The Intricate Relationships between Key Macroeconomic Variables and Economic Growth in Jordan

Nevin Youssef Kalbouneh[1], **Hussein Ali Al-Zeaud**[2], ***Bashar Younis Alkhawaldeh**[3], **Mohammad Abdel Mohsen Al-Afeef**[4]

[1]Assistant Professor, Department of Banking and Finance, Faculty of Business, Jerash University, P. O. Box 26150, Jerash, Jordan

[2]Professor of finance and economics, Departments of Finance and Economics, Al al-Bayt University, Mafraq 25113, Jordan

[3]Assistant Professor, Department of Administrative Sciences, Faculty of Business, Jerash University, PO. Box 26150, Jerash, Jordan

[4]Full Professor, Department of Banking and Finance, Faculty of Business, Jerash University, P. O. Box 26150, Jerash, Jordan

Abstract

This study looks at the complex interactions between key macroeconomic factors such the money supply, revenue from taxes, interest rate, and government expenditure and how these affects economic growth in Jordan. The study uses the reliable Augmented Autoregressive Distributed Lag (AARDL) model to detect both the short-term and long-term dynamics of these variables across the extensive time period from 1970 to 2022. The study's findings offer fascinating new perspectives on Jordan's economic environment. In both short-run and long-run scenarios, it is discovered that the money supply and interest rates continually have a large and detrimental effect on economic growth. Contrarily, revenue from taxes and government expenditures are found to be important stimuli for economic growth, with effects that are consistently favourable and statistically significant in both the short- and long-term. The economic policymakers in Jordan can benefit greatly from these results. They emphasise the significance of solid fiscal policies built on effective taxation and wise public spending. The study also clarifies the difficult interaction between monetary and fiscal policy and highlights the necessity of coordination and modification of such policies in determining Jordan's economic direction.

1. Introduction

The interaction between economic growth and other macroeconomic factors has long been the subject of substantial research and policy debate (Islam et al., 2022; Agan & Balcilar, 2023). Understanding the complicated relationships between essential variables such as the money supply, tax income, interest rates, and government spending is critical in Jordan, a country noted for its unique economic troubles and potential. Jordan, located at a crossroads in the Middle East, has been aiming to build a robust and sustainable economic growth trajectory (Hajar & Hajer, 2023). The Jordanian government has enacted a number of fiscal

and monetary policies over time to guide the country's economy in the direction of stability and prosperity (Alzyadat, 2022). Money supply, tax revenue, interest rates, and government spending are critical pillars of the nation's economic policy framework and will be studied in this study. Each of these elements' influences Jordan's overall economic environment in a unique yet interrelated way (Benner & Lertzman, 2022). One of the most important factors influencing economic activity is the money supply, which includes the amount of money in circulation as well as deposits and other liquid assets. According to Kumar et al. (2023), a well-managed money supply can promote price stability and boost the effectiveness of financial markets, both of which are essential for luring investments and fostering growth. Additionally, the government's capacity to raise tax money is crucial for funding public expenditures like social programs and infrastructure growth, both of which serve as key engines of economic growth. The central bank's primary tool for implementing policy, the interest rate, has a significant impact on inflation, consumption trends, and investment decisions. Effective interest rate management can promote borrowing, increase consumption, and stimulate investment, all of which are essential for promoting economic growth (Barrdear & Kumhof, 2022). Additionally, government expenditure—which includes both capital and ongoing expenses—is crucial in fostering an atmosphere favorable to economic growth. A wise distribution of public resources can encourage economic growth by enhancing infrastructure, advancing healthcare and education, and encouraging innovation. The rate of economic growth in Jordan has, nevertheless, fluctuated recently. The stability and sustainability of the nation's economic progress have been questioned in light of these changes (Rahman et al., 2023). To control the money supply and interest rates, the Central Bank of Jordan uses a variety of financial instruments. The ability of these policies to affect economic growth, however, still poses a serious problem. For monetary policy to be improved, it is crucial to evaluate whether changes in the money supply and interest rates have the desired effect on investment, consumption, and inflation (Moh'd Al-Tamimi, et al., 2023). Jordan's fiscal policy also primarily relies on tax collection and government expenditure to pay for public projects and services. Aligning these budgetary tools with the goals of the country's economic growth is a difficulty (Alzyadat, 2022; Alhawamdeh et al., 2023). For policymakers looking to optimise fiscal policy, understanding how changes in tax collection and government expenditure impact overall economic performance is essential. This research study aims to provide insightful contributions to the field of economic policy and direct Jordan's policymakers towards more efficient approaches for achieving stable, inclusive, and sustainable economic growth. This study investigates the recent growth of Jordan's economy in relation to changes in the money supply, tax revenue, interest rates, and government expenditure. The factors that influence economic growth in Jordan have been the subject of a sizable body of research, but the use of the Augmented Autoregressive Distributed Lag (ARDL) model in the context of this study fills a considerable vacuum in the literature. The application of the Augmented Autoregressive Distributed Lag (ARDL) model in this study fills a sizable vacuum in the body of knowledge regarding the association between Jordan's money supply, tax collection, interest rate, and government expenditure. In order to examine the effects of these economic variables on growth, past research in Jordan has mostly focused on conventional time-series analysis, regression models, and cointegration tests.

