

Asymmetric Effects of Fiscal Policy on Economic Development in Turkey

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Abstract

The increasing use of fiscal policy as a macroeconomic management instrument has rekindled the awareness in the use of fiscal policy in alleviating poverty, improving the standard of living and reducing the rate of unemployment especially in emerging economies of the world. The paper investigates the asymmetric effects of basic fiscal policy instruments on economic development in Turkey between 1981 and 2022 by using a Non-linear ARDL (NARDL) technique. The study reveals that government expenditure shocks in Turkey significantly affect unemployment, poverty, and the Human Development Index, with positive shocks stimulating economic activity and negative shocks causing GDP decline and job losses. Turkey can enhance its financial assistance, healthcare, housing, employment, and education through various programs such as Conditional Cash Transfer Programmes, Universal Health Insurance, urban transformation, and vocational training. The study recommends balancing short-term benefits with long-term risks for effective resource utilization and debt sustainability.

Keywords: Asymmetric Effects, Fiscal Policy, Economic Development, NARDL and Turkey.

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Introduction

Fiscal policy is a financial tool employed to correct series of economic disturbances and restore the economy to its steady state. Fiscal policy provides government an avenue to influence the economy through revenue generation and public spending to achieve macroeconomic objectives like poverty reduction, high standard of living and economic development. It is important to emphasise that using expenditure alone as a proxy for fiscal policy may be insufficient to achieve desired level of poverty reduction in the country. The increasing use of fiscal policy as a macroeconomic management instrument has rekindled the awareness in the use of fiscal policy in alleviating poverty, improving the standard of living and reducing the rate of unemployment especially in emerging economies of the world [1]. Poverty has been a major challenge facing a number of developing and emerging economies in the past decades [2].

Fiscal policy plays a crucial role in shaping economic development, especially in emerging economies like Turkey. Turkey is the sev-

enth largest economy in Asia, with a GDP of US\$1.03 trillion in the year 2023 [3]. However, its impact can vary depending on the business cycle phase, economic conditions, and the economy's characteristics. Understanding these asymmetries is essential for developing appropriate fiscal strategies to promote sustainable growth and stability. Turkey's economy is characterized by high volatility, frequent business cycle fluctuations, and susceptibility to external shocks [4]. The asymmetric effects of fiscal policy interventions highlight the importance of understanding the economy's direction and structural conditions.

Fiscal policy and inflationary pressures during economic booms can have negative effects, especially in economies like Turkey, where inflationary pressures and external sector vulnerabilities are present. Expansionary fiscal policy during periods of economic growth tends to amplify inflation rather than foster further growth, especially when public debt rises and the exchange rate depreciates, raising import prices and fueling inflation. This asymmetric effect is particularly relevant

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for Turkey, where monetary and fiscal policies are not always well-coordinated, and fiscal stimulus can be inflationary without fostering long-term productive capacity. Turkey's structural vulnerabilities, such as dependence on external financing, currency volatility, and susceptibility to commodity price fluctuations, further contribute to the asymmetric nature of fiscal policy effects.

There was an upsurge in the international flow of financial capital and thus, crises began to spread. Turkey was significantly affected by the crisis and embarked on the implementation of essentially expansionary fiscal policy [5]. Also, public expenditure is found to increase through tax cuts to revive the Turkish economy. Thus, it is revealed that the monetary policies put in place are quite inadequate and as an alternative, fiscal policies appear to be more effective [6]. It is of paramount importance that fiscal policy should be applied in good time and be complemented with other policies as well. Similarly, globalization comes with a rise in the international flow of financial capital and its associated crises continue rise in manifolds. Turkish economy is not an exception in the global crises. Though, the Asian economy is affected by the crisis and has applied series of expansionary fiscal policies to cushion the impact [7].

Studies such as on fiscal policy effects in Turkey show nonlinear responses depending on the economic cycle [8, 9]. Expansionary fiscal policies are more effective during recessions, as they bridge the gap created by weak private sector demand. However, during high economic growth, fiscal stimulus may lead to inflation or an unsustainable rise in public debt. The economic structure, high reliance on external financing, fluctuations in commodity prices, and the vulnerability of the Turkish lira to exchange rate volatility complicate fiscal transmission mechanisms. Also, there is a rising displeasure with the approximations of linear systems as a result of the development of sophisticated theoretical models of economic situations. Thus, it is crucial to conduct research on the asymmetric impact of fiscal policy on development indicators, particularly in Turkey, by distinguishing between the effects of positive and negative fiscal policy shocks.

Literature Review

On the effect of policy shocks on the economy, Jouini, examines the impact of fiscal policy shocks on the economy of Saudi Arabia from 1969 to 2015 using multivariate two-state Markov switching models [10]. Results show that government spending changes significantly affect output, consumption, investment, and reserves across regimes. Differentiating impulse responses between regimes maximizes fiscal policy effectiveness. The empirical findings emanated from the study could benefit policymakers in making reasonable economic decisions and achieve favorable economic repercussions through effective policy coordination. Also, the study reveals that the two-state MS-VEC model accurately represents Saudi Arabia's macroeconomic relationships. Regime-shifts are persistent, with the first regime being more persistent than the second. Most switches are attributed to major economic events.

The empirical findings provide valuable economic insights for Saudi policymakers, enabling them to make sound economic decisions using fiscal policy as a prominent instrument of mac-

roeconomic stabilization. Effective policy coordination and control measures on government spending can improve efficiency. Establishing sovereign wealth funds and specialized government development funds can also boost investment and economic development. These findings may also be useful for other Gulf decision-makers due to shared economic characteristics.

To this end, Asaju, Adagba and Kajang, investigate the degree of effectiveness of government in the use this instrument in enhancing economic development and poverty reduction in Nigeria [11]. The study reveals slow aggregate growth, uneven sectoral growth, and rising poverty rates due to lack of fiscal discipline. The country's inflation rate continues to rise, budget deficit becomes higher, recurrent expenditure takes a greater part of the total expenditure, resulting in the nation's heightened debt profile. These and many more contravene the attainment of fiscal objectives within the economy. It is suggested that strict fiscal discipline and commitment to policy consistency through the Programme Project Budgeting system are recommended by the government to promote economic development and improve citizens' living standards.

Fiscal policy's impact on economic growth is a contentious topic, with economic theory suggesting lower public expenditure may boost growth, while higher expenditure is considered desirable. Qamar. Ghouse. Aslam. Raza and Aziz examine the public expenditure-economic growth relation, focusing on the Arme y Curve [12]. It calculates the optimum levels of government expenditures for development, current, and overall spending to maximize economic growth. The results show that Pakistan's current economic structure requires a 22.41%, 14%, and 8.3% increase in overall government spending, current spending, and development spending. To achieve sustainable growth, Pakistan needs to enhance its tax to GDP ratio, improve development expenditures, and reduce current expenditures. The study reveals that Pakistan's optimum public expenditure levels from 1974 to 2018 positively impact economic growth, but current fiscal policy is not meeting these guidelines, leading to poor social services and economic improvement. Revenue collection is needed for improved economic conditions.

