Fiscal policy and public expenditure on sustainable economic growth Malaysia: an empirical assessment of budgetary priorities

Kong Yeong Cheng[1], Jerome Kueh Swee Hui[2*]

[1,2] *Faculty of Economics and Business, Universiti Malaysia Sarawak*

ARTICLE INFO

ABSTRACT

Public spending is a key factor in determining the economic path of countries in promoting sustainable growth and improving social welfare. Over the past forty years, the structure of the government expenditure in Malaysia has undergone substantial changes, including global economic disturbances. The objective of the study is to examine the impact of different types of public spending on Malaysia's economic growth from 1981 to 2023, based on Keynesian theory and Wagner's Law. This study employs methods such as Autoregressive Distributed Lag (ARDL), Vector Autoregression (VAR) Granger causality test, impulse response function and variance decomposition. This study contributes novelty in term of integrating long-run and dynamic shock response analysis of the disaggregated public spending-growth nexus of Malaysia. The findings of the study indicate that development spending, particularly on general administration, supports growth, while subsidies show weaker or mixed effects. Crises like in 1998, 2009 and 2020 influence these relationships. The study provides policy insights to support long-term economic growth.

[2*] Corresponding author: E-mail address: kshjerome@unimas.my

1.   INTRODUCTION

In the evolving landscape of fiscal policy, understanding the dynamics of public expenditure and its influence on sustainable economic growth has become increasingly prominent, especially for developing countries, such as Malaysia. Over the past four decades, Malaysia has experienced significant changes in its public expenditure patterns, shaped by structural reforms and external economic shocks. The rising costs of operational expenditures, such as salaries, pensions, and debt servicing, have raised concerns regarding the sustainability and effectiveness of government spending. The budgetary pressures, intensified by global crises such as the Asian Financial Crisis (1998), the Global Financial Crisis (2009), and the COVID-19 pandemic (2020), highlighted the need for a comprehensive analysis of the effects of different types of public expenditure on economic growth.

Figure 1 shows Malaysia's public spending by sector from 1981 to 2023. Economic services rose from RM6,908 million to RM57,238 million; social services from RM2,437 million to RM24,247 million; defence and security from RM1,839 million to RM11,381 million; and general administration from RM174 million to RM3,225 million. Debt servicing increased from RM2,046 million to RM46,331 million, while emoluments rose from RM3,600 million to RM91,860 million. Pension and gratuities grew from RM585 million to RM34,080 million; supplies and services from RM1,929 million to RM35,898 million. Subsidies rose sharply from RM1,101 million to RM77,878 million, especially during crises. Asset acquisition reached RM1,023 million in 2023, and grants and transfers grew from RM283 million to RM23,340 million. These trends reflect Malaysia's commitment to development, welfare, and fiscal management.
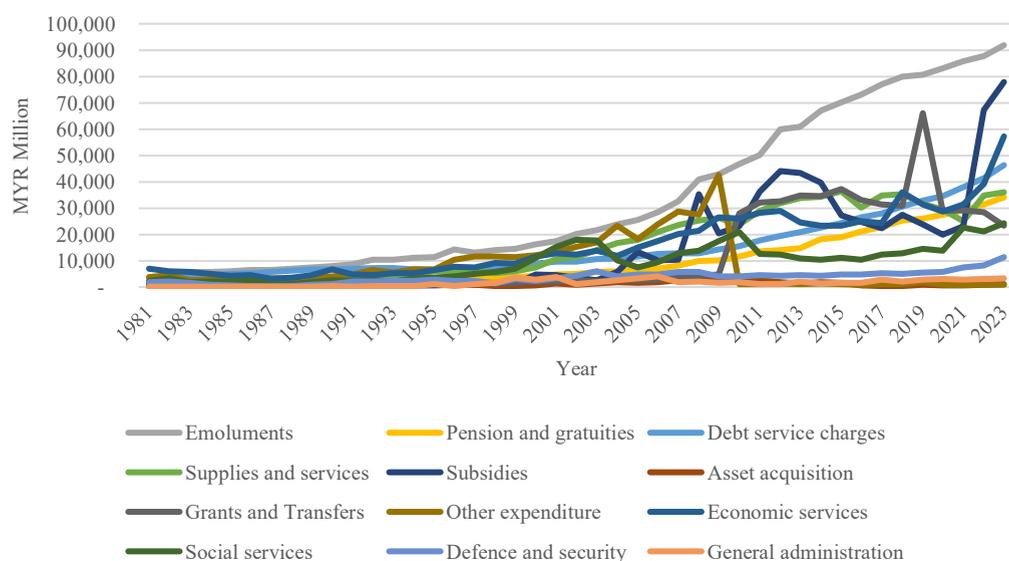
Fig. 1. Public spending in Malaysia from 1981-2023
(Source: Department of Statistics Malaysia)

Figure 2 shows Malaysia's economic growth from 1981 to 2023. Nominal GDP rose from RM57,602 million in 1981 to RM1,821,080 million in 2023. Strong growth in the early 1990s, such as RM195,461 million in 1994, was supported by public investment in infrastructure, education, and healthcare. GDP slowed during the 1997-1998 Asian Financial Crisis and 2008-2009 Global Financial Crisis, staying at RM281,792 million in 1997 and RM768,868 million in 2008. Continued investment in economic and social services supported steady GDP growth, reaching RM1,821,080 million in 2023.

Fig. 2. Economic growth in Malaysia from 1981-2023
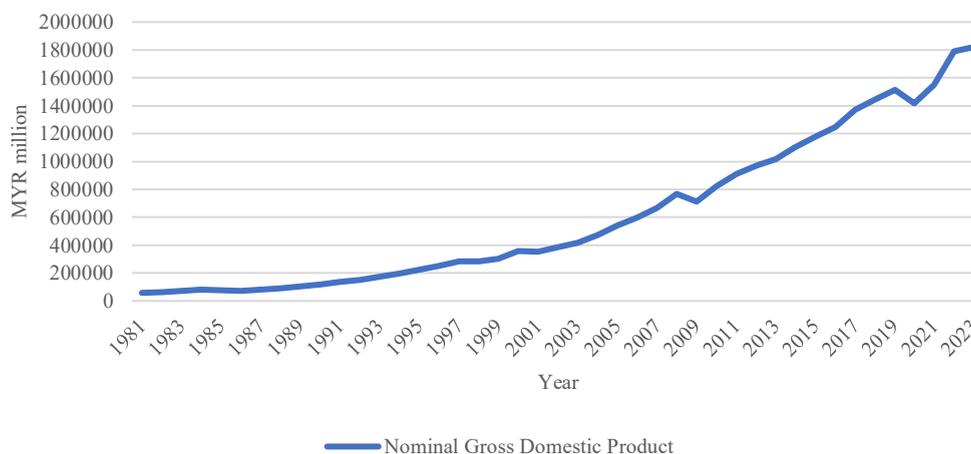(Source: China Economic Information Centre, CEIC Database, 2024)

In addition, the operating expenditure such as emoluments, pensions, and debt service, charges has increased significantly, limiting funds for development sectors (The Star, 2024). Emoluments rose from RM3.6 billion to RM91.86 billion, pensions from RM585 million to RM34.08 billion, and debt service charges from RM2.046 billion to RM46.331 billion. Subsidies also rose from RM19,793 million in 2020 to RM77,878 million in 2023. These trends reflect shifts during crises like the 1998 Asian Financial Crisis, the 2009 Global Financial Crisis, and the 2020 COVID-19 pandemic, which led to GDP contractions of -1.5% (2009) and -6.23% (2020). Rising operating expenditure poses risks to fiscal sustainability (The Star, 2024; Yeah Kim Leng). Interest rate, determined by Bank Negara Malaysia through the OPR, affects borrowing costs and fiscal capacity (Baharuddin, 2021).

From a policy perspective, Malaysia encounters various budgetary constraints that could affect the effectiveness of public expenditure as a catalyst for growth. Firstly, fiscal policy of Malaysia has become more constrained due to fixed operating costs, such as wages and pensions for public sector workers, and increasing debt service costs. Secondly, higher debt payments make it tougher for the government to spend money. These problems could have major effects on the economy, causing harder to keep the budget balanced, giving less room for future counter-cyclical policies, and pushing out long-term productive investment. Therefore, it is important to know how each type of spending affects growth while develop spending plans that provide the most output while keeping the budget solid. By examining how different public spending categories affect Malaysia's economic growth, the findings support sustainable and inclusive economic growth and Sustainable Development Goal, SDG 8 (Decent Work and Economic Growth).