2. Literature Review

Globally, economic research has placed a lot of emphasis on the connection between macroeconomic factors and economic growth. Understanding how the money supply, tax revenue, interest rate, and government expenditure affect economic growth is crucial in the case of Jordan, a country with special economic challenges and peculiarities. The literature review is a summary of the most important conclusions and revelations from earlier research on these factors and how they affect Jordan's economic growth. Wen et al. (2019) use a time-varying parameter vector autoregressive model to considerably advance our understanding of China's economic dynamics, Alkhawaldeh et al., (2022). Their research reveals intricate connections

between the price of crude oil, monetary policy, and economic indices. Notably, the favourable short-term effects of global crude oil price shocks on inflation and economic development underscore China's susceptibility to outside influences. The necessity for thoughtful policy solutions is highlighted by the diverse long-term implications. The study also emphasises the essential role that monetary policy plays in balancing the detrimental impacts of oil price shocks on economic growth and the significance of its adaptability.

Doan Van's research (2020), which incorporates well-known economists' economic theories, explores the basic connection between the money supply and inflation. The study supports theoretical viewpoints by examining data from Vietnam and China over a specified time span, showing that ongoing money supply increase results in long-term inflation. The contrast between short-term and long-term consequences is consistent with accepted theories of monetary quantity, illuminating the complex dynamics of inflation. Furthermore, the strikingly strong links between inflation and money supply growth in China and Vietnam highlight how applicable these ideas are everywhere. A thorough investigation into the effect of public expenditure on economic growth in Nigeria was carried out by Onifade et al. in 2020. With a large amount of time-series data, they apply Pesaran's ARDL technique, which yields insightful results. The results show a consistent link between government expenditure and Nigeria's economic growth. In particular, the study shows that while public capital expenditures had a favourable impact on economic growth, it was not statistically significant. Results of the Granger Causality Test show that government fiscal growth, which is financed by debt, has a big impact on public expenditure and domestic investment, with the latter also having an impact on real economic growth. Based on these empirical findings, the paper makes significant policy recommendations that can influence Nigeria's fiscal and monetary policies. Chugunov et al. (2021) add to the body of knowledge by creating an institutional framework for investigating the fiscal-monetary combination. Their research highlights how crucial it is to provide advantageous monetary circumstances for fiscal policies and a balanced budget in order to effectively regulate the money supply. The structural-functional approach they provide emphasises how monetary and fiscal policy both affect aggregate demand. Their conclusions, which are based on an examination of 19 emerging economies, highlight the importance of making productive investments and the impact that fiscal structure has on economic growth. The study also emphasises how crucial sound monetary policy is in setting up the ideal conditions for achieving intermediate and long-term inflation targets. In low-revenue and lower middle-revenue nations, Arvin et al. (2021) investigate the relationships between institutional quality, public expenditure, tax revenue, and economic growth. They make a distinction between short-run and long-run outcomes in their work, which provides a complex explanation of these linkages. Notably, the study emphasises the endogenous relationships between institutional quality, public expenditure, tax revenue, and short-term economic growth. But the reliable and consistent finding across all samples is that these factors are crucial for generating long-term economic growth. This emphasises how crucial it is to create institutions and put in place efficient fiscal policies for long-term economic growth. In Parui (2022), the impact of government expenditure on aggregate demand and economic growth is thoroughly examined, with a distinction between consumption and investment expenditure. The study's findings show that, particularly in a profit-led demand regime, a switch from government consumption to investment can increase aggregate demand and economic development. In a wage-led demand environment, the impact is less obvious, and the outcomes depend on whether or not a balanced budget assumption is made. The report also emphasises how government deficit expenditure may be used to support economic growth while preventing unmanageable levels of public debt, Fraihat et al., (2023). Through a meta-regression analysis, Gechert and Heimberger (2022) add to our understanding of how corporate taxes affect economic growth. Their findings imply that publication bias may affect the reporting of corporation tax reductions' growth-enhancing impacts. After accounting for this bias, the analysis comes to the conclusion that there is insufficient data to prove that corporate taxes have a major impact on growth, Alkhawaldeh et al., (2023). The