Fiscal policy focuses on achieving economic growth through public expenditures, with real expenditures being the most directly affecting. The Arme y curve, a geometric expression predicting the optimal level of public spending for economic growth, is crucial for estimating government size and therefore, Yüksel, tests the Arme y curve using ARDL bounds testing between 1981 and 2018 in Turkey aiming to determine the optimal government size for maximum economic growth [13]. Using the bound test (ARDL) approach, the results show significant results and meet theoretical expectations. Results also show that the optimal level of public expenditure enhances economic growth at 16% of GDP. However, actual expenditure rates varied between 12.1% and 33.5%, with an average of 20%. The rate of public expenditure to GDP that maximizes economic growth was calculated at 16%. The actual level of public expenditure in the Turkish economy between 1981 and 2018 is above the optimal level. It is suggested that government size positively impacts economic growth up to a certain level, but negatively affects growth thereafter.

Similar with the study above, the empirical study on redistributive impacts of indirect taxes on Turkish economy by Albayrak, reveals that indirect taxes are found to give rise to income inequality shown by the 2008 financial crisis which led to a decrease in VAT and SCT rates, making indirect taxes more regressive, and affecting Turkey's social security structure, with VAT distribution uniform across income groups [6]. The less redistributive nature of social security structure takes a toll on the Turkey's growth rate. This is just a tax sided analysis while the expenditure component is conspicuously missing.

Similarly, globalization comes with a rise in the international flow of financial capital and its associated crises continue rise in manifolds. Turkish economy is not an exception in the global crises. Though, the Asian economy is affected by the crisis and has applied series of expansionary fiscal policies to cushion the impact. In the light of the above, Özer, examines the crises; occasioned by the spread of globalization, while implementing fiscal policies in the Turkish economy [7]. The results show globalization comes with a bag of mixed fortune as liberalization policies adopted by the country in the face of globalization creates new opportunities and at the same time serves a source of threat to the economy. The high level of dependence of Turkey's economy on the developed world's nations has a significant impact on the emergence of the crisis. It was found out that liberal policies adopted by the country led to unbridle and unguarded flow of global capital into the Turkey economy in the short run and this makes the economy vulnerable to certain risks. As a result, the structural challenges of the economy such as a rise the country's debt profile, inflation, foreign trade deficit, current account deficit and unemployment continue to escalate unabated.

There was an upsurge in the international flow of financial capital and thus, crises began to spread. Turkey was significantly affected by the crisis and embarked on the implementation of essentially expansionary fiscal policy. Also, public expenditure is found to increase through tax cuts to revive the Turkish economy. Thus, it is revealed that the monetary policies put in place are quite inadequate and as an alternative, fiscal policies appear to be more effective. Meanwhile, the focus of the study is rather too wide as no specific fiscal policy thrust is emphasized and by implication the conclusion emanated from the study is too general. The work recommends that expansionary fiscal policies should be sustained and after attaining the desired level, contractionary policy should then be applied. It is of paramount importance that fiscal policy should be applied in good time and be complemented with other policies as well.

Higher taxes as prominent component of government revenue is linked to increased unemployment, as evidenced in Brazil and Mexico [14]. Static models employed in the study suggest that taxes on family expenditures have a simultaneous increase in unemployment rates while real interest rate maintains a positive relationship with unemployment and taxes on family income maintain an inverse relationship with unemployment. By implication, tax – which is a withdrawal in the economy – takes a toll on the level of unemployment in those countries. However, government spending, which has a substantial effect on unemployment, is largely disregarded.

Methodology

The analysis of asymmetric impact of fiscal policy on economic development variables in Turkey was examined by separating the effect of positive fiscal policy shock from negative shock. Following the modification of the study of Afandi, Wahyuni and Sriyana, the baseline models for this study are [2]

Model 1: Unemployment

$$UNE_t = \alpha_0 + \alpha_1 f_t + \alpha_2 POP_t + \alpha_3 INT_t + \varepsilon_{1t} \quad 1a$$

Where, UNE_t is the unemployment, total (% of total labour force) and f_t implies fiscal policy variables comprising expenditure (EXP_t) revenue (REV_t) and debt (DBT_t).

That is, $f_t = \alpha_{11} EXP_t + \alpha_{12} REV_t + \alpha_{13} DBT_t$

Model 2: Poverty

$$POV_t = \beta_0 + \beta_1 f_t + \beta_2 POP_t + \beta_3 INF_t + \varepsilon_{2t} \quad 1b$$

Where, POV_t is poverty rate (measured by multi-dimensional poverty index)

Model 3: Human Development Index (HDI)

$$HDI_t = \varphi_1 + \beta_1 f_t + \varphi_2 POP_t + \varphi_3 INF_t + \varepsilon_{3t} \quad 1c$$

Where, HDI_t is the Human Development Index (HDI) – ranges from 0 to 1- which measures a country's performance in national human development, with higher values indicating better outcomes.

Population is one important variable that is frequently utilised in empirical research to analyse difficulties related to economic development [15]. In addition, the government's budgetary capability may limit country's development, and these factors are linked to the rates of population growth and inflation; for this reason, these variables were chosen as control variables [2].

The study utilized the Non-linear Autoregressive Distributed Lag (NARDL) model to examine the asymmetric impact of fiscal policy instruments on economic development, capturing potential short- and long-term asymmetries. This allows for separate analysis of how positive and negative changes in fiscal policy impact each of the dependent variables in the equations 1_a, 1_b and 1_c, providing insights into potential asymmetries as follows:

$$f_t^+ = \sum_{i=1}^p \Delta f_t^+ = \sum_{i=1}^p \text{Max}(\Delta f_t^+, 0) \quad 2a$$

$$f_t^- = \sum_{i=1}^p \Delta f_t^- = \sum_{i=1}^p \text{Min}(\Delta f_t^-, 0) \quad 2b$$

It is assumed that the effects of $f_t > 0$ (positive) could be different from the effects of $f_t < 0$ (negative). Thus, asymmetric cointegration becomes

Model 1: Unemployment

$$UNE_0 = \alpha_0 + \alpha_1^+ f_t^+ + \alpha_2^- f_t^- + \alpha_3 POP_t + \alpha_4 INT_t + \varepsilon_{1t} \quad 3a$$