This study enhances the existing knowledge base by providing a detailed sectoral analysis of public expenditure in Malaysia from 1981 to 2023, considering the crisis conditions. This study differentiates itself from previous research, which typically examines aggregate expenditure or short-term effects, by disaggregating public spending into specific components, such as salaries, pensions, subsidies, and development sectors, and assessing their distinct influence on economic growth. Furthermore, by using interest rates as a control variable and utilizing crisis dummies for significant economic disruptions, the analysis offers a more refined comprehension of fiscal policy effectiveness across various macroeconomic contexts. It will provide actionable lessons for policymakers seeking to enhance budgetary plans for sustainable growth.

Therefore, this study aims to examine the impact of different types of public spending on Malaysia's economic growth from 1981 to 2023, using the interest rate as a control variable, addressing concerns about the efficiency and sustainability of government expenditure amidst rising operational costs.

2.　　LITERATURE REVIEW

This research reviews existing studies on the relationship between public spending and economic growth, guided by Keynesian economics and Wagner's Law. Keynesian theory emphasizes that government spending stimulates aggregate demand, increasing output, employment, and income, especially during economic downturns. Zulkifli, Effendi, and Shafai (2022) applied this theory in Malaysia and found that development expenditure positively influences growth, while Poku, Opoku, and Ennin (2022) observed a similar short-term impact in Ghana. Wagner's Law, proposed by Adolf Wagner, suggests that as an economy grows, public demand for services rises, leading to increased government expenditure. Senawi and Sulaiman (2020) supported this in the Malaysian context, showing a long-term relationship between sectoral government spending and GDP. Adesanya and Bankole (2024) found that GDP growth drives spending in Nigeria. While global research supports these theories, empirical studies specific to Malaysia are still limited, especially those considering sectoral spending, interest rate, and crisis effects such as the Asian Financial Crisis and the COVID-19 pandemic. Since Malaysia is a developing country, this review focuses on literature from similar economies to provide a relevant foundation for analysing how public spending, moderated by interest rate, affects economic growth.

2.1　　Developing country

Developing countries are nations with lower income levels, limited industrialization and developing institutional frameworks. A major aspect of these countries is their strong reliance on government expenditure to drive economic growth, due to weak private sectors and limited capital formation, similar as Malaysia. Public spending in these countries plays a vital role in improving infrastructure, education, and health services, which are necessary for long-term development. Therefore, understanding how different types of public spending, such as operating and development expenditure on how to affect GDP is crucial in the context of developing economies. This also provided very important insights for the research.

2.2　　Operating expenditure on economic growth

Okang et al. (2020) in Nigeria found that administrative and economic services expenditures positively affect GDP, while transfers have a negative effect. Aluthge et al. (2020) confirmed that capital expenditure boosts growth in both terms, while recurrent spending has little effect. Onifade et al. (2020) showed recurrent spending harms growth, capital expenditure is positive but insignificant, and public debt is a key obstacle. Onotaniyohwo and Iyaji (2020) found that infrastructure spending boosts growth, but education and healthcare do not. Daniel and Oruta (2021) found that capital spending on economic services supports long-run growth, but social recurrent spending harms it. Olayiwola et al. (2021) showed a long-run positive impact of health spending in Nigeria but no causality. Zulkifli et al. (2022) found Malaysian development spending aids growth, but education, healthcare, and capital formation reduce it.

Handayani et al. (2022) found that public spending hurts growth in North Sumatra, but consumption and population help. Assenova (2022) found that Bulgaria's capital spending helps pre-COVID, while salaries and social care stabilized demand during COVID. Bredino et al. (2022) found that all spending types hurt growth in Nigeria, and debt worsens it. Joseph et al. (2023) found spending in Nigeria helps growth insignificantly, but VAT is significant. Yusuf et al. (2023) found that recurrent spending aids long-run growth, but capital hurts due to inefficiency, and debt servicing is negative. Emeru (2023) found that education and health boost Ethiopian growth, but agriculture harms it, while defence and

investment are insignificant. Paudel (2023) showed that capital education spending boosts Nepal's growth, but health spending is ineffective. Sriningsih et al. (2023) found that health, education, and economic spending boost Indonesian GDP, but social protection hurts it. Buthelezi (2023) found that short-run spending reduces South African growth, long-run spending has slight benefit, and shocks harm low-growth states. Adesanya and Bankole (2024) found that recurrent spending helps Nigeria's GDP, capital is mixed, and debt harms it. Sama et al. (2024) found that Sub-Saharan public spending hinders sustainability, but governance helps. Fitriani et al. (2024) found that Sumatra's health spending helps GDP insignificantly, grants hurt it, and taxes support growth.

Table 1. Summary of literature review of operating expenditure on economic growth

Author & Year	Methods	Key Findings
Aluthge et al. (2020)	Time-series analysis	Capital expenditure supports growth, while recurrent/operating expenditure shows weak or limited influence on economic growth.
Onifade et al. (2020)	Time-series analysis	Recurrent expenditure negatively affects economic growth, capital expenditure is positive but insignificant and public debt harms growth.
Daniel and Oruta (2021)	Time-series analysis	Recurrent spending in social-related areas negatively affects growth, implying inefficiency when dominated by operating commitments.
Assenova (2022)	Comparative analysis (pre-COVID vs COVID period)	During crisis (COVID), operating-type spending such as wages/social care stabilises demand, supporting short-term resilience.

2.3 Development expenditure on economic growth

Senawi and Sulaiman (2020) used the ARDL model in Malaysia, finding that health, education, transportation, and defence positively affect growth, while housing does not. Aluthge et al. (2020) confirmed that capital expenditure boosts growth in both terms, while recurrent spending has little effect in Nigeria. Onifade et al. (2020) showed recurrent spending harms growth, capital expenditure is positive but insignificant, and public debt is a key obstacle. Onotaniyohwo and Iyaji (2020) found that infrastructure spending boosts growth, but education and healthcare do not. Ahuja and Pandit (2020) showed that government spending causes growth and trade openness matters. Olaoye et al. (2020) found positive spending shocks raise growth in ECOWAS, negative shocks reduce it, and 21.49% of GDP is optimal. Daniel and Oruta (2021) found that capital spending on economic services supports long-run growth, but social recurrent spending harms it. Le and Tran (2021) found that education spending boosts growth in Vietnam after two years.

Popescu and Diaconu (2021) found short-run causality in Romania, but no long-term link. Olonite et al. (2021) found that capital spending helps growth, but subsidies harm it. Kim et al. (2021) found local spending aids China's growth more than central spending, and net taxes are ineffective. Zulkifli et al. (2022) found Malaysian development spending aids growth, but education, healthcare, and capital formation reduce it. Poku et al. (2022) found Ghana's public spending aids short-run GDP but not long-run, while FDI and capital formation help both. Gebreyesus (2022) found that Ethiopian capital and service sector spending help growth, but agriculture and FDI hinder it. Sinha (2022) found that agriculture spending has little effect in Bihar, but capital formation helps. Paudel (2023) showed that capital education spending boosts Nepal's growth, but health spending is ineffective. Rahman (2023) found spending in SAARC countries boosts GDP, confirming Wagner's Law. Mai (2023) found that total and capital spending hurt Vietnam's growth, while FDI and trade helped. Abdelli et al. (2024) found that all health and agriculture shocks help Tunisia's GDP, but education and military hurt. El Aissaoui et al. (2024) found Morocco's spending helps growth in the short and long term. Aisyah et al. (2024) found that Indonesian spending stabilizes demand and taxes help with macro problems.

Table 2. Summary of literature review of development expenditure on economic growth

Author & Year	Methods	Key Findings
Zulkifli, Effendi & Shafai (2022)	Disaggregated expenditure-growth econometric analysis (Malaysia)	Development expenditure positively influences growth, indicating productive effects of investment-driven spending; however, some components (education, healthcare, capital formation) may show negative associations depending on allocation/efficiency.
Poku, Opoku & Ennin (2022)	ARDL time-series (Ghana)	Government spending shows positive growth effects, particularly where expenditure supports development initiatives and productive sectors.
Okang et al. (2019)	Time-series analysis	Spending on economic services positively affects GDP, implying development-related investment is growth-enhancing, while transfers reduce growth.
Onotaniyohwo & Iyaji (2020)	Infrastructure-led growth model	Infrastructure development expenditure significantly supports growth, while education/health spending is not significant.
Daniel & Oruta (2021)	Time-series analysis	Capital expenditure on economic services supports long-run growth, consistent with investment-driven public spending.
Olayiwola et al. (2021)	Time-series analysis	Health-related spending shows long-run positive effect but without causality evidence, suggesting allocation effectiveness matters.
Assenova (2022)	Pre-/during crisis comparative analysis	Development spending is more effective in pre-crisis periods, but its effectiveness declines during crisis relative to operating stabilisation spending.