research pinpoints a number of variables, such as measurement options and control variables, that have an impact on reported estimates. Taking into account elements including the effectiveness of the legal system, the assets of the central bank, the efficiency of the banking industry, and the danger of bank insolvency, Ozili et al. (2023) analyse the impact of abnormal increases in credit supply on economic growth in Nigeria. The study finds that during the global financial crisis, anomalous credit supply boosts real GDP growth but decreases real GDP per capita. This is done using the generalised method of moments (GMM) regression. Depending on how well-developed the legal system is, the influence varies. Strong legal systems increase GDP per capita and lessen the negative effects on real GDP growth. Anthony-Orji et al. (2023) examine the effects of financial inclusion and development on Nigeria's economic growth. Their examination of linear regression demonstrates that inclusiveness and financial development have a beneficial impact on economic growth. The report makes policy recommendations for the government to promote more effective fund mobilisation and accessibility, particularly for people and enterprises at all societal levels. Eneche and Stephen (2023) investigate the link between tax collections and Nigeria's economic growth. According to their data, there is a little but favourable correlation between the revenue from the petroleum profit tax and economic growth. Value-added tax (VAT) and corporate revenue tax, which are non-oil tax revenues, however, exhibit strong positive correlations with economic growth. The report makes recommendations for policies that will increase the effective utilisation of tax revenue while lowering corruption and tax evasion. By exploring the effects of demography on economic growth, Luo (2023) questions accepted knowledge. According to the study, population ageing may raise the need for expenditure taxes, spurring greater growth. A younger population, however, might result in a rise in revenue tax demand, which would restrain growth. These theories are supported by international panel evidence, with stronger democracies demonstrating a more notable impact. These findings shed new light on the interplay between population variables and economic growth.

3. Research Methodology

The purpose of this research is to examine how monetary and fiscal policies in Jordan influenced the growth of GDP from 1970 to 2022. The data was primarily derived from the World Bank Development Database Indicator (2023). The analysis makes use of state-of-the-art unit root testing, cointegration methods, and causality checks. The neo-traditional revised Solow growth model, advanced by Mankiw, Romer, and Weil in 1992 and further developed in Islam's panel data framework in 1995, is the primary topic of this investigation. This theoretical framework shares certain structural features with the Cobb-Douglas production function.

$$M_t = O_t^r (P_t V G_t)^{1-x} \qquad (1)$$

where, M_t depict the output, P_t represent the capital V_t denote the force of labour; meanwhile, O_t Depict the level of technology and efficiency, and time is denoted by t, consider the following functional form:

$$LNGDP_t = f(LNMS_t, LNIR_t, LNTR_t, LNGE_t) \qquad (2)$$

Before performing estimations with the augmented autoregressive distributed lag (ARDL) model, the researchers conducted a battery of unit roots tests to ensure that the variables under study were stationary (Umar et al., 2015; Kamalu et al., 2019; Ibrahim et al., 2020; Kamalu et al., 2022). Among these were tests like the Phillips-Perron (PP) and the Augmented Dickey-Fuller (ADF). In order to deal with possible uncertainty in break dates and increase the robustness of commonly used unit root tests (ADF and PP), new unit root tests were developed. One such test is the LS (2013) unit root test, which employs a single structural break in a minimal LM test. When compared to earlier structural break tests, the Clemente-Montanes-Reyes (CMR) test showed superior size and power characteristics. It was quite good at pinpointing precise break dates, which meant less room for error in estimations and forecasts. Using the augmented autoregressive distributed lag (ARDL) cointegration approach pioneered by Jamil and Ahmad, we analyze the impact of monetary supply, tax

income, interest rates, and government spending on economic development in Jordan. When compared to cointegration methods that need predetermined integration orders for data series, the ARDL model offers more leeway. It is appropriate for I(0) and I(1) integrated variables, but not I(2) integrated variables. Also, it effectively deals with endogeneity problems, even in the case of tiny datasets, by employing lag selection for both explanatory and dependent variables. Sam et al. (2019) presented a revised ARDL model that includes more F-tests, mitigating the degenerate case-1 problem seen by prior researchers, despite worries about the I(1) requirement and the limitations of the proposed t-test.