Model 2: Poverty

$$POV_t = \beta_0 + \beta_1 f_t^+ + \beta_2 f_t^- + \beta_3 POP_t + \beta_4 INF_t + \varepsilon_{2t} \quad 3b$$

Model 3: Human Development Index (HDI)

$$H_t = \varphi_1 + \varphi_1 f_t^+ + \varphi_2 f_t^- + \varphi_3 POP_t + \varphi_4 INF_t + \varepsilon_{3t} \quad 3c$$

Then, by incorporating the economic development variables used in this study, equations 3a to c become

Model 1: Unemployment

$$\Delta UNE_t = \alpha_0 + \sum_{i=1}^{P_1} \alpha_{1i} \Delta UNE_{t-i} + \sum_{i=0}^{P_2} \alpha_{2i}^+ \Delta f_{t-i}^+ + \sum_{i=0}^{P_3} \alpha_{3i}^- \Delta f_{t-i}^- + \sum_{i=0}^{P_4} \alpha_{4i} \Delta POP_{t-i} + \sum_{i=0}^{P_5} \alpha_{5i} \Delta INF_{t-i} + \rho_0 UNE_{t-1} + \rho_1 f_{t-1}^+ + \rho_2 f_{t-1}^- + \rho_3 POP_t + \rho_4 INT_t + \varepsilon_{1t} \quad 4a$$

Model 2: Poverty

$$\Delta POV_t = \alpha_0 + \sum_{i=1}^{P_1} \alpha_{1i} \Delta POV_{t-i} + \sum_{i=0}^{P_2} \alpha_{2i}^+ \Delta f_{t-i}^+ + \sum_{i=0}^{P_3} \alpha_{3i}^- \Delta f_{t-i}^- + \sum_{i=0}^{P_4} \alpha_{4i} \Delta POP_{t-i} + \sum_{i=0}^{P_5} \alpha_{5i} \Delta INF_{t-i} + \rho_0 POV_{t-1} + \rho_1 f_{t-1}^+ + \rho_2 f_{t-1}^- + \rho_3 POP_t + \rho_4 INF_t + \varepsilon_{2t} \quad 4b$$

Model 3: Human Development Index (HDI)

$$\Delta HDI_t = \alpha_0 + \sum_{i=1}^{P_1} \alpha_{1i} \Delta HDI_{t-i} + \sum_{i=0}^{P_2} \alpha_{2i}^+ \Delta f_{t-i}^+ + \sum_{i=0}^{P_3} \alpha_{3i}^- \Delta f_{t-i}^- + \sum_{i=0}^{P_4} \alpha_{4i} \Delta POP_{t-i} + \sum_{i=0}^{P_5} \alpha_{5i} \Delta INF_{t-i} + \rho_0 HDI_{t-1} + \rho_1 f_{t-1}^+ + \rho_2 f_{t-1}^- + \rho_3 POP_t + \rho_4 INT_t + \varepsilon_{3t} \quad 4c$$

Where, α_1 - α_4 are short run coefficients estimated and ρ_1 - ρ_3 are estimable long run coefficients. After estimating equations 4a to c, then, the following assumptions were tested for the purpose of this analysis.

1. Short-run adjustment asymmetry is inferred if the following Δf_t^+ and Δf_t^- take different lag orders respectively;
2. Short run asymmetric impacts are manifested if they occur at the similar lag order i, the estimate of α_{2i}^+ is different from the estimate of α_{3i}^- ;
3. Short run cumulative asymmetric effects are established if $\sum \alpha_{2i}^+ \neq \sum \alpha_{3i}^-$;

Results and Findings

The results of asymmetric effects of fiscal policy on economic development for Turkey are presented in Table 1.

Table 1: Results of Asymmetric effects of fiscal policy on economic development

Method: Non-Linear ARDL Model								
Model 1(3, 3, 1, 1)			Model 2 (3, 3, 1, 1)			Model 3 (3, 2, 1, 1)		
Variable	Co-eff.	P-value	Variable	Co-eff.	P-value	Variable	Co-eff.	P-value
Dep. Variable: UNE			Dep. Variable: POV			Dep. Variable: HDI		
Short Run Estimate								
D(EXP ⁺)	0.3607	0.0355	D(EXP ⁺)	0.0016	0.0920	D(EXP ⁺)	-0.0134	0.0003
D(EXP ⁺ (-1))	0.5010	0.0546	D(EXP ⁺ (-1))	0.0803	0.9959	D(EXP ⁺ (-1))	-0.0066	0.0072
D(EXP ⁺ (-2))	0.6620	0.0254	D(EXP ⁺ (-2))	0.0043	0.0181	D(EXP ⁺ (-2))	-0.0104	0.0033
D(EXP ⁺ (-3))	0.3726	0.0434	D(EXP ⁺ (-3))	0.0006	0.5318	D(EXP ⁺ (-3))	-0.0046	0.0107
D(EXP ⁻)	0.4977	0.0021	D(EXP ⁻)	-0.0038	0.0519	D(EXP ⁻)	0.0105	0.0024
D(EXP ⁻ (-1))	1.0368	0.0368	D(EXP ⁻ (-1))	0.0030	0.1060	D(EXP ⁻ (-1))	0.0049	0.0463
D(EXP ⁻ (-2))	0.1101	0.0276	D(EXP ⁻ (-2))	-0.0047	0.0145	D(EXP ⁻ (-2))	0.0050	0.0114
D(EXP ⁻ (-3))	0.6016	0.0210	D(EXP ⁻ (-3))	0.0016	0.0920	DPOP	-1.1045	0.0003
DPOP	1.1149	0.0063	DPOP	2.3349	0.0003	DINF	-0.1078	0.0004
DINT	0.1230	0.0014	DINF	0.1150	0.0901			
Model 1(3, 1, 1, 1)			Model 2 (3, 3, 1, 1)			Model 3 (3, 3, 1,0)		
D(REV ⁺)	0.2528	0.0492	D(REV ⁺)	-0.0009	0.0810	D(REV ⁺)	0.0360	0.0819
D(REV ⁺ (-1))	1.1575	0.0107	D(REV ⁺ (-1))	-0.0062	0.0147	D(REV ⁺ (-1))	-0.0294	0.0295
D(REV ⁺ (-2))	0.9515	0.0123	D(REV ⁻)	0.0016	0.0592	D(REV ⁺ (-2))	0.0026	0.0020

4. Long run asymmetric impact is inferred if the normalized long-run estimates obtained for all the decomposed partial cumulative sums of positive are different from their respective negative changes i.e. $\frac{\hat{\rho}_1^+}{-\rho_0} \neq \frac{\hat{\rho}_2^-}{-\rho_0}$