3.   METHODOLOGY

This research applies a quantitative design to examine the relationship between public spending and economic growth in Malaysia from 1981 to 2023, using secondary data from the Department of Statistics Malaysia (DOSM) and the CEIC Database (2024). The analysis employs EViews 13 with regression and time-series econometric models, incorporating interest rate as a control variable and crisis dummy (SPIKE) variables for the Asian Financial Crisis (1998), Global Financial Crisis (2009), and COVID-19 pandemic (2020). The theoretical framework is based on Keynesian economics and Wagner's Law, which explain how public spending influences and is influenced by economic growth. The conceptual framework categorises public spending into operating and development expenditure, with subcomponents such as emoluments (LEMO), pensions and gratuities (LPENGRA), debt service charges (LDEBT), supplies and services (LSUPP), subsidies LSUB), asset acquisitions (LASSET), grants and transfers (LGRANTS), other expenditures (LOTHER), economic services (LECO), social services (LSOCIAL), defence and security (LDEFENCE), and general administration (LGENERAL), all measured in MYR (millions). The dependent variable is nominal GDP (LGDP), and the control variable is the interest rate (LINTEREST, %), with all data collected annually over 43 years. The target population includes all national-level fiscal and economic data in Malaysia within the selected timeframe. The hypotheses tested are: H1 - Public spending significantly affects economic growth; H2 - There is a causal relationship between public spending and economic growth; and H3 - Economic crises significantly affect the spending-growth relationship.
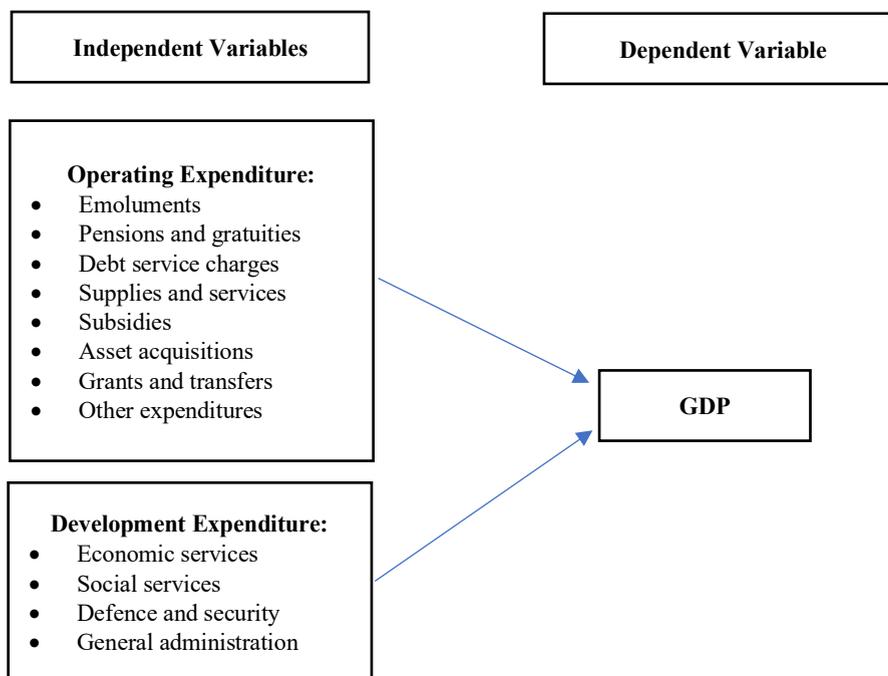
Fig. 3. Conceptual framework

3.1   Descriptive statistics

Descriptive statistics summarize key features of the dataset, including mean, median, standard deviation, minimum, and maximum for variables such as GDP and public spending components. This provides a foundation for deeper econometric analysis.

3.2   Unit root tests

To ensure valid regression, unit root tests check if the time series data is stationary, meaning constant mean and variance. This research uses Augmented Dickey Fuller (ADF), Phillips Perron (PP), and Kwiatkowski Phillips Schmidt Shin (KPSS) tests. ADF and PP assume non-stationarity as the null, while KPSS assumes stationarity. If the ADF or PP p-value is below 5 percent, the series is stationary. For KPSS, a low p-value means rejecting stationarity. Variables are tested at the level and first difference to determine if they are $I(0)$ or $I(1)$. Using all three tests improves accuracy and guides model selection, especially for ARDL, which accepts mixed orders.

3.3   Autoregressive Distributed Lag (ARDL) model

ARDL is appropriate for this study as it can be utilized when variables are a combination of $I(0)$ and $I(1)$, where frequently encountered in macroeconomic data. The ECM framework is suitable for a small sample size and captures the short-run dynamics and long-run linkages, simultaneously. Furthermore, the ARDL's flexible lag structure accounts for delays in policy transmission, and the bounds testing methodology offers a reliable means to examine the long-run cointegration among the variables.

The regression equation is stated as follows:

$$
\begin{aligned}
LGDP_t = {} & a_0 + a_1 LEMO_t + a_2 LPENGRA_t + a_3 LDEBT_t + a_4 LSUPP_t + a_5 LSUB_t + a_6 LASSET_t \\
& + a_7 LGRANTS_t + a_8 LOTHER_t + a_9 LECO_t + a_{10} LSOCIAL_t + a_{11} LDEFENCE_t \\
& + a_{12} LGENERAL_t + a_{13} LINTEREST_t + \epsilon_t
\end{aligned}
$$

where:
a_0: Constant term.
$a_1, a_2 \dots a_{13}$: Coefficients for the respective independent variables, a_{13} is the coefficient for the interest rate as a control variable.
$LGDP_t$: Natural log of nominal GDP in year t (dependent variable).
$LEMO_t$: Natural log of emoluments.
$LPENGRA_t$: Natural log of pensions and gratuities.
$LDEBT_t$: Natural log of debt service charges.
$LSUPP_t$: Natural log of supplies and services.
$LSUB_t$: Natural log of subsidies.
$LASSET_t$: Natural log of asset acquisitions.
$LGRANTS_t$: Natural log of grants and transfers.
$LOTHER_t$: Natural log of other expenditures.
$LECO_t$: Natural log of economic services.
$LSOCIAL_t$: Natural log of social services.
$LDEFENCE_t$: Natural log of defence and security.
$LGENERAL_t$: Natural log of general administration.
$LINTEREST_t$: Natural log of interest rate (control variable).
ϵ_t: Error term capturing unobserved influences.

After that, written in ARDL form as follows:

$$
\begin{aligned}
\Delta L\,GDP_t = {} & a_0 + \sum_{k=1}^{p} a_1 \Delta L\,EMO_{t-k} + \sum_{k=1}^{p} a_2 \Delta L\,PENGRA_{t-k} + \sum_{k=1}^{p} a_3 \Delta L\,DEBT_{t-k} \\
& + \sum_{k=1}^{p} a_4 \Delta L\,SUPP_{t-k} + \sum_{k=1}^{p} a_5 \Delta L\,SUB_{t-k} + \sum_{k=1}^{p} a_6 \Delta L\,ASSET_{t-k} \\
& + \sum_{k=1}^{p} a_7 \Delta L\,GRANTS_{t-k} + \sum_{k=1}^{p} a_8 \Delta L\,OTHER_{t-k} + \sum_{k=1}^{p} a_9 \Delta L\,ECO_{t-k} \\
& + \sum_{k=1}^{p} a_{10} \Delta L\,SOCIAL_{t-k} + \sum_{k=1}^{p} a_{11} \Delta L\,DEFENCE_{t-k} + \sum_{k=1}^{p} a_{12} \Delta L\,GENERAL_{t-k} \\
& + \sum_{k=1}^{p} a_{13} \Delta L\,INTEREST_{t-k} + \lambda_1 L\,GDP_{t-1} + \lambda_2 L\,EMO_{t-1} + \lambda_3 L\,PENGRA_{t-1} \\
& + \lambda_4 L\,DEBT_{t-1} + \lambda_5 L\,SUPP_{t-1} + \lambda_6 L\,SUB_{t-1} + \lambda_7 L\,ASSET_{t-1} \\
& + \lambda_8 L\,GRANTS_{t-1} + \lambda_9 L\,OTHER_{t-1} + \lambda_{10} L\,ECO_{t-1} + \lambda_{11} L\,SOCIAL_{t-1} \\
& + \lambda_{12} L\,DEFENCE_{t-1} + \lambda_{13} L\,GENERAL_{t-1} + \lambda_{14} L\,INTEREST_{t-1} + \epsilon_t
\end{aligned}
$$

where:
Δ : First difference operator.
k: Lag length
$t - k$: represents the variable with a lag of k periods.
$LGDP_t$: Natural log of nominal GDP in year t (dependent variable).