$$\Delta lnGDP_t = \omega_0 + \sum_{i=1}^{r} \omega_1 lnGDP_{t-1} + \sum_{i=1}^{s} +\omega_2 \Delta lnMS_{t-1} + \sum_{i=1}^{q} \omega_3 \Delta IR_{t-1} + \sum_{i=1}^{w} \omega_4 \Delta lnTR_{t-1} + \sum_{i=1}^{k} \omega_5 \Delta lnGE_{t-1}$$
$$+ \tau_1 lnGDP_t + \tau_2 lnMS_t + \tau_3 lnIR_t + \tau_4 lnTR_t + \tau_5 lnGE_t + \varepsilon_t \quad (3)$$

The overall significance of the ARDL modeling study's coefficients is evaluated using an F-test. A t-test on lagged dependent variables is then performed to wrap things up. The lack of a level link produces an irregular null hypothesis distribution, which complicates the investigation. Asymptotic critical values for strictly I(1) and I(0) regressors are supplied as an alternative to the standard critical values. Depending on whether or not the F-test and t-test statistics are above the upper CV or below the lower crucial value, long-term associations exist between the parameters. If the test statistic falls in this range, it will be unable to detect long-term correlations. The error correction model (ECT) for assessing intermediate qualities is also presented in Equation (4).

$$\Delta lnGDP_t = \omega_0 + \sum_{i=1}^{r} \omega_1 lnGDP_{t-1} + \sum_{i=1}^{s} +\omega_2 \Delta lnMS_{t-1} + \sum_{i=1}^{q} \omega_3 \Delta IR_{t-1} + \sum_{i=1}^{w} \omega_4 \Delta lnTR_{t-1} + \sum_{i=1}^{k} \omega_5 \Delta lnGE_{t-1}$$
$$+ \sigma ECT_t + \varepsilon_t \quad (4)$$

Short-term fluctuations are captured by the variable, whereas the error correction term gauges how quickly each period returns to equilibrium after a shock in the relevant variable. The expected range of the error correction term is -1, where 0 indicates no correction towards equilibrium and 1 indicates full correction. If the expected value is -1, any shock in the current period will be totally neutralized in the future era. The cointegration connection was analyzed using three test statistics:

$$F_{ovrall}^{test} H_0: \cap_1 = \cap_2 = \cap_3 = \cap_4 = \cap_5 = 0 \qquad (5)$$
$$t_{DV}^{test} H_0: \cap_1 = 0 \qquad (6)$$
$$F_{IV}^{test} H_0: \cap_2 = \cap_3 = \cap_4 = \cap_5 = 0 \qquad (7)$$

Equations (6) and (7) present the F-test and t-test as test statistics, following the work of Pesaran et al. (2001). Equation (8) displays the revised F-test proposed by Sam et al. (2019). For cointegration to be established, all three tests must be statistically significant over an arbitrary threshold. If this criterion is not met, then the cointegration relationship cannot exist. In degenerate example 1, the F-independent statistics are not significant whereas the t-statistic and the total F-statistic are. If Case 2 is made degenerate, the F and t statistics become statistically significant. There are two main steps to the ARDL model estimation process. The first stage in establishing if the variables have a long-term causal link is co-integration testing. This is accomplished with the help of the following model:

$$\Delta lnGDP_t = \omega_0 lnGDP_{t-1} + \omega_1 \Delta lnMS_{t-1} + \omega_2 \Delta IR_{t-1} + \omega_3 \Delta lnTR_{t-1} + \omega_4 \Delta lnGE_{t-1} + \tau_1 lnMS_t + \tau_2 lnIR_t$$
$$+ \tau_3 lnTR_t + \tau_4 lnGE_t + \varepsilon_t \quad (8)$$

