Yıldırım (2021)	Türkiye	2000:Q3-2020:Q2	ARDL & Fourier-Shin	Negative

Indeed, recent studies in countries such as Nigeria, Egypt, and Türkiye support this finding. On the other hand, findings on the crowding-in effect emerge prominently in some developed countries, mainly when GE providing complementary services are concentrated. These contradictory findings show that the relationship between GE and PC is not one-way, fixed, and generally valid; on the contrary, it is dynamic, depending on the country, time, and structural conditions. Therefore, empirical analyses of whether GE stimulate or crowd out PC must be interpreted within the specific context of the country and the characteristics of the data set used.

4. Econometric Methodology

This study aims to determine whether GE have a complementary or substitutive effect on PC by using annual data from 2000 to 2023 for 38 OECD countries. Table 2 presents explanatory information regarding the data utilized in the analysis, while equation (1) indicates the econometric model to be estimated.

Table 2: Description of Variables

Variables	Abbreviation	Measure	Source
Households and NPISHs Final Consumption Expenditure	LNHFCE	Constant 2015 US$	WDI (2025)
General Government Final Consumption Expenditure	LNGFCE	Constant 2015 US$	WDI (2025)
Gross Domestic Product	LNGDP	Constant 2015 US$	WDI (2025)

$$\ln HFCE_{i,t} = \beta_0 + \beta_1 \ln GGFCE_{i,t} + \beta_2 \ln GDP_{i,t} + \varepsilon_{i,t} \quad (1)$$

In equation (1), the dependent variable is PC expenditure. The independent variable whose effect is investigated is GFCE[4]. GDP is included in the model as a control variable. β_0 and $\varepsilon_{i,t}$ denote the constant and error terms, respectively.

The empirical methodology consists of four stages. The most important a priori test in panel data analysis is to check the cross-section dependence (CSD). Since the appropriate methodology is selected depending on CSD (Yurdadoğ et al., 2022). Another a priori test is to evaluate the slope homogeneity. If the slope coefficients are heterogeneous, selecting the appropriate estimators is important for reliable results. Accordingly, CSD and slope homogeneity tests are carried out in the first stage. For CSD, Breusch and Pagan's (1980) CDLM1 and Pesaran's (2015) CDLM2 and CD tests are used. The delta test developed by Pesaran and Yamagata (2008), based on the Swamy (1970) approach, is used for slope homogeneity. In the second stage, the Pesaran (2007) CIPS test is used to determine the unit root properties of the series. The choice of this test is based on the idea of using second generation panel unit root tests in the presence of CSD. The null hypothesis of the Pesaran (2007) CIPS test, which considers CSD, implies that the series has a unit root (Aydin and Bozatli, 2022; Serin and Akça, 2022). In the third stage, whether there is a long-term relationship within the model's scope is investigated, as presented in equation (1). The LM bootstrap panel cointegration test (Westerlund and Edgerton, 2007) is used in this context. Based on McCoskey and Kao's (1998) methodology, this test considers CSD and provides reliable results using the bootstrap approach. Another reason for preferring this test is that all series are I (1) (Bozatli & Serin, 2025; Bagci et al., 2025). In the last stage, long-run forecasts

4 GFCE comprises all current expenditure by the government on goods and services, including employee compensation. It also encompasses most expenditures related to national defense and security, excluding, however, military expenditures classified under government capital formation.

are calculated with the Cross-Sectionally Augmented Autoregressive-Distributed Lag (CS-ARDL; Chudik et al., (2016) method and robustness checked with the Augmented Mean Group (AMG; Eberhardt and Bond, 2009; Eberhardt and Teal, 2010) estimator. The CS-ARDL estimator addresses uncorrelated residuals by using the dynamic model framework and weak exogeneity among the regressors. This approach yields reliable results as it accounts for CSD, endogeneity, and heterogeneity. On the other hand, the AMG estimator allows modeling unobservable common factors through the common dynamic effect parameter in unit-specific regressions. Furthermore, it yields results that are resilient to parameter heterogeneity and CSD (Bozatli & Akca, 2023).

5. Empirical Results

As an initial step in the empirical analysis, tests for CSD and slope homogeneity were conducted for each variable and model specification. The results are presented in Table 3.

Table 3: CSD and Slope Homogeneity Test Results

CSD	**CD_{LM1}**	**CD_{LM2}**	**CD**
LNHFCE	12570.76* (0.000)	316.50* (0.000)	104.46* (0.000)
LNGFCE	12598.95* (0.000)	317.25* (0.000)	104.92* (0.000)
LNGDP	13604.31* (0.000)	344.06* (0.000)	108.78* (0.000)
MODEL	4367.96* (0.000)	97.74* (0.000)	9.55* (0.000)
Slope Homogeneity	**Test**	**Test Statistics**	**P-value**
MODEL	$\hat{\Delta}$	32.493*	0.000
	$\hat{\Delta}_{adj}$	35.594*	0.000

Note: * p<0.01. Probability values are in parentheses.

Table 3 demonstrate the existence of CSD in both the model and the variables. On the other hand, it was established that the slope coefficients exhibited heterogeneity. Accordingly, in the following part of the analysis process, estimators that consider CSD, including unit root, cointegration, and long-term estimators, were preferred. Again, estimators that accommodate the heterogeneity of the slope coefficients were employed. The following phase of the investigation involved examining the unit root characteristics

of the series utilizing the Pesaran (2007) CIPS approach, with the results presented in Table 4.