LEMO$_t$, LPENGRA$_t$, LDEBT$_t$, LSUPP$_t$, LSUB$_t$, LASSET$_t$, LGRANTS$_t$, LOTHER$_t$, LECO$_t$, LSOCIAL$_t$, LDEFENCE$_t$, LGENERAL$_t$, LINTEREST$_t$: Natural logs of independent variables (and interest rate (LINTEREST) as a control variable).

a_0: Drift component.

$a_1, a_2 \dots a_{13}$: Short-run coefficients.

$\lambda_1, \lambda_2 \dots \lambda_{13}$: Long-run coefficients.

ϵ_t: Error term.

3.4 Baseline regression

The baseline regression model examines the impact of public spending components on Malaysia's GDP without the crisis dummy. It identifies long and short-term effects of expenditure under normal conditions. Key spending categories are included, with interest rate as a control variable. This model serves as the control for assessing spending effects on GDP without crisis influence.

The regression equation is stated as follows:

$$
\begin{aligned}
LGDP_t = \beta_0 &+ \beta_1 LEMO_t + \beta_2 LPENGRA_t + \beta_3 LDEBT_t + \beta_4 LSUPP_t + \beta_5 LSUBt + \beta_6 LASSET_t \\
&+ \beta_7 LGRANTS_t + \beta_8 LOTHER_t + \beta_9 LECO_t + \beta_10 LSOCIAL_t + \beta_1 1 LDEFENCE_t \\
&+ \beta_1 2 LGENERAL_t + \gamma LINTEREST_t + \epsilon_t
\end{aligned}
$$

where:

LGDP$_t$: Natural log of nominal GDP in year t (dependent variable).

LEMO$_t$: Natural log of emoluments.

LPENGRA$_t$: Natural log of pensions and gratuities.

LDEBT$_t$: Natural log of debt service charges.

LSUPP$_t$: Natural log of supplies and services.

LSUB$_t$: Natural log of subsidies.

LASSET$_t$: Natural log of asset acquisitions.

LGRANTS$_t$: Natural log of grants and transfers.

LOTHER$_t$: Natural log of other expenditures.

LECO$_t$: Natural log of economic services.

LSOCIAL$_t$: Natural log of social services.

LDEFENCE$_t$: Natural log of defence and security.

LGENERAL$_t$: Natural log of general administration.

LINTEREST$_t$: Natural log of interest rate (control variable).

γ: Coefficient for the interest rate as a control variable.

δ: Coefficient for the crisis dummy variable

β$_0$: Intercept term, representing the baseline GDP when all independent variables are zero.

β$_1$, β$_2$…, β$_{12}$: Coefficients representing the effect of each independent variable on GDP growth.

ε$_t$: Error term capturing unobserved influences.

3.5   Crisis dummy regression

The crisis dummy regression evaluates the direct effects of significant economic crises, like the Asian Financial Crisis (1998), the Global Financial Crisis (2009), and the COVID-19 pandemic (2020), on GDP growth in Malaysia. This technique assesses the impact of crises by including a crisis dummy variable, while controlling for components of public spending.

$$
\begin{aligned}
LGDP_t = {} & \beta_0 + \beta_1 LEMO_t + \beta_2 LPENGRA_t + \beta_3 LDEBT_t + \beta_4 LSUPP_t + \beta_5 LSUB_t + \beta_6 LASSET_t \\
& + \beta_7 LGRANTS_t + \beta_8 LOTHER_t + \beta_9 LECO_t + \beta_{10} LSOCIAL_t + \beta_{11} LDEFENCE_t \\
& + \beta_{12} LGENERAL_t + \gamma LINTEREST_t + \delta SPIKE_t + \epsilon_t
\end{aligned}
$$

where:

$LGDP_t$: Natural log of nominal GDP in year t (dependent variable).

$LEMO_t$: Natural log of emoluments.

$LPENGRA_t$: Natural log of pensions and gratuities.

$LDEBT_t$: Natural log of debt service charges.

$LSUPP_t$: Natural log of supplies and services.

$LSUB_t$: Natural log of subsidies.

$LASSET_t$: Natural log of asset acquisitions.

$LGRANTS_t$: Natural log of grants and transfers.

$LOTHER_t$: Natural log of other expenditures.

$LECO_t$: Natural log of economic services.

$LSOCIAL_t$: Natural log of social services.

$LDEFENCE_t$: Natural log of defence and security.

$LGENERAL_t$: Natural log of general administration.

$LINTEREST_t$: Natural log of interest rate (control variable).

$SPIKE_t$: Crisis dummy variable (1 in crisis years, i.e. 1998, 2009, 2020, and 0 in other years).

γ: Coefficient for the interest rate as a control variable.

δ: Coefficient for the crisis dummy variable

β_0: Intercept term, representing the baseline GDP when all independent variables are zero.

β_1, β_2…, β_{12}: Coefficients representing the effect of each independent variable on GDP growth.

ϵ_t: Error term capturing unobserved influences.

The ARDL regression model, including all public spending sectors, interest rate (control variable), and the crisis dummy variable, is specified as:

3.6   VAR Granger Causality Test

The VAR Granger Causality Test is used to examine the direction of causality between public spending and economic growth. It checks whether one variable can help to predict the other over time using lag values in a VAR system.

To test whether public spending granger causes GDP:

$$\text{LGDP}_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \text{ LGDP}_{t-i} + \sum_{j=1}^{p} \beta_j \text{ LEXP}_{t-j} + \sum_{k=1}^{p} \theta_k \text{ LINTEREST}_{t-k} + \varepsilon_t$$

To test whether GDP granger causes public spending:

$$\text{LEXP}_t = \delta_0 + \sum_{i=1}^{p} \delta_i \text{ LEXP}_{t-i} + \sum_{j=1}^{p} \phi_j \text{ LGDP}_{t-j} + \sum_{k=1}^{p} \lambda_k \text{ LINTEREST}_{t-k} + \nu_t$$

Where:

LGDP_t = Natural log of nominal GDP (economic growth)

LEXP_t = Natural log of specific public spending component

LINTEREST_t = Natural log of interest rate (control variable)

P = optimal lag length

ε_t, ν_t = error terms

3.7 Impulse Response Function (IRF)

The purpose of this analysis is to examine how shocks to different components of public spending affect GDP growth over time. By using the impulse response function (IRF), this research aims to assess the dynamic effects of one-time changes in public expenditure on GDP, while controlling for the influence of the interest rate. This approach helps uncover the short- and long-term implications of fiscal policy decisions on economic growth.

3.8 Variance decomposition

The purpose of this variance decomposition analysis is to determine the relative contribution of different public spending components to fluctuations in GDP growth. By measuring how much each component explains the prediction error variance of GDP over time, this approach highlights which types of public spending have the most significant influence on economic performance.

3.9 Diagnostics tests

During ARDL regression, diagnostic tests are used to check assumptions for baseline and crisis dummy models. These include tests for autocorrelation (Durbin Watson), heteroskedasticity (Breusch Pagan and White), normality (Jarque Bera), model stability (CUSUM and CUSUM of Squares), and specification error (Ramsey RESET). Autocorrelation indicates correlation among errors and affects the coefficient efficiency. Heteroskedasticity reflects unequal error variance and may require robust standard errors. Normality ensures valid inference, especially in small samples. CUSUM and CUSUM of Squares assess stability and structural breaks. The Ramsey RESET test detects omitted variables or incorrect functional form. These tests ensure the ARDL model is valid and reliable.

