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Testing the validity of the fiscal illusion hypothesis for Türkiye

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Abstract

This study aims to empirically test the validity of the fiscal illusion hypothesis in the Turkish economy. Fiscal illusion refers to the situation in which individuals fail to fully perceive the true cost of public expenditures. Factors such as the complex structure of the tax system, the high share of indirect taxes in the budget, and the financing of public expenditures through debt can lead individuals to develop misleading perceptions about the cost of public services. Accordingly, this study attempts to reveal the existence of the fiscal illusion phenomenon by analyzing the structural characteristics of public revenues and public expenditures in Türkiye. The primary objective of the study is to examine the long-term relationship between tax revenues and public expenditures in Türkiye within the framework of the fiscal illusion hypothesis and to determine the direction of this relationship through causality analysis. The study was conducted with annual data for the period 1975–2022 and aims to contribute to the understanding of perceptual factors affecting decision-making processes in public finance through time series analysis methods.

Keywords: Fiscal Illusion Hypothesis, Public Expenditure, Taxes.

Jelcodes: C22, H20, H30

1. Introduction

The relationship between government revenues and public expenditures has long been a central topic in public finance literature. One important but often overlooked concept in this context is the fiscal illusion hypothesis. Originally proposed by Puviani (1903) and later developed by Buchanan and Wagner (1977), the hypothesis suggests that individuals systematically misperceive the actual cost of government activities. Factors such as a complex tax structure, a heavy reliance on indirect taxation, and the use of public debt to finance government spending can obscure the real burden of public services from taxpayers (Mourao, 2008; Buchanan and Wagner, 1977). These distortions may result in greater tolerance for public spending and the acceptance of inefficient fiscal policies.

Two main theoretical approaches attempt to explain the relationship between tax revenues and government expenditures: Wagner’s Law and the Keynesian view. Wagner’s Law predicts that public expenditures increase alongside economic growth, treating government spending as a dependent variable (Wagner, 1883). In contrast, the Keynesian perspective considers government spending as an active policy tool to stimulate economic growth and increase aggregate demand, often emphasizing that it should be planned independently of tax revenues (Keynes, 1936).

Beyond theoretical debates, empirical research demonstrates that the direction of the relationship between tax revenues and public expenditures may vary across countries and over time. These studies are commonly



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categorized under four principal hypotheses. The first, the Tax-Spend Hypothesis, posits that tax revenues determine government spending, emphasizing fiscal discipline. According to this perspective, government expenditures are constrained by prevailing tax revenues, and spending expands as tax revenues increase (Buchanan and Wagner, 1977). The second, the Spend-Tax Hypothesis, argues that government spending drives tax revenues, suggesting that governments initially raise expenditures and subsequently increase tax revenues to finance this spending (Peacock and Wiseman, 1961). The third, the Fiscal Synchronization Hypothesis, proposes a bidirectional relationship between revenues and expenditures (Musgrave, 1966). Lastly, the Institutional Separation Hypothesis contends that no statistically significant relationship exists between tax revenues and government spending (Wildavsky, 1988). In developing countries like Türkiye, fiscal illusion may be further intensified by structural features of the fiscal system. A tax system dominated by indirect taxes, limited transparency in government budgets, and widespread use of borrowing can weaken fiscal accountability and distort citizens' perception of the true cost of public expenditures (Oates, 1988; Gemmell et al., 2002).

Although the fiscal illusion hypothesis has received considerable theoretical attention, empirical studies that test its validity remain limited—particularly in emerging market economies. This study aims to fill this gap by empirically examining the fiscal illusion hypothesis in the case of Türkiye, using annual data for the period 1975–2022. The analysis employs the Autoregressive Distributed Lag (ARDL) bounds testing approach (Pesaran et al., 2001) to investigate the long-run relationship between tax revenues and public expenditures, and applies the Toda-Yamamoto causality test (Toda and Yamamoto, 1995) to determine the direction of causality.

2. Literature Review

The relationship between government revenues and expenditures has been extensively examined in both international and Turkish literature, with studies employing different periods, countries, and methodologies. Recent research has focused particularly on disaggregating tax types to test the expenditure-tax and revenue-expenditure hypotheses. These studies reveal both general causal relationships and period- or structure-specific differences.