The purpose of this research is to use the ARDL framework to analyze the impact of MS, IR, TR, and GE on economic growth in Jordan. Two different methods of estimation are used in the ARDL model, with co-

integration testing taking the lead. The AIC criterion is used to select lag orders, such as the first difference operator, the error term, and a - e, to determine the existence of a long-term causal relationship between the variables. The F-statistic is used to examine the equilibrium long-term relationships between the horizontal variables. Long- and short-term dynamics of the variables are both assessed using the ARDL model. Here is a presentation of the ARDL model for assessing the quality of long-term partnerships:

$$\Delta lnGDP_t = \omega_0 + \sum_{i=1}^{r1} \omega_1 lnGDP_{t-1} + \sum_{i=0}^{r2} +\omega_2 \Delta lnMS_{t-1} + \sum_{i=0}^{r3} \omega_3 \Delta IR_{t-1} + \sum_{i=0}^{r4} \omega_4 \Delta lnTR_{t-1} + \sum_{i=0}^{r5} \omega_5 \Delta lnGE_{t-1} + \varepsilon_t \quad (9)$$

The ARDL-ECT model could be used to approximate the short-run association for the provided model:

$$\Delta lnGDP_t = \omega_0 + \sum_{i=1}^{r1} \omega_1 lnGDP_{t-1} + \sum_{i=0}^{r2} +\omega_2 \Delta lnMS_{t-1} + \sum_{i=0}^{r3} \omega_3 \Delta IR_{t-1} + \sum_{i=0}^{r4} \omega_4 \Delta lnTR_{t-1} + \sum_{i=0}^{r5} \omega_5 \Delta lnGE_{t-1} + \sigma ECT_t + \varphi_t \quad (10)$$

4. Empirical Results and Discussion

Table 1 gives descriptive statistics that shed insight on the features of the variables $lnGDP_t$, $lnMS_t$, $lnIR_t$, $lnTR_t$, $lnGE_t$ shedding light on their characteristics. The average value of each variable is represented by the mean. For instance, the median value for lnGDP is about 22.803, meaning that the dataset's median value for the natural logarithm of GDP is roughly 22.803. When the data is sorted in ascending order, the median is the middle value. Although it resembles the mean, it is unaffected by outliers (extreme values) (Ahmad et al., 2015a; Ahmad et al., 2015b; Ahmad et al., 2015c). The median values are reasonably symmetrical with respect to the means. These numbers display each variable's range. For instance, lnGDP shows significant variability with a range from a minimum of roughly 20.276 to a maximum of approximately 24.582. The spread or dispersion of data points around the mean is measured by the standard deviation. Higher standard deviations (like 1.705 for lnMS) indicate that the data are more variable. The asymmetry of the data distribution is measured by skewness. Positive skewness (such as 0.181 for lnIR) denotes a slight rightward skew, whereas negative skewness (such as -0.238 for lnGDP) denotes a slight leftward skew. When compared to a normal distribution, kurtosis evaluates how the distribution's tails are shaped. A distribution with slightly heavier tails than a normal distribution is indicated by values around 2.350 (such as for the lnGDP metric) (Atiku, et al., 2021; Atiku, et al., 2022).

Table 1 Descriptive Statistics

	$lnGDP_t$	$lnMS_t$	$lnIR_t$	$lnTR_t$	$lnGE_t$
Mean	22.803	22.189	2.256	21.463	21.463
Median	22.658	22.289	2.224	21.273	21.273
Maximum	24.582	24.413	2.534	22.709	22.709
Minimum	20.276	18.677	1.948	20.158	20.158
Std. Dev.	1.200	1.705	0.147	0.805	0.805
Skewness	-0.238	-0.524	0.181	0.295	0.295
Kurtosis	2.350	2.276	2.189	1.839	1.839

A Pearson correlation matrix is shown in Table 2 to look at the connections between the study's independent variables. The Pearson correlation coefficient, which ranges from -1 (perfectly negative correlation) to 1 (perfectly positive correlation), and 0 (no linear correlation), assesses the intensity and direction of the linear link between two variables. The independent variable correlation values were less than 0.85, which suggests that there were no problems with multicollinearity because the correlation coefficients between independent variable pairings in the analysis were all lower than 0.85 (Ahmad et al., 2018).