The following equations were used for estimating asymmetric dynamic multiplier effects:

$$K_{b^+} = \sum_{j=0}^b \frac{\partial UNE_{t+j}}{\partial F_t^+}, K_{b^-} = \sum_{j=0}^b \frac{\partial UNE_{t+j}}{\partial F_t^-}, b = 1, 2, 3 \dots \dots \dots 5a$$

$$K_{b^+} = \sum_{j=0}^b \frac{\partial POV_{t+j}}{\partial F_t^+}, K_{b^-} = \sum_{j=0}^b \frac{\partial POV_{t+j}}{\partial F_t^-}, b = 1, 2, 3 \dots \dots \dots 5b$$

$$K_{b^+} = \sum_{j=0}^b \frac{\partial HDI_{t+j}}{\partial F_t^+}, K_{b^-} = \sum_{j=0}^b \frac{\partial HDI_{t+j}}{\partial F_t^-}, b = 1, 2, 3 \dots \dots \dots 5c$$

Noting that $b \rightarrow \infty$, $K_{b^+} \rightarrow \theta_1^+$ and $K_{b^-} \rightarrow \theta_2^-$

Data Sources

Annual secondary data on poverty rate, unemployment rate, real interest rate, human development index (HDI), debt-to- GDP ratio, revenue as a percentage of GDP, expenditure as a percentage of GDP, inflation rate and population rate of Turkey from 1981 to 2022 were used. The data were sourced from the World Development Indicators; International Monetary Fund, United Nations Development Programme and World Bank Group, [3,16-18].

D(REV⁺(-3))	0.5666	0.0654	D(REV⁻(-1))	0.0052	0.0177	D(REV⁺(-3))	-0.0273	0.0044
D(REV⁻)	0.2772	0.0270	D(REV⁻(-2))	0.0055	0.0045	D(REV⁻)	-0.0126	0.0254
D(REV⁻(-1))	0.5716	0.0386	D(REV⁻(-3))	0.0037	0.0200	D(REV⁻(-1))	0.0121	0.0255
DPOP	1.4900	0.0003	DPOP	0.1009	0.0014	D(REV⁻(-2))	-0.0369	0.0215
DINT	0.3120	0.0114	DINF	0.9030	0.0094	D(REV⁻(-3))	-0.0119	0.0986
						DPOP	-1.0041	0.0263
Model 1(3, 2, 1, 1)			Model 2 (3, 3, 1, 1)			Model 3 (3, 3, 1, 1)		
D(DBT⁺)	-0.2130	0.0261	D(DBT⁺)	0.0030	0.0746	D(DBT⁺)	-0.0002	0.0308
D(DBT⁺(-1))	-0.5269	0.0977	D(DBT⁺(-1))	0.0065	0.0110	D(DBT⁺(-1))	-0.0040	0.0057
D(DBT⁺(-2))	-0.5935	0.0661	D(DBT⁺(-2))	0.0033	0.0778	D(DBT⁺(-2))	-0.0011	0.0540
D(DBT⁺(-3))	-0.5621	0.0942	D(DBT⁺(-3))	0.0072	0.0448	D(DBT⁺(-3))	0.0007	0.0402
D(DBT⁻)	-0.0805	0.6046	D(DBT⁻)	0.0022	0.0566	D(DBT⁻)	0.0019	0.0297
D(DBT⁻(-1))	-0.2339	0.0703	D(DBT⁻(-1))	-0.0017	0.0859	D(DBT⁻(-1))	0.0076	0.0028
D(DBT⁻(-2))	-0.2938	0.0729	D(DBT⁻(-2))	0.0002	0.0506	D(DBT⁻(-2))	0.0104	0.0017
DPOP	2.1442	0.0104	D(DBT⁻(-3))	-0.0031	0.0806	D(DBT⁻(-3))	0.0048	0.0039
DINT	1.4569	0.0011	DPOP	2.1012	0.0004	DPOP	-1.1009	0.0160
			DINF	3.9949	0.0783	DINF	-0.1023	0.0011
Long Run Estimate								
EXP⁺	-2.5103	0.0835	EXP⁺	-0.0004	0.0132	EXP⁺	-0.0010	0.0109
EXP⁻	-1.2975	0.0086	EXP⁻	-0.0004	0.0567	EXP⁻	-0.0112	0.0135
REV⁺	-2.7936	0.0768	REV⁺	0.0003	0.0793	REV⁺	0.0403	0.0987
REV⁻	-1.9563	0.0793	REV⁻	-0.0002	0.0584	REV⁻	0.0018	0.0601
DBT⁺	-1.7404	0.0806	DBT⁺	-0.0071	0.0293	DBT⁺	0.0052	0.0079
DBT⁻	-1.6096	0.0836	DBT⁻	-0.0069	0.0296	DBT⁻	-0.0021	0.0284
POP	7.2589	0.0796	POP	0.0027	0.0687	POP	0.0055	0.0022
INT	1.0023	0.0045	INF	1.0049	0.0011	INF	-1.4509	0.0003
C	-2.8643	0.0800	C	-0.0169	0.0264	C	-0.0827	0.0662

Source: Author's estimations

The Model 1 Table 1 reveals positive [D(EXP⁺)] coefficients, indicating that positive government expenditure shocks have short-term positive effects on unemployment in Turkey, while negative shocks [D(EXP⁻)] have short-term negative effects, both statistically significant at different levels. The cumulative effects of the negative shocks to the government expenditure on unemployment were found to be negative in the short run. These effects are statistically significant at different levels. Furthermore, the study reveals that positive shocks to government revenue [D(REV⁺)] in Turkey have a short-term positive effect on unemployment, with statistically significant effects and positive cumulative effects. Again, the signs of D(REV⁻) coefficients are positive but with different magnitudes and statistically significant at different levels. The cumulative effects of the negative shocks to the government revenue on unemployment were found to be positive in the short run. The debt-to-GDP ratio (DBT) results show negative short-term effects of negative government debt shocks on unemployment in Turkey, with statistically significant effects. Positive short-term effects are positive, but the cumulative effects of the negative shocks to the government revenue on unemployment were found to be positive in the short run. Again, population growth rates (DPOP) and interest rate (DINT) confer significant positive impact on unemployment rate in each of the three models in the short run.