Table 1 summarizes key studies in reverse chronological order, including both general and subcategory analyses, presenting the country/sample, period, methodology, and main findings.

Table 1. Seminal Studies on the Causal Relationship Between Government Revenues and Expenditures

Year	Study	Country/Sample	Time Period	Econometric Approach	Findings
2020	Çevik and Çıvık	Türkiye	2006:01–2019:09	Cointegration, VECM, Granger causality	Direct taxes → expenditures; indirect taxes → one-way causality
2018	Dritsaki	Greece	1980–2015	Toda-Yamamoto causality	Government revenues determine expenditures
2017	Çetintaş and Bayguşova	Kyrgyzstan	1995–2014	ARDL	Causality from revenues to expenditures
2015	Şahin Uysal and Akar	Türkiye	2006:01–2014:09	Fiscal illusion test	Expenditure-tax hypothesis holds
2014	Al-Zaeund	Jordan	1990–2011	Causality analysis	Bi-directional causality between revenues and expenditures
2013	Kaya and Şen	Türkiye	1975–2011	VAR, Granger causality	Supports the spend-and-tax hypothesis.
2012	Yamak and Abdioğlu	Türkiye	1995–2003	VECM, Granger causality	Expenditures → Revenues (total and subcategories)
2009	Chang and	China	—	—	Supports institutional

Chiang					differences approach
2008	Chen	Taiwan	1955–2005	Toda-Yamamoto causality	Revenues → Expenditures (from real public revenues to defense spending)
2008	Mahvadi and Westerlund	50 U.S. States	1963–1997	Panel cointegration	Short-term: Revenues → Expenditures; Long-term: Expenditures → Revenues
2008	Durkaya and Ceylan	Türkiye	1975–2004	VECM, Granger causality	Expenditures → Indirect taxes; no causality for direct taxes
2007	Gounder et al.	Fiji	1968–2003	Granger causality	Long-term: Expenditures → Revenues (total and subcategories); Short-term: Expenditures → Revenues
2006	Ewing et al.	—	—	—	Supports institutional differences approach
2005	Barua	Bangladesh	1974–2004	Johansen cointegration, Granger	No short-term relationship; long-term causality from revenues to expenditures
2004	Günaydın	Türkiye	1983–2003	Toda-Yamamoto, ECM	Revenue-expenditure hypothesis holds
2002	Chang and Ho	China	1977–1999	Causality analysis	Bi-directional causality
1998	Darrat	Türkiye	1967–1994	VECM, Granger	Supports revenue-expenditure hypothesis
1998	Park	Korea	1964–1992	Granger causality	Revenues determine expenditures
1992	Hoover and Sheffrin	USA	1955–1989	VAR	Valid until 1960; afterwards, institutional differences prevail
1986	Furstenberg et al.	Türkiye / USA	1954–1982 (quarterly)	VAR, Granger causality	Expenditures → Revenues
1986	Anderson et al.	USA	1946–1983	Granger causality	Expenditures affect tax revenues
1979	Peacock and Wiseman	—	—	—	Extraordinary expenditures increase tax revenues
1974	Barro	—	—	Ricardian Equivalence Hypothesis	Expenditures may determine revenues

The table demonstrates that both aggregate and disaggregated analyses have been conducted. International studies such as Dritsaki (2018), Park (1998), and Barua (2005) generally confirm that revenues can influence

expenditures in the long run, though short-term effects vary. Conversely, research by Hoover and Sheffrin (1992) and Chang and Chiang (2009) emphasizes the crucial role of institutional and structural factors in shaping the revenue-expenditure nexus.

Studies from Türkiye consistently support both the expenditure-tax and revenue-expenditure hypotheses. For example, Durkaya and Ceylan (2007) highlight the differential effects of indirect and direct taxes on public spending, and Çevik and Çıvık (2020) confirm these distinctions in recent periods. Other researchers (Şahin Uysal and Akar, 2015; Darrat, 1998; Günaydın, 2004) similarly find that government expenditures generally drive revenue changes, aligning with public choice and fiscal illusion frameworks.