4.   RESULTS AND DISCUSSION

4.1   Descriptive statistics

Table 3 presents descriptive statistics (mean, median, max, min, standard deviation) for all variables from 1981 to 2023. Nominal GDP averaged RM610,279.30 million, ranging from RM57,602.00 to RM1,821,080.00, with a standard deviation of RM542,346.80, indicating high variability. Emoluments (EMO) had the highest average at RM33,766.80 million, followed by subsidies (SUB) at RM14,259.50 million and debt service charges (DEBT) at RM13,450.90 million, all with notable variation. Economic services (ECO) and social services (SOCIAL) averaged RM12,676.80 million and RM9,323.80 million. General administration (GENERAL), defence and security (defence), and asset acquisition (ASSET) had lower means at RM15,677.10 million, RM3,646.60 million, and RM982.00 million. Other categories like pensions (PENGRA), grants (GRANTS), other expenditures (OTHER), and supplies (SUPP) showed varied averages and standard deviations, with GRANTS averaging RM12,153.70 million and a high deviation of RM16,107.40 million, indicating yearly fluctuations.

Table 3. Descriptive analysis

Variable	Mean	Median	Max	Min	Std. Dev.
GDP	610279.3	383215.0	1821080.0	57602.0	542346.8
GRANTS	12153.7	2125.0	66050.0	283.0	16107.4
GENERAL	1567.7	1567.0	4076.0	118.0	1219.0
EMO	33766.8	20242.0	91860.0	3600.0	29563.6
ECO	16286.8	12433.0	57238.0	3164.0	12215.8
DEFENCE	3646.6	3956.0	11381.0	333.0	2306.4
DEBT	14505.9	9669.0	46331.0	2046.0	11371.2
ASSET	982.0	770.0	2835.0	93.0	773.4
OTHER	8067.5	3702.0	42565.0	800.0	9402.1
PENGRA	9555.8	5134.0	34080.0	585.0	9889.9
SOCIAL	9323.8	10260.0	24247.0	1033.0	6643.9
SUB	14529.5	4552.0	77878.0	271.0	18915.4
SUPP	16025.5	11269.0	36373.0	1929.0	12968.6

Note: Estimation from E-views 13.

4.2   Unit root tests

This research used ADF, PP, and KPSS tests (intercept and trend-intercept) to identify integration orders. ARDL requires variables to be $I(0)$ or $I(1)$, not $I(2)$, so tests were evaluated at the 5% level. At level (intercept), most variables (LGDP, LASSET, LDEFENCE, LECO, LEMO, LDEBT, LGENERAL, LGRANTS, LOTHER, LPENGRA, LSOCIAL, LSUB, LSUPP) were non-stationary based on ADF and PP, while KPSS rejected stationarity. Only LINTEREST was stationary at level ($I(0)$). After first differencing, all variables became stationary except ΔLDEBT. ADF and PP rejected the unit root null for all differenced variables. The final structure has one I(0) variable (LINTEREST), several $I(1)$, and one mixed (LDEBT), meeting ARDL conditions.

Table 4. Unit root tests

Variable	ADF (Intercept)	ADF (Trend and Intercept)	PP (Intercept)	PP (Trend and Intercept)	KPSS (Intercept)	KPSS (Trend and Intercept)
Level						
LGDP	-1.2944 (0)	-0.9951 (0)	-1.3501(2)	-1.0594(1)	0.8174 (5) *	0.1733 (5) *
LASSET	-1.3601 (0)	-1.7611 (0)	-1.3641 (1)	-1.8773 (2)	0.4756 (5) *	0.1603 (5) *
LDEBT	-1.4904 (0)	-2.6833 (0)	-1.2226 (4)	-2.9874 (4)	0.8264 (5) *	0.1314 (4)
LDEFENCE	-0.6649 (0)	-2.4768 (0)	-0.7410 (1)	-2.5583 (1)	0.6575 (5) *	0.0793 (4)
LECO	0.4825 (0)	-3.2762 (0)	0.6282 (3)	-3.2265 (4)	0.7783 (5) *	0.1068 (4)
LEMO	-1.4353 (0)	-1.7677 (0)	-1.5412 (3)	-1.8268 (2)	0.8219 (5) *	0.0951 (4)
LGENERAL	-1.0858 (1)	-2.3946 (0)	-1.3052 (4)	-2.2365 (2)	0.6490 (5) *	0.1580 (5) *
LGRANTS	-1.3181 (0)	-1.9407 (0)	-1.3117 (2)	-2.0511 (3)	0.7567 (5) *	0.1073 (5)
LOTHER	-1.4061 (0)	-1.7764 (0)	-1.3470 (1)	-1.7764 (0)	0.2752 (5)	0.1786 (5) *
LPENGRA	-0.8104 (0)	-1.7561 (0)	-0.8454 (2)	-1.7984 (2)	0.8175 (5) *	0.1427 (5)
LSOCIAL	-0.8256 (0)	-2.2533 (0)	-0.7038 (5)	-2.3595 (2)	0.7079 (5) *	0.1275 (4)
LSUB	-0.1454 (0)	-2.7464 (0)	-0.0567 (2)	-2.7560 (1)	0.7455 (5) *	0.1158 (4)
LSUPP	-1.0373 (0)	-0.9491 (0)	-1.0410 (1)	-0.9612 (1)	0.7871 (5) *	0.1364 (5)
LINTEREST	-6.3437 (0) *	-7.0040 (0) *	-6.4641 (4) *	-7.0085 (4) *	0.4128 (4)	0.1010 (4)
First Differences						
ΔLGDP	-5.9444 (0) *	-6.0844 (0) *	-5.9444 (0) *	-6.0767 (3) *	0.2331 (0)	0.0834 (2)
ΔLASSET	-6.6912 (0) *	-6.6474 (0) *	-6.7033 (1) *	-6.6729 (2) *	0.1024 (1)	0.1009 (1)
ΔLDEBT	-3.9407 (0) *	-3.7196 (0) *	-3.9445 (4) *	-3.7558 (7) *	0.1563 (4)	0.1475 (4) *
ΔLDEFENCE	-5.7876 (0) *	-5.8326 (0) *	-5.7876 (0) *	-5.8326 (0) *	0.1149 (1)	0.0859 (0)
ΔLECO	-6.2870 (0) *	-6.4743 (0) *	-6.2877 (4) *	-6.5115 (5) *	0.2672 (2)	0.1133 (4)
ΔLEMO	-7.1377 (0) *	-7.3694 (0) *	-7.1377 (0) *	-7.3694 (0) *	0.2209 (3)	0.1077 (3)
ΔLGENERAL	-9.4472 (0) *	-9.3409 (0) *	-9.6109 (3) *	-9.5294 (3) *	0.1188 (8)	0.0909 (9)
ΔLGRANTS	-7.3127 (0) *	-7.2363 (0) *	-7.3031 (2) *	-7.2267 (2) *	0.1226 (2)	0.0981 (1)
ΔLOTHER	-7.1476 (0) *	-7.1616 (0) *	-7.1651 (2) *	-7.2323 (3) *	0.1635 (2)	0.0751 (4)
ΔLPENGRA	-6.9925 (0) *	-7.0703 (0) *	-6.9925 (0) *	-7.1063 (2) *	0.1209 (1)	0.0647 (2)
ΔLSOCIAL	-6.2971 (0) *	-6.2487 (0) *	-6.3406 (6) *	-6.2789 (6) *	0.1006 (7)	0.1013 (7)
ΔLSUB	-6.2702 (0) *	-6.3493 (0) *	-6.2740 (2) *	-6.3597 (2) *	0.1840 (2)	0.1193 (3)
ΔLSUPP	-6.3797 (0) *	-6.3851 (0) *	-6.3797 (0) *	-6.3851 (0) *	0.2135 (2)	0.1398 (1)
ΔLINTEREST	-9.3055 (1) *	-9.1733 (1) *	-16.7087 (2) *	-16.4511 (2) *	0.0651 (2)	0.0458 (2)

Note: Asterisks (*) indicate statistically significant at 5 percent level.
Note: Estimation from E-views 13.

4.3   ARDL model results (without crisis dummy)

Bound test

Table 5 shows the ARDL bounds test result with an *F*-statistic of 7.643, exceeding the 10% (1.76-2.77), 5% (2.32-3.04), and 1% (2.66-3.61) bounds. This confirms a long-run relationship between GDP and the variables, allowing further analysis of short and long-run ARDL results.