Contrary to the short run estimates, the results of the long run estimates indicate a negative relationship between shocks to government expenditure and unemployment in Turkey. The results reveal that both the positive and negative shocks to government expenditure confer a significant negative non-linear impact on unemployment in Turkey. The results show that government expenditure shocks can have significant economic implications, especially in Turkey, where unemployment is a key concern. It implies that positive shocks include increased demand, which stimulates economic activity and employment expansion. The multiplier effect further magnifies the initial increase in government spending, leading to a broader positive impact. Conversely, negative shocks involve decreased demand, potentially causing GDP growth decline, business contraction and decreased consumer confidence. The non-linear impact on unemployment suggests that the relationship between government expenditure shocks and unemployment is not strictly linear and as a result, positive shocks may initially reduce unemployment, but excessive spending could lead to inflationary pressures and monetary policy tightening while negative shocks may initially lead to a modest increase in unemployment, but severe austerity measures or fiscal consolidation could lead to a deep recession. The results are in line with findings of Saraireh, which show that public spending and unemployment are interrelated; and that any in-

crease in recurrent expenditure decreases the unemployment rate in the long run [19].

Also, the results of the long run estimates indicate a significant negative relationship between shocks to government revenue and unemployment in Turkey. The results reveal that both positive and negative shocks to government revenue confer a significant negative non-linear impact on unemployment. The results imply that positive shocks, such as increased tax collections or non-tax revenue, can enhance the government's fiscal capacity, allowing for investments in public goods and services in Turkey. This can boost investor and consumer confidence, stimulating economic activity. Conversely, negative shocks, such as decreased tax collections or income decline, impose constraints on government spending, potentially leading to austerity measures. Reduced government revenue can erode consumer and business confidence, causing lower spending and investment. This can lead to job losses in both the public and private sectors. The non-linear relationship between government revenue shocks and unemployment can promote sustainable economic development and mitigate adverse employment effects. The results are in line with findings of Musa, Asare, and Gulumbe, which found out that despite government revenue impacting growth, the unprecedented rise in general prices continues to eat deep into the economy [20].

The results of the long run estimates of debt-to-GDP ratio indicate a significant negative relationship between shocks to debt and unemployment. It is shown that both positive and negative shocks to public debt confer a significant negative non-linear impact on unemployment in Turkey. The implication of the results is that the positive shocks can increase Turkish's borrowing capacity, stimulate economic growth and fund expansionary fiscal policies. Also, increased government spending can create jobs through public works projects and indirectly through the multiplier effect. Conversely, negative shocks can impose fiscal constraints, leading to austerity measures and job losses. A sheer deterioration in public debt metrics may erode investor confidence, leading to capital outflows, currency depreciation, and higher borrowing costs. The non-linear impact on unemployment suggests that the relationship between public debt shocks and unemployment is not strictly linear and as a result, positive shocks can initially stimulate job creation and economic growth, while negative shocks may lead to fiscal crises, higher borrowing costs, and negative employment effects. The results uphold the assumption of Keynesian economists which argue that rising public debt leads to productive spending and a positive economic multiplier effect.

Again, population growth rate (POP) showed an estimated co-efficient of -2.8643. This implies that a 1% increase in population growth rate leads to 2.8643% fall in unemployment rate in Turkey. The co-efficient is statistically significant at 10% level. This implies that the population growth rate in Turkey has an inverse relationship with unemployment. This relationship is based on the labour supply effect, demand for goods and services, entrepreneurship and innovation, and economic dynamism in Turkey. As a result, a larger labour force, increased demand for goods and services, and a thriving economy can reduce unemployment. Also, entrepreneurs can identify new market niches and develop innovative products, while urbanization and demographic growth

can create a vibrant labour market, attract investment and create employment opportunities. On the contrary, the positive relationship between interest rate and unemployment indicate that the higher the rate of interest the lower the level of investment and the higher the rate of unemployment and vice versa.

The Model 2 Table 1 reveals that positive government expenditure shocks [D(EXP+)] have positive short-term effects on poverty in Turkey, with cumulative effects being positive. Conversely, negative shocks [D(EXP-)] have mostly negative effects, with statistically significant effects at different levels. It is equally apparent that the coefficients of D(REV+) are all negative and with different magnitudes. This shows that, in the short run, the effect of positive shocks to government revenue on poverty level in Turkey was found to be negative. All these effects were found to be statistically significant. Then, the cumulative effects of the positive shocks to the government revenue on poverty were found to be negative in the short run. Again, the signs of D(REV-) coefficients are all positive but with different magnitudes and statistically significant at different levels. The cumulative effects of the negative shocks to the government revenue on poverty were found to be negative in the short run.

The results for the estimates of the signs of D(DBT+) coefficients are all positive with different magnitudes. This shows that, in the short run, the effects of positive shocks to government debt on poverty in Turkey were found to be positive and these effects are statistically significant. Also, the cumulative effects of the positive shocks to the government debt on poverty were positive in the short run. Again, the signs of D(DBT-) coefficients are mostly positive and with different magnitudes and statistically significant at different levels. The cumulative effects of the negative shocks to the government debt on poverty in Turkey were apparently negative in the short run. Also, population growth rates (DPOP) and inflation rate (DINF) confer significant positive relationship on poverty level in each of the three models in the short run.

Again, the results of the long run estimates indicate a significant positive relationship between shocks to government expenditure and poverty in Turkey. The results reveal that both positive and negative shocks to government expenditure confer a significant positive non-linear impact on poverty. The results imply that the relationship between government expenditure shocks and poverty in Turkey is significant, with both positive and negative shocks having a non-linear impact. It is indicated that positive shocks can provide the government with additional resources to invest in social welfare programmes, infrastructure development and poverty alleviation initiatives. However, inefficiencies in government spending, such as corruption or misallocation of resources, may diminish the impact of these expenditures. As a result, possible negative effects include macroeconomic imbalances, inflationary pressures, and increased debt burdens. In addition, negative shocks may lead to cuts in essential services and social safety nets, exacerbating poverty and in the long run, the negative impact may linger on. The results are in line with findings of the work of Farayibi and Owuru, which found out that public spending can foster development in an economy [21].

From the long run estimates, it is indicated that a positive shock to government revenue confers a positive non-linear impact on pov-

erty while a negative shock to government revenue confers a negative non-linear impact on poverty level in Turkey. The results also imply that government revenue in Turkey significantly impacts poverty levels, with both positive and negative effects. The positive revenue shocks may initially fund social welfare programmes, thereby reducing poverty. However, inefficiencies in government can diminish long-term effects. On the other hand, negative shocks may cut essential services, thereby worsening poverty level in the country. Turkey's economy is vulnerable, requiring efficient revenue management, fiscal sustainability, human capital investment, and social safety net strengthening. This underscores the need for effective fiscal management, targeted poverty reduction strategies, and investment in human capital and social development. The results are in line with findings of Asaju, Adagba and Kajang, which show that there is a high incidence of extra-budgetary allocation and that the non-oil sector's contribution to the country's revenue has not been worthwhile [11].