Overall, the literature utilizes a wide array of methodologies—including VAR, ARDL, Johansen cointegration, VECM, and Granger causality tests—to explore the dynamics between government revenues and expenditures. The growing focus on tax subcategories highlights the importance of separating direct and indirect taxes, especially within the Turkish context, to achieve a nuanced understanding of fiscal policy dynamics.

3. Data & Methodology

3.1. Data Description

This study investigates the relationship between government expenditures and tax revenue subcomponents in Türkiye over the period 1975–2022. The data were sourced from the OECD and World Bank databases. All variables are expressed as a percentage of Gross Domestic Product (GDP) to ensure comparability.

Table 2. Description of Study Variables and Data Collection Sources

Variable	Definition	Data Source
GE	Government final consumption expenditures	World Bank, GDBF
PI	Personal income tax revenues	OECD
CP	Corporate income tax	OECD
GS	Good and services taxes	OECD

Figure 1 illustrates the temporal evolution of GE, PI, CP, and GS from 1975 to 2022, highlighting trends and fluctuations. GE exhibits a relatively stable upward trend with moderate volatility, PI and CP display more pronounced fluctuations, and GS shows a general upward trajectory with occasional short-term shocks. These patterns suggest potential interdependencies, which will be formally tested through cointegration and Granger causality analyses.