Table 5. Bound test (without crisis dummy)

Test Summary	Value			
F-statistic	7.643			
Critical Values (Asymptotic)		10%	5%	1%
I(0)		1.76	1.98	2.41
I(1)		2.77	3.04	3.61

Note: Estimation from E-views 13.

Cointegrating relation

Table 6 presents long-run ARDL results, showing several variables significantly affect GDP at the 10% level. LEMO (0.4196), LECO (0.1409), LGENERAL (0.0878), and LPENGRA (0.3815) have positive effects, supported by findings of Yusuf and Mohd (2023) and Zulkifli et al. (2022). LSOCIAL has a negative effect with a coefficient of 0.0495, suggesting inefficiencies. The constant is also positive and significant.

Table 6. Cointegrating relation (without crisis dummy)

Variable	Coefficient	t-Statistic	p-value
LEMO	0.4196	2.2279	0.0344*
LECO	0.1409	2.6476	0.0134*
LGENERAL	0.0878	4.3991	0.0002*
LPENGRA	0.3815	4.6187	0.0001*
LSOCIAL	-0.0495	-2.0929	0.0459*
Constant	3.5211	6.6347	0.0000*

Note: Asterisks (*) indicate statistically significant at 10 percent level.
Note: Estimation from E-views 13.

Error Correction Model (ECM)

Table 7 presents the ARDL error correction model. The error correction term with a coefficient of 1.2757 is statistically significant, showing rapid adjustment. The short-run results show that LGDP (coefficient of 0.5779), LEMO (coefficient of 0.1218), LECO (coefficient of 0.0809), LDEFENCE (coefficient of 0.0704), and LDEBT (coefficient of 0.1683) have positive short-term impact on the GDP. LASSET has a negative effect with a coefficient of 0.0378. LGENERAL, LGRANTS, LOTHER, LPENGRA, and LSUB are all positive, with LOTHER weakly significant. LINTEREST has a negative impact a coefficient of 0.0115 and is used as a control. Result of LECO is aligned with Zulkifli et al. (2022) and Poku et al. (2022).

Table 7. Error Correction Model (ECM) (without crisis dummy)

Variable	Coefficient	t-Statistic	p-value
COINTEQ*	-1.2757	-15.4305	0.0000*
D(LGDP(-1))	0.5779	8.8483	0.0000*
D(LEMO)	0.1218	2.6219	0.0142*
D(LECO)	0.0809	3.1985	0.0035*
D(LDEFENCE)	0.0704	6.0860	0.0000*
D(LDEBT)	0.1683	3.6606	0.0011*
D(LASSET)	-0.0378	-3.9496	0.0005*
D(LGENERAL)	0.0422	5.4411	0.0000*
D(LGRANTS)	0.0405	3.5000	0.0016*
D(LOTHER)	0.0119	1.7374	0.0937*
D(LPENGRA)	0.1592	3.4041	0.0021*
D(LSUB)	0.0243	2.7888	0.0096*
D(LINTEREST)	-0.0115	-4.5932	0.0001*

Note: Asterisks (*) indicate statistically significant at 10 percent level.
Note: Estimation from E-views 13.

Diagnostic tests (without crisis dummy)

Table 8, Figure 4 and Figure 5 show diagnostic tests for the ARDL model without the crisis dummy, all at the 5% level. Jarque-Bera (p = 0.7955) confirms normality. Breusch-Godfrey (p = 0.1523)

shows no serial correlation. Breusch-Pagan-Godfrey (p = 0.5886) indicates constant variance. Ramsey RESET (p = 0.7920) confirms correct model form. CUSUM and CUSUMSQ show stability. Thus, the model is reliable with no diagnostic issues.

Table 8. Diagnostic tests (without crisis dummy)

Diagnostic Tests	F-Statistics (p-value)
Jarque-Bera Normality Test	0.4573 (0.7955)
Breusch-Godfrey Serial Correlation LM Test	2.2442 (0.1523)
Heteroscedasticity Test: Breusch-Pagan-Godfrey	0.9223 (0.5886)
Ramsey RESET Tests	0.0726 (0.7920)
CUSUM Test	Stable
CUSUM of Squares Test	Stable

Note: Asterisks (*) indicate statistically significant at 5 percent level.
Note: Estimation from E-views 13.
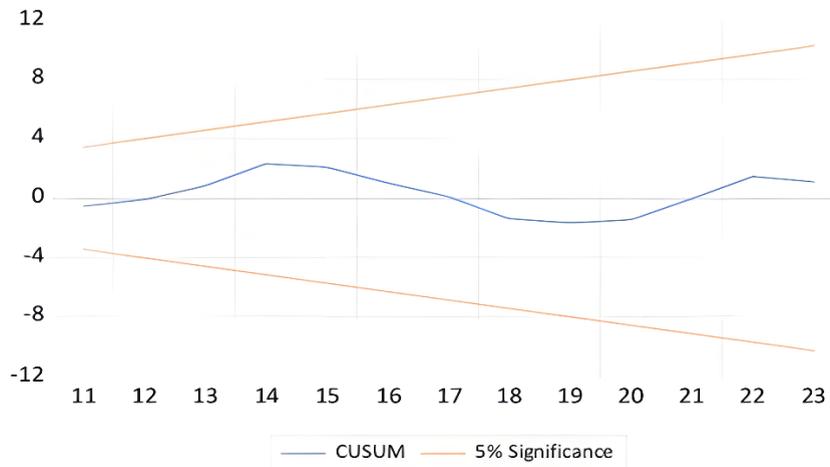
Note: Estimation from E-views 13.
Fig. 4. CUSUM Test (without crisis dummy)
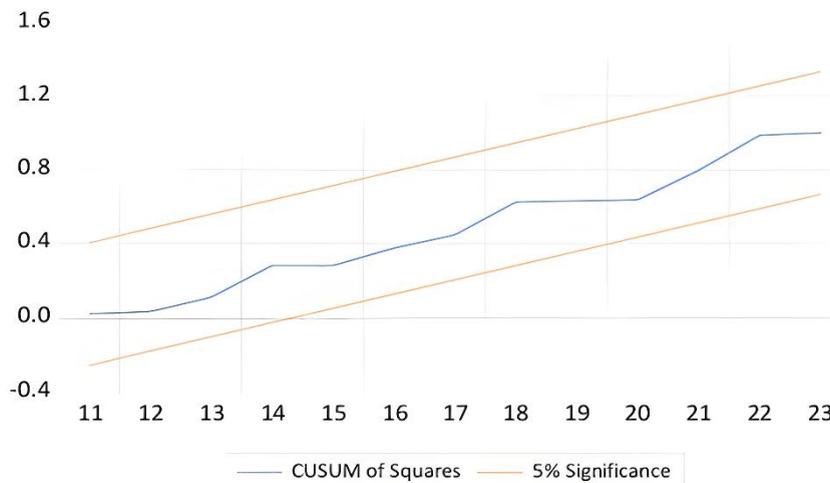
Note: Estimation from E-views 13.
Fig. 5. CUSUM of Square Test (without crisis dummy)

VAR Granger Causality Test (without crisis dummy)