The results of the long run estimates of debt-to-GDP ratio indicate a significant negative relationship between shocks to government debt and poverty in Turkey. The results reveal that both positive and negative shocks to government debt confer a significant negative non-linear impact on poverty level. The implication is that positive shocks may initially have a negative impact on poverty levels due to concerns about debt sustainability, fiscal instability, and macroeconomic uncertainty. In the long run, the negative impact may persist or worsen, as high levels of government debt can limit private investment and lead to austerity measures. Turkey's economy is vulnerable to external shocks, which can exacerbate poverty. Conversely, negative shocks may have an initial positive impact, as reduced debt levels can stimulate economic growth and create employment opportunities. Effective fiscal management is crucial to maintain macroeconomic stability and promote poverty reduction. Also, the positive relationship between inflation rate and poverty level indicates that the higher the rate of inflation the lower the peoples purchasing power and the higher the rate of poverty and vice versa. The results are in line with findings of Boskin, that significant increases in the debt-to-GDP ratio may result in greater taxes and decreased future earnings and low standard of living as well as rise in poverty rate [22].

In Model 3 Table 1 it is crystal clear that the coefficients of $D(-EXP+)$ are all negative and this shows that, in the short run, the effects of positive shocks to government expenditure on HDI in Turkey are negative. Also, the cumulative effects of the positive shocks to government expenditure on HDI in Turkey are not positive. Also, the signs of $D(EXP-)$ coefficients are all positive with different magnitudes. The cumulative effects of the negative shocks to the government expenditure on HDI are found to be positive in the short run. Likewise, the coefficients of $D(REV+)$ are both positive and negative with different magnitudes. Then, the cumulative effects of the positive shocks to the government revenue on HDI in Turkey were found to be negative in the short run. Again, the signs of $D(REV-)$ coefficients are both positive and negative but with different magnitudes and statistically significant at different levels. The cumulative effects of the negative shocks to the government revenue on HDI were found to be negative in the short run.

The results for the estimates of the signs of $D(DBT+)$ coefficients are both positive and negative with different magnitudes. Also, the

cumulative effects of the positive shocks to the government debt on HDI were found to be negative in the short run. Again, the signs of $D(DBT-)$ coefficients are all positive and with different magnitudes and statistically significant at different levels. The cumulative effects of the negative shocks to the government debt on HDI in Nigeria were found to be negative in the short run. Also, the coefficients of population growth rates ($DPOP$) and inflation rate ($DINF$) are negative, indicating that the variables have negative relationship with HDI in each of the three models in the short run.

Again, the results of the long run estimates indicate significant negative relationship between shocks to government expenditure and HDI in Turkey. The results reveal that both positive and negative shocks to government expenditure confer a significant negative non-linear impact on HDI in Turkey. The study reveals a negative correlation between government spending shocks and the Human Development Index (HDI), indicating suboptimal effectiveness in public spending and suggesting potential inefficiencies or misallocation of resources. The study also raises concerns about the quality and accessibility of public services, such as education, healthcare, infrastructure, and social welfare programs. The findings emphasize the need for fiscal sustainability and prudent management to prevent fiscal deficits and debt accumulation that would enable Turkey to allocate resources towards long-term inclusive growth and development. The results are in line with findings of the work of Özer, which conclude that the use of fiscal policy can have a significant effect on both short - and long - term sustainable economic development [7].

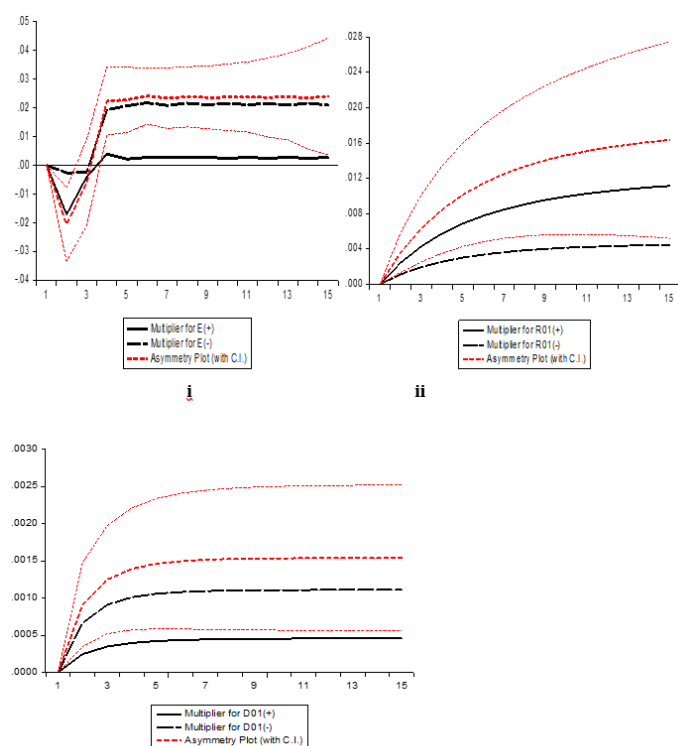
Also, the results of the long run estimates indicate a significant positive relationship between shocks to government revenue and HDI in Turkey. The results reveal that both positive and negative shocks to government revenue confer a significant positive non-linear impact on HDI in Turkey. The results imply that increased revenue can positively impact human development outcomes in Turkey. This suggests that higher levels of government revenue can be used to invest in critical areas like education, healthcare, infrastructure, and social welfare programs. The study emphasizes the importance of implementing policies that enhance revenue mobilization and fiscal capacity, such as broadening the tax base and diversifying revenue sources. It also emphasizes the need for sustainable fiscal policies to maintain macroeconomic stability. The findings underscore the importance of balancing short-term benefits with long-term risks to ensure effective utilization of public resources. The results are in line with findings of the work of Durotoye, (2019) which conclude that the use of fiscal policy can have a significant effect on both short - and long - term sustainable economic development.

Conversely, the results of the long run estimates indicate that a positive shock to public debt confers a positive non-linear impact on HDI while a negative shock to public debt confers a negative non-linear impact on HDI in Turkey. The results imply that Turkey can leverage public debt to finance investments in human development, potentially improving the country's Gross Domestic Product (GDP). However, the impact of public debt shocks on HDI is not constant, and further increases may lead to diminishing returns or negative consequences. Policymakers must also consider the long-term sustainability of debt levels to avoid fiscal vulnerabilities and debt distress. Investment priorities should be prioritized

in sectors directly impacting human development, such as education, healthcare, infrastructure, and social welfare programs. Also, the negative relationship between inflation rate and HDI indicate that inflation can negatively impact life expectancy by increasing healthcare costs and leading to malnutrition, especially in food prices, which can be less accessible to the poor. The results are in line with findings of Baum, Checherita-Westphal, and Rother, that high level of government debt in developing countries significantly impacts their economic prospects while growing public debt can potentially crowd-out investment and threaten growth and development through higher long-term interest rates [23].