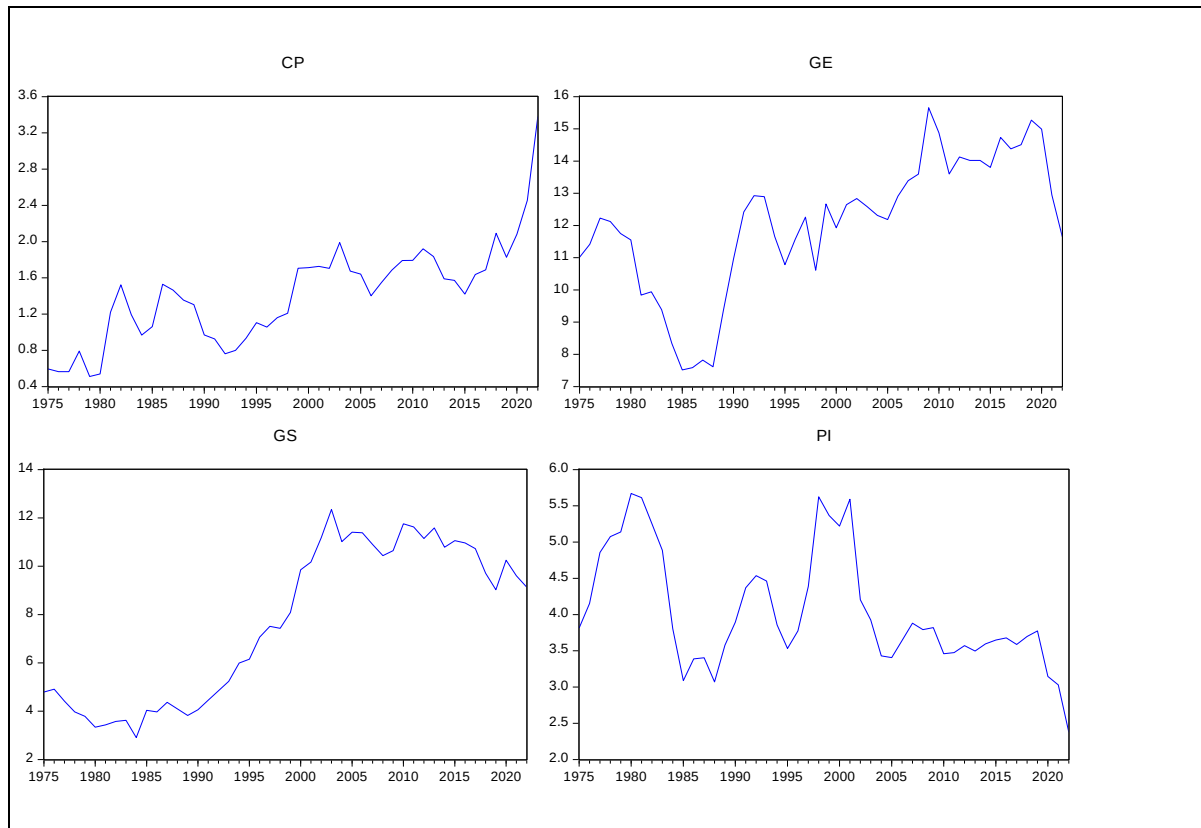


Figure 1. Visualization of the Series Between 1975 and 2022

Source: Prepared by author

Table 3 provides descriptive statistics, indicating that GE has the highest mean value (12.06% of GDP), while CP has the lowest (1.41%). Skewness and kurtosis measures suggest approximate normality for GE and GS, whereas PI and CP deviate slightly from normality. The correlation matrix (Table 4) reveals moderate positive correlations between GE and GS (0.74), and CP and GS (0.66), with negative correlations between PI and CP (-0.48) and PI and GS (-0.35), pointing towards possible interdependencies among the variables.

Table 3. Descriptive statistics of the variables

	PI	CP	GS	GE
Mean	4.042	1.41	7.63	12.06
Median	3.79	1.49	7.79	12.28
Maximum	5.66	3.38	12.34	15.65
Minimum	2.37	0.51	2.90	7.51
Std. Dev.	0.80	0.54	3.21	2.10
Skewness	0.62	0.72	-0.06	-0.58
Kurtosis	2.55	4.85	1.31	2.76
Jarque-Bera	3.47	11.06	5.71	2.87
Probability	0.17	0.00	0.05	0.23

Sum	194.04	67.98	366.60	579.21
Sum Sq. Dev.	30.12	14.16	486.89	208.16
Observations	48	48	48	48

Source: Own computations by the author

Table 4. Results of Correlation Analysis

	PI	CP	GS	GE
PI	1			
CP	-0.48	1		
GS	-0.35	0.66	1	
GE	-0.07	0.34	0.74	1

Source: Own computations by the author

3.2. Econometric Methodology

To determine the stationarity properties of the series, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were applied. Based on the integration properties, the ARDL bounds testing approach was employed to examine the existence of a long-run relationship among the variables. Diagnostic tests were conducted to ensure the reliability of the estimated model, and the Toda-Yamamoto (1995) causality test was used to analyze the direction of causality between government expenditures and different categories of tax revenues.

4. Empirical Findings

4.1. Unit Root Tests

To assess the suitability of the time series models, the stationarity properties of the variables were examined using both the ADF and PP unit root tests. The results at levels are presented in Table 5, while the outcomes after first differencing are reported in Table 6. The findings indicate that all series are non-stationary in levels, suggesting the presence of unit roots. However, after first differencing, all variables become stationary, implying that they are integrated of order one, $I(1)$. For the ADF tests, optimal lag lengths were selected based on the Akaike Information Criterion (AIC). The PP tests were conducted using the Quadratic Spectral kernel with Newey-West bandwidth adjustments to correct for potential serial correlation and heteroskedasticity. Overall, the results confirm that all variables are $I(1)$, becoming stationary only after first differencing.

Table 5. Stationarity Test Results at Level (1975–2022)

ADF unit root test							PP unit root test					
Series	Level Constant	Critical Thresholds		Level Constant and Trend	Critical Thresholds		Level Constant	Critical Thresholds		Level Constant and Trend	Critical Thresholds	
		5%	1%		5%	1%		5%	1%		5%	1%
GE	-1.56(0)	-2.92	-3.57	-1.88(0)	-3.50	-4.16	-1.77	-2.92	-3.57	-2.16	-3.50	-4.16
PI	-2.26(1)	-2.92	-3.58	-3.13(1)	-3.51	-4.17	-1.99	-2.92	-3.57	-2.84	-3.50	-4.16
CP	-0.56(4)	-2.93	-3.59	-2.77(4)	-3.51	-4.18	0.17	-2.92	-3.57	-1.79	-3.50	-4.16
GS	-0.88(0)	-2.92	-3.57	-0.84(0)	-3.50	-4.16	-0.96	-2.92	-3.57	-1.18	-3.50	-4.16

Note: The values in parentheses represent the selected lag lengths for the ADF models, determined based on the Akaike Information Criterion (AIC). (***) denotes statistical significance at the 1% level.