Table 2 Correlation Matrix

	$lnGDP_t$	$lnMS_t$	$lnIR_t$	$lnTR_t$	$lnGE_t$
$lnGDP_t$	**1.000**				
$lnMS_t$	0.278*	**1.000**			
	(0.000)				
$lnIR_t$	-0.260	-0.157	**1.000**		
	(0.059)	(0.259)			
$lnTR_t$	0.150*	0.213*	-0.413**	**1.000**	
	(0.000)	(0.000)	(0.002)		
$lnGE_t$	0.360*	0.413*	-0.275*	0.268*	**1.000**
	(0.000)	(0.000)	(0.000)	(0.000)	

Table 3 shows the outcomes of various tests carried out to choose the proper time delays for the study. The SIC (Schwarz Information Criterion) technique was one of these, however it produced fewer desirable outcomes than the others. Consequently, a somewhat longer wait is preferred for the objectives of our inquiry. So, for lag selection in this study, the SIC strategy was chosen.

Table 3 Lag Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2.349862	NA	1.52e-05	0.259178	0.413612	0.317770
1	283.3687	513.1271	2.53e-10	-10.74974	-9.977569*	-10.45678
2	308.0442	40.28654*	1.80e-10*	-11.10384*	-9.713934	-10.57651*

According to Alkhawaldeh et al. (2020), the findings of traditional unit root tests, such as ADF and PP, which ignore structural breakdowns in the data, are shown in Table 4. According to these tests, every variable becomes stationary at the first difference, indicating an integration order of I(1). It's important to note that these traditional unit root tests can produce confusing results if structural discontinuities in the time series data are not taken into account. The CMR unit root tests, which take into consideration the existence of two undetermined structural breaks within the time series, are used in this work to address this issue. The outcomes of these tests are shown in Table 4. The findings show that all variables exhibit non-stationarity at the level when two structural breakdowns are taken into account for the Jordanian data, suggesting the existence of a unit root issue. However, when two structural breaks are considered, the variables become stationary at the first difference. This suggests that all of the series have I(1) as their common integration order. This study addresses the issue of ambiguity around the stationarity and integration order of the variables and provides more trustworthy results by combining the LS and CMR unit root tests that take into account probable structural breaks in the data.

The augmented autoregressive distributed lag (AARDL) model was used in this study's analysis to look at the long-term connections between Jordan's economic growth, money supply, tax revenue, interest rates, and government expenditure. The results of the boundary test, shown in Table 5, were utilised to evaluate the statistical significance of the test results. To determine whether the test results were statistically significant, critical values (CV) were used, and these CVs came from a variety of sources, including Pesaran and Shin (2001) for the F-test and t-test, Narayan and Smyth (2005) for the corrected F-test, taking into account the small sample size, and Sam et al. (2019) for the F-test involving explanatory factors. The augmented ARDL cointegration test results show that the series being studied are cointegrated. This study suggests a long-term and intricate link between Jordan's money supply, tax revenue, interest rates, public expenditure, and economic growth. Furthermore, the test statistics in all three tests exceed the critical values at both the lower and upper bounds at a 1% significance level, offering strong support for cointegration. The boundary test results clearly show a long-term link between the variables, indicating that changes in remittances can have a

significant and long-lasting impact on Jordan's economic growth rate. These results highlight the importance of taking into account key macroeconomic variables as a crucial element in addressing promoting economic growth in the nation.

Table 4 Unit root tests without structural break

Variables	ADF	PP	CMR		
			du1	du2	Break-Year
$lnGDP_t$	-2.001 (0.601)	-2.196 (0.492)	-0.102	-0.022	1995 and 2008
$lnMS_t$	-1.175 (0.915)	-1.317 (0.883)	0.320	0.745	1984 and 2005
$lnIR_t$	-1.215 (0.907)	-1.462 (0.841)	0.139	-0.242	1987 and 2006
$lnTR_t$	-2.469 (0.343)	-2.756 (0.213)	-0.069	0.047	1998 and 2006
$lnGE_t$	-2.232 (0.183)	-2.116 (0.345)	0.041	-0.014	1979 and 1987
$\Delta lnGDP_t$	-4.335** (0.002)	-4.313** (0.003)	1.239*	1.255*	1980 and 1987
$\Delta lnMS_t$	-4.343** (0.003)	-4.364** (0.002)	-3.101*	-2.037	1981 and 2007
$\Delta lnIR_t$	-3.810** (0.016)	-3.650** (0.025)	-1.069*	1.047*	1998 and 2006
$\Delta lnTR_t$	-4.480* (0.001)	-4.438* (0.001)	1.808*	1.944	1998 and 2008
$\Delta lnGE_t$	-5.670* (0.000)	-5.993* (0.000)	1.082*	1.007	1988 and 2006