Dynamic Multiplier Graphs of NARDL Estimates of Model 1 (For Turkey)

The Dynamic Multiplier graphs of NARDL estimates of the three threshold variables in Model 1 are presented in the Figure 1.



Source: Author's graphical illustration

Figure 4.11a: Dynamic Multiplier Graphs of NARDL Estimates of Fiscal Policy Instruments of Model 1 (For Turkey)

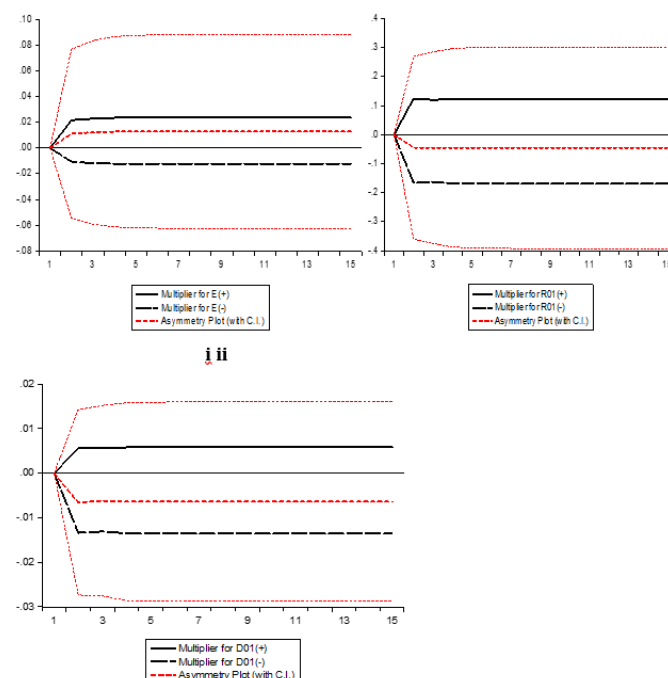
Figure 1 (i) reveals asymmetric relationship between Turkey's unemployment to negative and positive shocks of expenditure (EXP). The unemployment is seen to respond more negatively to positive shocks from expenditure in the short run than positive shocks in the long run, indicating no asymmetry in the relationship between government expenditure and unemployment rate in Turkey. This implies that there is no evidence of asymmetry in both short- and long run relationships between government expenditure and unemployment rate in Turkey. This is an indication of a stable and predictable relationship which allows policymakers to make informed decisions in fiscal policy formulation and employment strategies. The results imply that an efficient resource allocation in Turkish government expenditure is crucial, with priority given to sectors with high employment potential. This may boost investor confidence in Turkey's economic stability. Similarly, Figure 1 (ii) reveals that un-

employment (UNE) in Turkey responds more positively to revenue (REV) shocks than to negative shocks in both short and long run, indicating no evidence of asymmetry in the relationship between government revenue and unemployment rate in Turkey.

The lack of asymmetry in the relationship between government revenue and unemployment in Turkey suggests a stable and predictable relationship, allowing policymakers to make informed decisions in fiscal policy formulation and employment strategies. However, it may require reassessing revenue mobilization strategies to address unemployment challenges. Despite this, persistent unemployment remains a concern, necessitating measures to promote social cohesion and inclusivity. In the same vein, the results of asymmetric unemployment adjustment to positive and negative debt-to-GDP (DBT) shocks are shown in Figure 1 (iii) by the DBT-negative and positive shocks. The study reveals that in Turkey, debt-to-GDP (DBT) reacts more to negative shocks than positive shocks, indicating no asymmetry in the relationship between the debt-to-GDP and unemployment rate in Turkey in both short- and long run. The dynamic multiplier graph reveals no asymmetry in the relationship between the debt-to-GDP ratio and unemployment in Turkey. This implies policy neutrality, allowing fiscal policy flexibility without a direct impact on unemployment. Structural factors, such as labour market dynamics and productivity levels, may play a more significant role in determining unemployment outcomes in Turkish economy. Thus, the absence of asymmetry may boost investor confidence in Turkey's economic stability.

Dynamic Multiplier Graphs of NARDL Estimates of Model 2

Again, the Dynamic Multiplier graphs of NARDL estimates of the three threshold variables in Model 2 are presented in the Figure 2.



Source: Author's graphical illustration

Figure 2: Dynamic Multiplier Graphs of NARDL Estimates of Fiscal Policy Instruments of Model 2

Figure 2 (i), reveals asymmetry in Turkey's poverty adjustment to expenditure shocks, with EXP responding more significantly to pos-

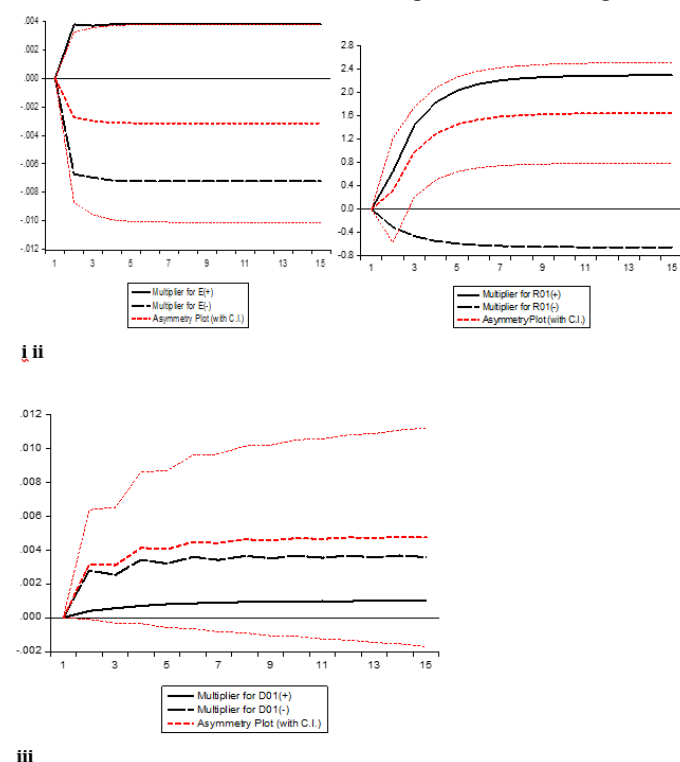
itive shocks than negative shocks in both short and long runs. This demonstrates a discrepancy between poverty rate and government expenditure in Turkey. The asymmetry between Turkey's poverty rate and government expenditure indicates that increases in government expenditure have a more significant positive effect on poverty reduction than decreases. This suggests that targeted increases in social welfare programmes, infrastructure development, and education can be effective in alleviating poverty in Turkey.