Table 4: CIPS Panel Unit Root Results

Variables	I (0)	I (1)	Critical Values
LNHFCE	-1.205	-2.981*	%1 (-2.23)
LNGGFCE	-1.541	-3.330*	%5 (-2.11)
LNGDP	-1.444	-3.234*	%10 (-2.04)

*Note: * p<0.01.*

Table 4 show that all series are stationary in the first difference. Accordingly, since all series exhibit the I (1) property, the LM bootstrap panel cointegration method was used to determine whether they move together in the long term, and the results are shared in Table 5.

Table 5: Results of Cointegration

Model	Statistic	Asymptotic p-value	Bootstrap p- value
LNHFCE = f(LNGGFCE, LNGDP)	0.570	0.284*	0.998*

*Note: * indicates that the null hypothesis cannot be rejected at 1% significance level. The analysis was conducted using 1000 Bootstrap.*

Table 5 indicates that the null hypothesis regarding the existence of cointegration cannot be rejected. Accordingly, the cointegration relationship is valid within the scope of the model in equation (1), and the long-term coefficients were calculated with CS-ARDL and AMG methods (Table 6).

Table 6: Long-run Estimation Results

	CS-ARDL		Robustness: AMG	
Variables	**Coefficients**	**P-value**	**Coefficients**	**P-value**
Long run				
LNGGFCE	0.3716**	0.040	0.1337*	0.009
LNGDP	0.6226*	0.002	0.7777*	0.000
Short-run				
ΔECT (-1)	-0.6594*	0.000	---	---
Δ LNGGFCE	-0.0350	0.537	---	---
Δ LNGDP	0.6641*	0.000	---	---

*Note: * p<0.01, and ** p<0.05.*

According to the findings obtained with the CS-ARDL estimator in Table 6, GFCE and GDP affect PC positively and are statistically significant in the long run. The same findings are supported by the results calculated with the help of the AMG estimator. In the short run, GFCE is statistically insignificant, while GDP has a positive effect. The error correction coefficient (ECT) indicates that the divergences between the series will be adjusted over time.

Such a result reveals that GFCE are complementary to PC. Regarding studies that consider the OECD sample, such a finding is consistent with Tagkalakis (2008) but differs from Nieh and Ho (2006). However, these studies cover 23 and 19 OECD countries, respectively, and include old data (1981-2000, 1970-2002). Accordingly, this study covers all OECD countries and presents new evidence with current data. The findings obtained in this study support the validity of Keynesian economic propositions for OECD countries.

On the other hand, empirical literature presents evidence supporting both a positive relationship—suggesting complementarity—between GE and PC (Ihori, 1990; Karras, 1994; Devereux et al., 1996; Okubo, 2003; Bouakez and Rebei, 2007), and a negative relationship—indicating substitutability (Levaggi, 1999; Chiu, 2001; García & Ramajo, 2006; Addedeji & Adegboye, 2020; Sarı & Yıldırım, 2021). Consequently, there is no definitive consensus on whether GFCE complement or substitute PC. This ambiguity stems from country-specific policies, the temporal context, and the econometric methods employed in the analyses.

6. Conclusion and Recommendations

The effects of fiscal policies on private sector behavior are one of the most controversial areas throughout the history of economic thought. Although it has been the subject of both theoretical and empirical studies on the direction in which fiscal policy implementations affect PC, no consensus has been reached, especially on GE. This issue has remained on the agenda, especially in crises since the Great Depression. In this context, our study, covering the period 2000-2023, was designed to reveal whether the effects of GFCE on PC expenditures in 38 OECD countries create a complementary or substitutive effect. The findings obtained from CS-ARDL and AMG estimators reveal that GFCE affect PC in a positive and statistically significant manner in the long term. This result reveals that GE have a complementary role in PC. In other words, an increase in GE does not crowd-out or in another definition substitute PC; instead, it acts as a

complementary force that reinforces it. This finding supports the thesis that "*expansionary fiscal policies will have positive effects on aggregate demand,*" which is one of the basic assumptions of the Keynesian economic approach.

While designing these policies, conjunctural conditions and the position of economic cycles should be considered. However, GFCE include current expenditures for goods and services that the state produces or procures from the market and offers to households free of charge or subsidizes, they do not include investment, transfer, and interest payments. Accordingly, to maximize the expansionary effect on PC, focus should be on increase productivity and support the tendency to consume, such as education, health, and social transfers. Also, financing these GE is of particular importance. Because expenditures financed through tax increases or borrowing have different effects, policymakers must consider these implications carefully. For example, a balance must be established between fiscal discipline and growth targets in countries with high public debt and budget deficits. In this case, each country must determine these effects and establish a balance between fiscal discipline and consumption-supporting policies.

This study, based on a sample of OECD countries, statistically demonstrates a complementary relationship between GFCE and private consumption PC. However, the analysis is subject to several limitations. Most notably, it controls only for GDP, which narrows the explanatory scope of the findings. Moreover, it does not distinguish between different types of GE, nor does it consider country-level specific factors or the potential asymmetric effects of fiscal policy. Given that factors such as institutional structures, income distribution, demographic indicators, and patterns of social expenditure may significantly influence the relationship between GE and PC, future research should adopt a more comprehensive analytical framework. Incorporating structural, institutional, and socioeconomic variables, as well as disaggregated fiscal components and country-specific dynamics, would not only enhance the robustness of empirical findings but also yield more nuanced and policy-relevant insights.

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