Note: * and ** indicate significance at 1% and 5% respectively. Values in parenthesis () represented p-value while values in bracket [] represented t-value

Table 5 Augmented ARDL bounds test result

Estimated Models	F_{ovrall}^{test}	t_{DV}^{test}	F_{IV}^{test}
$lnGDP_t = f(lnMS_t, lnIR_t, lnTR_t, lnGE_t)$	5.165*	7.882*	11.098*

Note: * and ** indicate significance at 1% and 5% respectively

The AARDL Estimates Results were displayed in Table 6. The results showed that Jordan's money supply had a negative effect on economic growth that persisted over the long and short terms. The findings specifically pointed to a situation where a 1% rise in money supply would be associated with a loss in short-term economic growth of 51.4% and a drop in long-term economic growth of 23.2%. This outcome is in line with Chugunov et al. (2021) and Anthony-Orji et al. (2023) findings. This shows that when the money supply increases quickly, the economy's short-term growth prospects may be affected negatively. This short-term phenomenon can be explained by the possibility that an increase in the amount of money entering the economy will cause inflationary pressures, which will raise prices and reduce consumers' purchasing power. This can thus hinder consumer expenditure and private sector investment, two vital engines of economic growth. Therefore, even though an increase in the money supply would at first seem to stimulate economic activity, the subsequent inflationary effects may overwhelm any transient benefits. The traditional notion that an increase in the money supply can boost long-term economic growth is also called into question by this research. Instead, it contends that a monetary policy that is overly loose and is marked by persistently large increases in the money supply could be harmful to the long-term strength and health of the Jordanian economy. Further research into the mechanisms behind this adverse link between the money supply and economic growth is essential. The effects of excessive money production on interest rates, inflation

expectations, and overall economic stability are potential considerations. The study's findings may also influence Jordanian officials to reconsider the central bank's monetary policy stance and think about more balanced plans that prioritise both price stability and economic growth.

Table 6 AARDL Estimates Results

Dependent variable: $lnGDP_t$		
Variables	**Coefficients**	**P-value**
$lnMS_t$	-0.514* (-6.981)	0.000
$\Delta lnMS_t$	-0.232* (-3.643)	0.000
$lnIR_t$	-0.145** (-3.087)	0.012
$\Delta lnIR_t$	-0.108* (-5.980)	0.000
$lnTR_t$	0.117* (3.166)	0.000
$\Delta lnTR_t$	0.104* (3.660)	0.000
$lnGE_t$	0.552* (7.985)	0.000
$\Delta lnGE_t$	0.132* (4.700)	0.000
ECT_{t-1}	-0.709* (-9.100)	0.000
R^2	0.678	
Adj R^2	0.519	

Note: * and ** indicate significance at 1% and 5% respectively

Additionally, the findings showed that both in the short and long terms, interest rates had a detrimental impact on Jordan's economic growth. According to the findings, a 1% increase in interest rates would result in a short- and long-term decline in economic growth of 14.5% and 10.8%, respectively. This outcome is in line with McMillan's (2020) findings. According to this correlation, higher interest rates may have a dampening effect on current economic activity. Borrowing expenses for both consumers and businesses rise when interest rates rise. This may discourage companies from investing in growth, lower consumer expenditure, and possibly short-term economic growth. Surprisingly, interest rates continue to have a negative effect on economic growth over the long term as well. An increase in interest rates has had a long-lasting negative impact on the rate of economic growth in general. The significance of taking into account the effects of interest rate policies over the long run is shown by this long-term effect. The results may cause Jordanian authorities to carefully consider the trade-offs between establishing price stability and promoting economic growth. It is a tough undertaking for central banks and policymakers to strike a balance between the necessity of controlling inflation and the imperative of promoting an environment that is conducive to investment and economic development. Additionally, it is crucial to take into account the different ways in which interest rates have an impact on economic growth, such as their impact on investment choices, the cost of borrowing, and the general financial stability of the economy.