Similarly, figure 2 (ii) reveals asymmetry in Turkey's poverty (POV) adjustment to government revenue (REV) shocks, with REV responding more significantly to negative shocks from poverty than positive shocks in both short and long run, indicating a significant relationship between poverty rate and revenue. The results imply that the poverty rate in Turkey is asymmetrically linked to government revenue, indicating a need for asymmetric revenue generation policies. This suggests that revenue-raising measures may disproportionately affect low-income individuals and worsen poverty.

In the same vein, the results reveals that in Turkey, the relationship between debt-to-GDP (DBT) and poverty rate is asymmetric in both short and long terms, with negative DBT shocks reacting more relative to unemployment than DBT positive shocks, indicating asymmetric unemployment adjustment. The results show that the debt-to-GDP ratio in Turkey has a symmetrical relationship with poverty rates, suggesting that debt levels have a differential impact on poverty levels. This suggests that fiscal policy priorities should balance debt management with poverty alleviation objectives. This is an indication that debt sustainability is crucial, requiring prudent borrowing practices and debt restructuring and investments in human capital development can mitigate the negative impact of debt on poverty levels.

Dynamic Multiplier Graphs of NARDL Estimates of Model 3 (For Turkey)

Also, the Dynamic Multiplier graphs of NARDL estimates of the three threshold variables in Model 3 are presented in the Figure 3.



Source: Author's graphical illustration

Figure 4.11c: Dynamic Multiplier Graphs of NARDL Estimates of Fiscal Policy Instruments of Model 3

Figure 3 (i) reveals the asymmetric evidence about Turkey's Human Development Index (HDI) change to both shocks from expenditure (EXP). HDI responds more significantly to negative shocks from EXP than positive shocks from EXP in both short and long run, indicating asymmetry between Human Development Index and government expenditure in Turkey in both short and long run. The results imply that the Human Development Index (HDI) in Turkey shows an asymmetry between government expenditure and the HDI, indicating that changes in government spending may impact the HDI deeply when expenditure decreases, particularly in areas like education, healthcare, and social welfare. The results also suggest that maintaining and expanding social welfare policies is crucial to support vulnerable populations and mitigate the adverse effects of expenditure reductions in Turkey and persistent disparities may undermine investor confidence in Turkey's economic prospects.

Similarly, from Figure 3 (ii), the graph reveals asymmetric evidence about Turkey's Human Development Index (HDI) adjustment to government revenue (REV) shocks. The results show that HDI responds more significantly to positive shocks from REV than negative shocks in both short and long run, indicating asymmetry between Human Development Index and government revenue in Turkey in both short and long run. The results imply that the Human Development Index (HDI) in Turkey is influenced by government revenue, with asymmetry indicating that changes in revenue can have a more significant impact on the index when revenue decreases. This could lead to cuts in social spending, exacerbating poverty and inequality.

In the same vein, the results of asymmetric HDI adjustment to positive and negative debt – to – GDP (DBT) shocks are shown in 4.11c (iii) by the DBT-negative and positive shocks. The findings show that in Turkey, debt-to-GDP and HDI do not show asymmetry in short and long run, with DBT reacting more to negative shocks than positive shocks. The results show that the debt-to-GDP ratio and the Human Development Index (HDI) in Turkey have no asymmetry, indicating a stable relationship. This stability allows policymakers to anticipate changes in debt levels, enabling more informed decision-making. However, debt levels must remain sustainable to avoid negative consequences for long-term economic development. Prioritizing investments in human capital development, such as education, healthcare, and social welfare programs, is also crucial to achieve the desired level of economic development.

Diagnostic Tests for the Non-linear ARDL

Diagnostic tests were conducted on the Non-linear version of ARDL for the three models to ensure its reliability, and they include residual diagnostic tests of normality, serial correlation, heteroskedascity, and Ramsey RESET test. The results are presented in Table 2.

Table 2: Diagnostic tests results of Non-linear ARDL

Diagnostic Tests	Model 1		Model 2		Model 3	
Jarque-Bera Test for Normality	1.4488	(0.5384)	4.7593	(0.9258)	3.9341	(0.1199)
Breusch-Godfrey Serial Correlation LM Test	3.0928	(0.3730)	3.0629	(0.2461)	0.8404	(0.5131)

Ramsey RESET Test	1.4319	(0.1555)	0.1844	(0.6966)	0.0710	(0.8029)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.2368	(0.9770)	0.3230	(0.9708)	2.2416	(0.1872)

Source: Author's estimation

The Jarque-Bera test for Normality assesses the normality of residuals in regression models for Mexico, ensuring data skewness and kurtosis match a normal distribution. If p-values exceed 0.05, the null hypothesis (H_0) is accepted, indicating regression models' reliability. Alternative approaches may be considered for validity. The Breusch-Godfrey Serial Correlation LM Test detects serial correlation in regression model residuals, ensuring accurate regression coefficient estimation. Ramsey's RESET test assesses specification error in regression models, confirming linear specification is adequate. These tests enhance regression analysis reliability, allowing accurate coefficient interpretation, reliable predictions, and confident hypothesis testing. The Breusch-Pagan-Godfrey Heteroskedasticity test confirms the absence of heteroskedasticity in the three models, indicating unbiased and consistent estimators since the test statistic's p-value is greater than a suitable threshold of ($p < 0.05$). Thus, the diagnostic tests on the Non-linear version of ARDL models show no issues with serial correlation, heteroscedasticity and normality [24,25].

Conclusion

The study's findings for Turkey reveal that both positive and negative government expenditure shocks significantly impact unemployment in Turkey with positive shocks stimulate economic activity, while negative shocks may lead to GDP decline, business contraction and job losses. The findings also show a significant link between government expenditure shocks and poverty in Turkey with positive shocks resulting in funding social welfare programmes, while negative shocks cause macroeconomic imbalances, inflation, and increased debt. The study reveals a negative correlation between government expenditure shocks and Turkey's Human Development Index, highlighting potential inefficiencies and concerns about public services quality and accessibility. Also, the study shows a positive correlation between government expenditure shocks and poverty in Turkey, with both positive and negative impacts. Positive shocks can fund social welfare programs, infrastructure development, and poverty alleviation, while negative shocks may lead to cuts in essential services. Efficient revenue management and fiscal sustainability are crucial for poverty reduction. The findings of the study reveal a negative correlation between government expenditure shocks and Turkey's Human Development Index, indicating suboptimal public spending and potential resource misallocation. It also raises concerns about public services' quality and accessibility. The study emphasizes fiscal sustainability, prudent management, and balancing short-term benefits with long-term risks for effective resource utilization and debt sustainability.

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