Table 6. Stationarity Test Results at First Difference (1975–2022)

ADF unit root test							PP unit root test					
Series	First Difference Constant	Critical Thresholds		First Difference Constant and Trend	Critical Thresholds		First Difference Constant	Critical Thresholds		First Difference Constant and Trend	Critical Thresholds	
		5%	1%		5%	1%		5%	1%		5%	1%
D(GE)	-5.88(0)**	-2.92	-3.58	-5.82(0)**	-3.51	-4.17	-5.88***	-2.92	-3.58	-5.83***	-3.51	-4.17
D(PI)	-4.45(3)**	-2.93	-3.59	-4.42(3)**	-3.51	-4.18	-4.90***	-2.92	-3.58	-4.94***	-3.51	-4.17
D(CP)	-1.95(3)	-2.93	-3.59	-1.95(3)	-3.51	-4.18	-4.73***	-2.92	-3.58	-4.78***	-3.51	-4.17
D(GS)	-6.45(0)**	-2.92	-3.58	-6.41(0)**	-3.51	-4.17	-6.54***	-2.92	-3.58	-6.50***	-3.51	-4.17

Note: The values in parentheses represent the selected lag lengths for the ADF models, determined based on the Akaike Information Criterion (AIC). (***) denotes statistical significance at the 1% level.

4.2. Cointegration Test

To investigate the long- and short-run dynamics between government expenditures and tax revenue subcomponents, an ARDL model is employed. The general specification of the model is given in equation (1):

$$\Delta GE_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta GE_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta PI_{t-i} + \sum_{i=0}^n \beta_{3i} \Delta CP_{t-i} + \sum_{i=0}^n \beta_{4i} \Delta GS_{t-i} + \sum_{i=0}^n \beta_{5i} + \beta_5 GE_{t-1} + \beta_6 PI_{t-1} + \beta_7 CP_{t-1} + \beta_8 GS_{t-1} + \mu_t \quad (1)$$

The null hypothesis of no cointegration is formulated as:

$$H_0: \begin{bmatrix} \beta_5 \\ \beta_6 \\ \beta_7 \\ \beta_8 \end{bmatrix} = 0_{4 \times 1} \text{ against the alternative of cointegration:}$$

$$H_1: \beta_5 \neq 0 \text{ or } H_1: \begin{bmatrix} \beta_6 \\ \beta_7 \\ \beta_8 \end{bmatrix} \neq 0_{3 \times 1}$$

The optimal lag length for the ARDL model was determined using multiple selection criteria, including LR, FPE, AIC, SC, and HQ. As shown in Table 7, the criteria suggest that a lag of 2 is appropriate.

Table 7. Selection of Lag Order Based on Information Criteria

Lag	LR	FPE	AIC	SC	HQ
0	NA	1.60	11.82	11.98	11.88
1	242.71	0.00	6.33	7.14*	6.63
2	35.67*	0.00*	6.03*	7.49	6.58*
3	15.42	0.00	6.26	8.37	7.05
4	24.40	0.00	6.09	8.84	7.11

*donates lag length chosen by the criteria.

Table 8 presents the diagnostic test results. The LM test confirms the absence of serial correlation (1.58, p=0.45), while the White heteroskedasticity test indicates no evidence of heteroskedasticity (13.08, p=0.28). The Jarque-Bera test suggests normality of residuals (0.06, p=0.96). Overall, the F-statistic (30.67, p<0.01) confirms the model's joint significance.