Figure 6 shows Granger causality results at 10% level. LASSET causes LGDP, suggesting asset acquisitions affect output. LDEBT and LSUPP cause LEMO and LDEFENCE, showing spending impacts wages and defence. LGDP causes LECO, growth raises economic spending. LASSET, LOTHER, and LSUB cause LDEBT. LEMO and LDEFENCE cause LGENERAL. LECO and LINTEREST cause LGRANTS (no meaning for LINTEREST). LEMO, LSUB, LSUPP cause LOTHER. LINTEREST also causes LOTHER (control only). LDEFENCE, LDEBT, LASSET cause LPENGRA. LGDP, LGRANTS, LSUB cause LSOCIAL. LECO causes LSUB. Four two-way links exist: LGDP↔LGENERAL, LEMO↔LDEFENCE, LEMO↔LGRANTS, LSOCIAL↔LSUPP, showing strong interconnections.
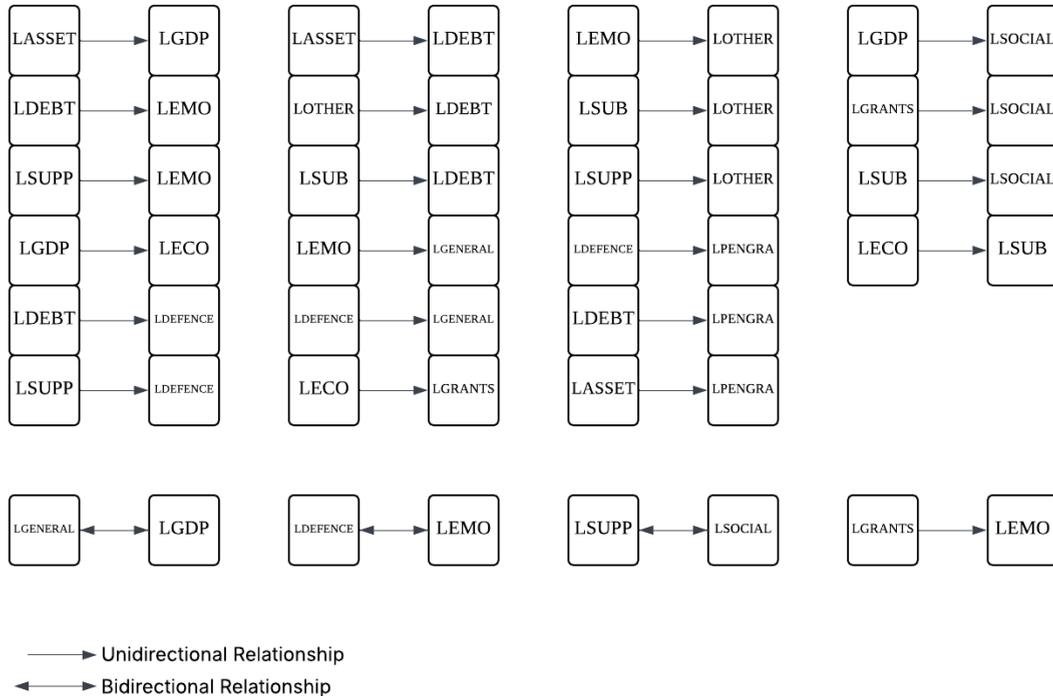

Fig. 6. Causality Type (without crisis dummy)

Impulse response function (without crisis dummy)

Figure 7 shows GDP responses to shocks from public spending using impulse response functions over 50 periods with Cholesky decomposition (95% CI). GDP reacts strongly to its own shock, confirming stability. LEMO causes an initial drop then a steady rise, suggesting wages boost demand. LECO shows a consistent rise, supporting long-term growth. LDEFENCE gives a short-lived small rise. LDEBT causes a quick, stable positive effect, likely from improved trust. LASSET causes a fall then stabilizes, possibly due to delayed returns. LGENERAL and LGRANTS show flat lines, indicating minimal impact. LSOCIAL and LSUB have near-zero effects. LSUPP shows a small, insignificant drop. LPENGRA slowly lifts GDP, implying pensions aid demand. LOTHER causes a fall, then stabilizes, suggesting unclear impact.
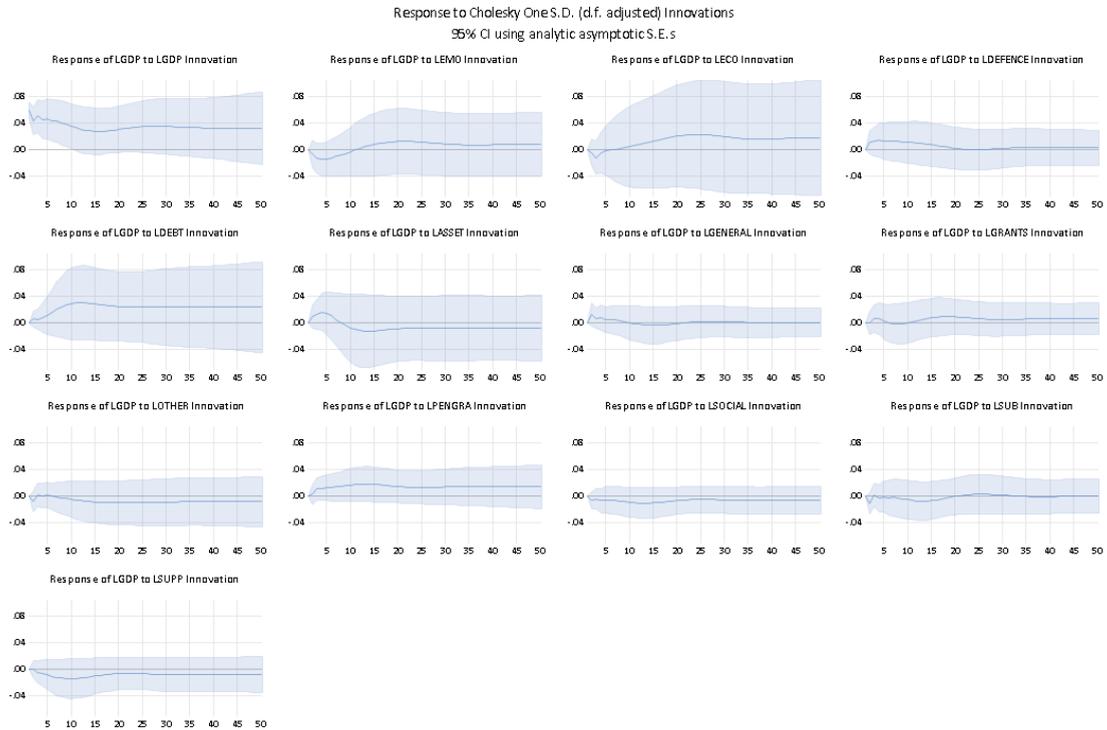
Note: Estimation from E-views 13.

Fig. 7. Impulse response function (without crisis dummy)

Variance decomposition (without crisis dummy)

Table 9 shows variance decomposition results for GDP (△LGDP) over 50 periods. GDP is fully self-explained at period 1 (100%) but drops to 45.37% by period 50, as other factors gain influence. △LDEBT rises from 3.98% to 20.48%, showing strong long-run impact. △LECO grows from 1.40% to 9.33%, indicating development spending supports growth. △LEMO stays stable around 3%. △LASSET rises to 2.93%, showing delayed capital impact. △LPENGRA grows to 7.48%, suggesting pensions boost demand. △LDEFENCE and △LGENERAL decline to 1.63% and 0.36%. △LGRANTS, △LOTHER, and △LSOCIAL rise slowly, peaking at 1.36%, 2.30%, and 1.79%. △LSUB and △LSUPP stay low, peaking at 0.42% and 2.64%. The CU column shows other variables' total share rises to 54.63%, proving public spending's key role in long-run GDP changes.

Table 9. Variance decomposition (without crisis dummy)

Period (Yearly)	Due to Innovation in:													
	ΔLGDP	ΔLEMO	ΔLECO	ΔLDEFENCE	ΔLDEBT	ΔLASSET	ΔLGENERAL	ΔLGRANTS	ΔLOTHER	ΔLPENGRA	ΔLSOCIAL	ΔLSUB	ΔLSUPP	ΔCU
Yearly Relative Variance in: ΔLGDP														
1	**100**	0	0	0	0	0	0	0	0	0	0	0	0	0
4	**77.1787**	3.2394	1.3965	3.9758	0.9991	4.1974	2.2491	0.6332	0.5293	2.0166	0.7545	1.0801	0.3764	21.4241
8	**70.1335**	3.6961	0.7632	4.6403	6.1451	3.5636	1.4887	0.3707	0.3067	4.1274	1.0860	0.6403	2.1724	29.8659
12	**60.7805**	2.6467	0.8909	4.4739	13.3892	3.2291	1.0408	0.2980	0.4988	6.0011	1.6965	0.7964	3.4980	39.2187
20	**49.5293**	2.9430	3.7753	3.3985	18.6499	3.6436	0.7594	1.1827	1.4136	7.5238	2.2089	0.8637	3.2918	50.4671
30	**46.7584**	3.3487	8.0062	2.3002	19.2228	3.2341	0.5507	1.3150	2.0074	7.1739	1.8282	0.6512	2.7328	53.3309
40	**46.1058**	3.0719	8.7249	1.8956	19.9527	3.0333	0.4346	1.3191	2.1764	4.6022	1.8055	0.5075	2.7031	51.1282
50	**45.3663**	3.0017	9.3259	1.6324	20.4817	2.9315	0.3590	1.3608	2.3042	7.4762	1.7864	0.4164	2.6407	54.6331

Notes: The last column provides the percentage of forecast error variances of each variable explained collectively by the other variables. The column in bold represents the impact of their own shock.

Note: Estimation from E-views 13.