Nevertheless, the results demonstrated a positive and significant correlation between tax revenue and economic growth over both the long and short durations. The research found that a 1% increase in tax collection would boost economic growth by 11.7% in the short term and 10.4% in the long term. This result is similar with Eneche and Stephen's findings from 2023. The analysis shows a clear short-run acceleration of economic expansion is connected with an increase in tax receipts. This means that the government may be

able to use more tax revenue to pay for investments, public infrastructure initiatives, and other programs that support the economy. Increasing tax revenue essentially supports short-term economic growth, increasing output and maybe creating jobs. The fact that tax income and economic growth have a long-term positive relationship is crucial. The analysis finds that long-term increases in tax revenue have a favorable and significant effect on economic growth. This supports the notion that an effective tax system may provide funds for long-term goals and initiatives for economic development. The significance of prudent budgetary planning and tax reform in Jordan is shown by these findings. A fair, efficient, and revenue-generating tax system can play a significant role in encouraging economic expansion. The study's findings also suggest that policymakers should think about measures to improve tax collection and extend the tax base in order to provide a reliable and long-term source of funding for the government's economic development efforts.

Likewise, both long- and short-term economic growth were positively and significantly correlated with government spending, according to the data. According to the results, a 1% increase in government spending would boost economic growth by 55.2% in the short term and 13.2% in the long run. This result is consistent with what Arvin et al. (2021) found. This suggests that when the government increases spending on various programs, infrastructure upgrades, and public services, the economy is momentarily stimulated. Higher output, more employment, and higher living standards for the populace may arise from this. The fact that there is a positive correlation between government expenditure and economic growth over the long run is significant. The study discovers that sustained increases in government expenditure continue to have a favourable and significant impact on economic growth over a longer time frame. This emphasises the idea that wise government expenditure may be a significant catalyst for long-term economic growth. These results emphasise the need of carefully planned fiscal strategies and focused public expenditure in Jordan. A government can make a significant contribution to economic growth and development by allocating resources in an effective and strategic manner to initiatives that improve infrastructure, education, healthcare, and productivity. The findings of the study also imply that decision-makers should take into account the effectiveness and quality of public expenditure. To maximise the beneficial effects of government expenditure on economic growth, it is crucial to ensure that public money is spent effectively and that investments are made in fields that produce the best economic returns.

5. Conclusion

This extensive study examined the complex interrelationships between key macroeconomic factors—money supply, tax revenue, interest rate, and government expenditure—and their significant effects on Jordan's economic growth. The investigation, which covered a large time period from 1970 to 2022, made use of the potent Augmented Autoregressive Distributed Lag (ARDL) model, allowing us to examine the dynamics of these important components over both short- and long-term time horizons. The results of this study are crucial for comprehending the intricate web of economic variables that determine Jordan's trajectory of economic growth. The constant and statistically significant inverse link between money supply and economic growth that was shown over the short and long terms was one of the most startling findings. This finding has significant effects on Jordan's monetary policy. It means that the anticipated benefits in terms of economic growth may not always result from a growthary monetary policy, which is defined by an increase in the money supply. Instead, it might restrict growth, perhaps through pressures brought on by inflation. As a result, while controlling the money supply to support the broader goals of promoting sustainable economic growth, authorities must be cautious and precise. The study also found that interest rates had a detrimental effect on Jordan's economic growth, which highlights the crucial role that monetary policy plays in determining the direction of the economy. Higher interest rates may hinder investment and borrowing, potentially impeding the growth of the economy. This finding underlines the significance of a cautious and flexible monetary policy,

where interest rates are carefully adjusted to fit the overall economic circumstances, thereby fostering a growth-friendly atmosphere. Contrarily, government expenditure and tax revenue were found to be important contributors to economic growth, with constant positive effects that were statistically significant in both the short- and long-term. These findings highlight the crucial part that fiscal policy has played in Jordan's economic growth. Economic activity, investment, and population well-being can all be improved by an effective tax system that mobilises revenue and strategically allocates government expenditure. For Jordan's economic policymakers, these findings have broad ramifications. They emphasise, first and foremost, the necessity of implementing a responsible fiscal strategy that prioritises the effective collection of tax revenue. The government can get the money it needs to support economic growth initiatives with the help of a well-designed tax system that minimises revenue leaks and maximises revenue generation. Furthermore, wise government expenditure has the ability to support long-term economic growth, particularly in sectors like infrastructure improvement, education, and healthcare. Such investments can increase the nation's competitiveness on the international stage, boost human capital, and encourage economic activity. The report also emphasises how closely monetary and fiscal policy interact to shape Jordan's economic environment. To achieve economic stability and sustainable growth, various policy domains must work in harmony and with effective coordination.

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