Table 8. Results of Diagnostic Tests

Autocorrelation (LM)	1.58(0.45)
Heteroscedasticity (White)	13.08(0.28)
Normality (Jarque-Bera)	0.06(0.96)
F-statistic	30.67(0.00)

Source: Own computations by the author

The ARDL bounds testing approach is employed to investigate the existence of a long-run relationship between government expenditures and tax revenues. As shown in Table 9, the computed F-statistic (6.27) exceeds the upper bound critical value at the 5% significance level (4.35), leading to the rejection of the null hypothesis of no cointegration. This result provides evidence of a stable long-run equilibrium relationship among the variables.

Table 9. Results of ARDL Bounds Test for Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.27	5%	3.23	4.35
k	3	1%	4.29	5.61

Source: Own computations by the author

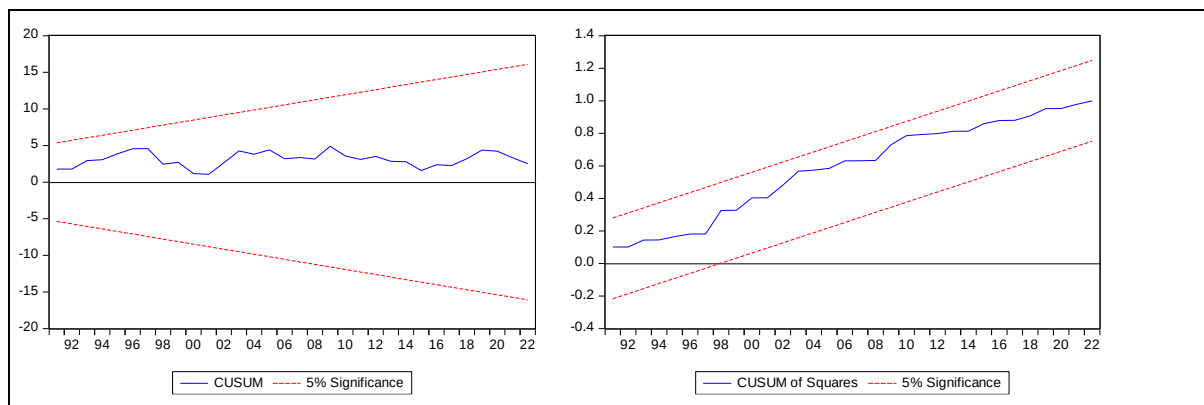


Figure 2. CUSUM and CUSUMQ Test Result Plots

Source: Prepared by author

Figure 2 displays the CUSUM and CUSUMQ test plots for the estimated model. In both cases, the cumulative sums of recursive residuals remain within the 5% significance bounds, providing evidence in favor of parameter stability over the sample period. These results suggest that the model's coefficients are stable and do not exhibit structural breaks during the estimation horizon.

4.3. Toda-Yamamoto (1995) Granger-causality Test

The Toda-Yamamoto (1995) procedure is employed to examine the direction of causality between government expenditures (GE) and tax revenue subcomponents, including personal income tax (PI), corporate income tax (CP), and goods and services tax (GS). The optimal lag length for the model was determined using LR, FPE, AIC, SC, and HQ criteria. As reported in Table 10, a lag of 2 is selected based on most criteria.

Table 10. Selection of Lag Order Based on Information Criteria

Lag	LR	FPE	AIC	SC	HQ
0	NA	1.591816	11.81636	11.97537	11.87592
1	258.8699	0.005800	6.198108	6.993170*	6.495943
2	36.54157*	0.004405*	5.906151*	7.337261	6.442253*

Table 11 shows diagnostic test results for autocorrelation and heteroskedasticity. The LM test indicates no evidence of serial correlation (LM=1.17, p=0.30), and the White test confirms the absence of heteroskedasticity (Test Statistic=243.07, p=0.43). These results suggest that the model satisfies standard assumptions for the Granger-causality test.

Table 11. Results of Autocorrelation and Heteroscedasticity Tests

Autocorrelation (LM)		
Lag Length	LM Test Statistic	P-Value
2	1.17	0.30
Heteroscedasticity (White)		
Lag Length	Test Statistic	P-Value
2	243.07	0.43

Source: Own computations by the author

Table 12. Results of Toda-Yamamoto (1995) Granger Causality Test

Direction of Causal Relationship	Null Hypothesis	Chi-sq.	Prob.	Granger-causality
GE → CP	GE does not granger cause CP	6.52	0.03**	One-way Causality GE → CP
CP → GE	CP does not granger cause GE	0.21	0.89	
GE → GS	GE does not granger cause GS	7.75	0.02**	One-way Causality GE → GS
GS → GE	GS does not granger cause GE	0.05	0.97	
PI → GS	PI does not granger cause GS	7.03	0.02**	One-way Causality PI → GS
GS → PI	GS does not granger cause PI	2.40	0.30	

Source: Author's calculations based on EViews 10 output. (**) denote statistical significance at 5% level.

As illustrated in Table 12, the results of the Toda-Yamamoto Granger-causality test reveal that the null hypothesis stating that current public consumption (CP) does not Granger-cause government expenditures (GE) cannot be rejected. Conversely, the null hypothesis that GE does not Granger-cause CP is rejected at the 5% significance level, indicating a unidirectional causality running from GE to CP. Similarly, the null hypothesis that government spending (GS) does not Granger-cause GE cannot be rejected, while the null hypothesis that GE does not Granger-cause GS is rejected, suggesting a one-way causality from GE to GS. Furthermore, the null hypothesis that GS does not Granger-cause public investment (PI) cannot be rejected, whereas the null hypothesis that PI does not Granger-cause GS is rejected, implying a unidirectional causality from PI to GS.

In summary, the Toda-Yamamoto Granger-causality test results reported in Table 11 demonstrate unidirectional causality in the following directions: $GE \rightarrow CP$, $GE \rightarrow GS$, and $PI \rightarrow GS$, with no evidence of causality observed in the other tested relationships.

The findings of the study reveal a one-way causality running from government expenditures to tax revenues in Türkiye. This result indicates that there is no causality from taxes to expenditures as suggested by the fiscal illusion hypothesis. Therefore, the fiscal illusion hypothesis is not supported in the Turkish case; instead, the spending-led hypothesis appears to be valid, implying that government expenditures drive tax revenues. This outcome highlights that public expenditures are the main determinant of fiscal discipline and budget balance, while tax policies are shaped in line with the financing needs of expenditures.

5. Conclusion

This study investigates the relationship between government expenditures and the components of tax revenues—personal income tax, corporate income tax, and goods and services tax—in Türkiye over the period 1975–2022. Using ARDL bounds testing and the Toda-Yamamoto Granger-causality approach, the analysis provides evidence of both long-term equilibrium relationships and causal dynamics among fiscal variables.

The results obtained from this study can be briefly summarized as follows: First, there is a one-way causality from government expenditures to corporate income tax (CP). Second, we observe a one-way causality from government expenditures to taxes on goods and services (GS). Importantly, there is no evidence of causality running from tax revenues to government expenditures. This finding implies that in Türkiye, tax revenues do not drive expenditures. Instead, government expenditures drive tax revenue components, particularly corporate taxes and consumption-based taxes. Therefore, the fiscal illusion hypothesis is not supported by the data. If the hypothesis were valid, we would expect taxes—especially indirect ones—to influence public expenditure through misperceived costs. But this is not the case in Türkiye. Instead, the spending-led hypothesis is supported: public spending is a leading factor that shapes tax policy, not the other way around. This finding suggests that taxpayers in Türkiye are not significantly affected by fiscal illusion, and that fiscal policy is driven more by spending needs than by perceptions of taxation. The findings of this study are consistent with previous empirical research indicating that government expenditures play a significant role in determining the components of tax revenues in Türkiye (Darrat, 1998; Günaydın, 2004; Kaya and Şen, 2013; Şahin Uysal and Akar, 2015; Çevik and Çıvık, 2020).

In line with the results obtained from this study, some policy recommendations can be made as follows. Fiscal discipline in Türkiye is more likely to be achieved by controlling public expenditures, rather than relying on tax increases. The government may consider increasing budget transparency and tax system simplicity to further minimize potential misperceptions. A long-term fiscal strategy should focus on efficiency in public spending, rather than reactive tax hikes.

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