4.4   ARDL model results (with crisis dummy)

Bound test

Table 10 shows the ARDL bounds test. The F-statistic is 5.3240. It exceeds the upper bounds at 10% (2.770), 5% (3.040), and 1% (3.610). Thus, the null is rejected at all levels, confirming a long-run relationship among variables.

Table 10. Bound test (with crisis dummy)

Test Summary	Value			
F-statistic	5.3240			
Critical Values (Asymptotic)		10%	5%	1%
I(0)		1.760	1.980	2.410
I(1)		2.770	3.040	3.610

Note: Estimation from E-views 13.

Cointegrating relation

Table 11 shows the long-run ARDL results at the 10% level. LEMO with coefficient of 1.3022 and LGENERAL (with coefficient of 0.1880) have positive impact and are statistically significant. These results are supported by Yusuf and Mohd (2021). SPIKE is negatively and significant (-0.2904, p=0.0475), showing crises reduce GDP. LASSET is weakly positive (0.1069). LSOCIAL (-0.1346) and LSUB (-0.0883) are negative. The constant is 2.0834 (p=0.0793), suggesting stable growth.

Table 11. Cointegrating relation (with crisis dummy)

Variable	Coefficient	*t*-Statistic	*p*-value
LEMO	1.3022	2.7972	0.0094*
LASSET	0.1069	1.7032	0.1000*
LGENERAL	0.1880	3.3128	0.0026*
LSOCIAL	-0.1346	-1.9174	0.0658*
LSUB	-0.0883	-1.7428	0.0927*
SPIKE	-0.2904	-2.0764	0.0475*
Constant	2.0834	1.8235	0.0793*

Note: Asterisks (*) indicate statistically significant at 10 percent level.
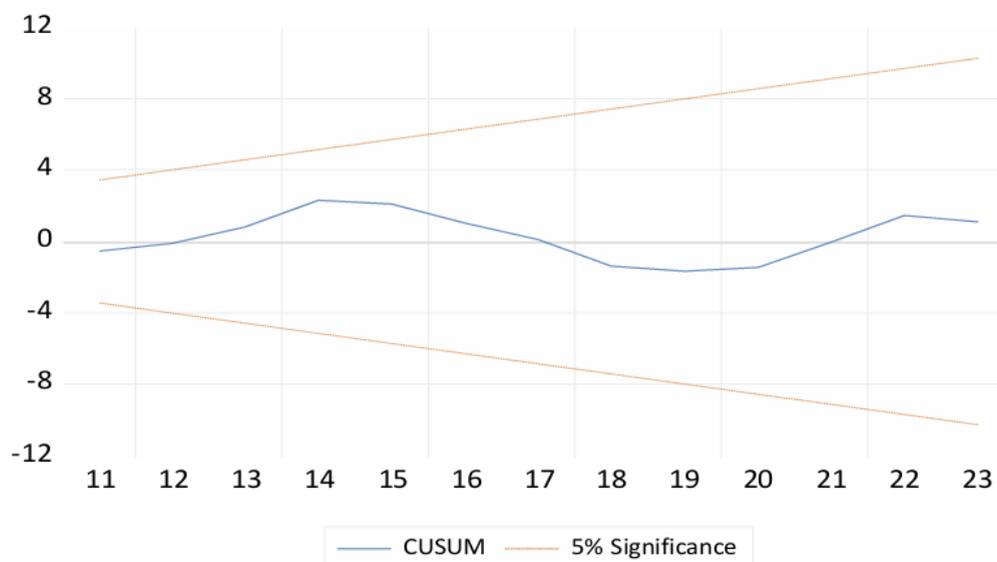Note: Estimation from E-views 13.

Error Correction Model (ECM)

Table 12 shows the ARDL error correction results. COINTEQ is -0.5171 (p=0.0000), meaning 51.71% of short-term gaps are corrected each period. D(LEMO) (0.3709, p=0.0000), D(LDEFENCE) (0.0924, p=0.0000), D(LDEBT) (0.2105, p=0.0003), D(LGENERAL) (0.0333, p=0.0005), and D(LGRANTS) (0.0484, p=0.0003) are positive and significant, showing strong short-run effects. D(SPIKE) is negative (-0.0582, p=0.0000), confirming crises reduce GDP. These findings are align with Senawi and Sulaiman (2020).

Table 12. Error Correction Model (ECM) (with crisis dummy)

Variable	Coefficient	t-Statistic	p-value
COINTEQ	-0.5171	-12.847	0.0000*
D(LEMO)	0.3709	6.886	0.0000*
D(LDEFENCE)	0.0924	5.589	0.0000*
D(LDEBT)	0.2105	4.032	0.0003*
D(LGENERAL)	0.0333	3.915	0.0005*
D(LGRANTS)	0.0484	4.059	0.0003*
D(SPIKE)	-0.0582	-4.864	0.0000*

Note: Asterisks (*) indicate statistically significant at 10 percent level.
Note: Estimation from E-views 13.

Diagnostic tests

Table 13, Figure 8, and Figure 9 show diagnostic results at 5% level. Jarque-Bera (p=0.8286) confirms normality. Breusch-Godfrey (p=0.1500) shows no serial correlation. Breusch-Pagan-Godfrey (p=0.4015) shows no heteroscedasticity. Ramsey RESET (p=0.0614) accepts model form. CUSUM and CUSUMSQ lines stay within bounds, confirming model stability.

Table 13. Diagnostic tests (with crisis dummy)

| Diagnostic Tests	F-Statistics (p-value)
Jarque-Bera Normality Test	0.3759 (0.8286)
Breusch-Godfrey Serial Correlation LM Test	2.1794 (0.1500)
Heteroscedasticity Test: Breusch-Pagan-Godfrey	1.1392 (0.4015)
Ramsey RESET Tests	4.0882 (0.0614)
CUSUM Test	Stable
CUSUM of Squares Test	Stable

Note: Asterisks (*) indicate statistically significant at 5 percent level.
Note: Estimation from E-views 13.

Note: Estimation from E-views 13.

Fig. 8. CUSUM Test (with crisis dummy)
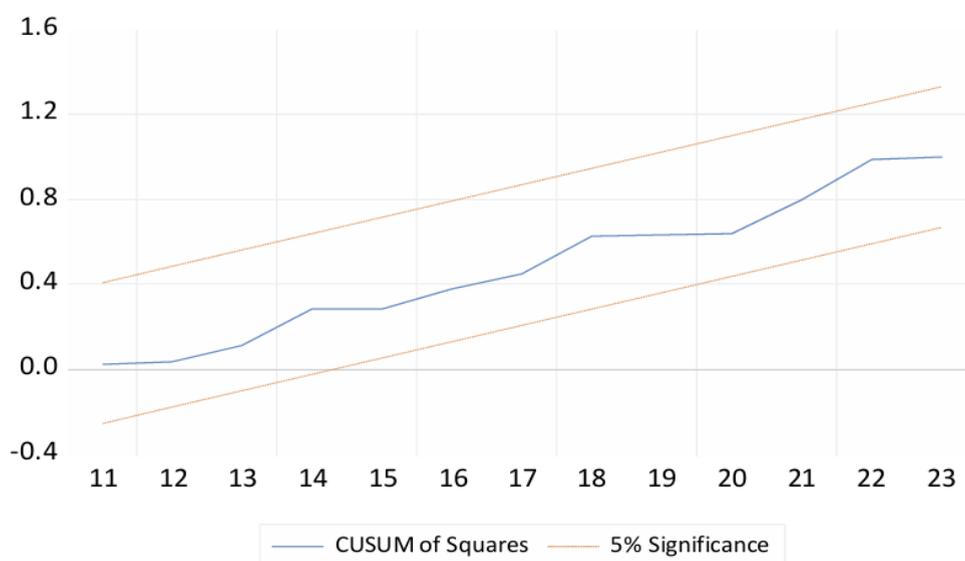
Note: Estimation from E-views 13.

Fig. 9. CUSUM of Square Test (with crisis dummy)

The results have significant theoretical implications for both Keynesian and Wagnerian frameworks. According to Keynesian theory, categories of development expenditure that support activities that increase productivity have larger growth benefits. This means that when the government spends money on strategic sectors, it can boost overall demand and increase productive capacity. This evidence is supported by previous researches indicating that capital and development investment generally fosters economic growth, especially in emerging nations (Zulkifli et al., 2022; Okang et al., 2020; Daniel & Oruta, 2021; Onotaniyohwo & Iyaji, 2020). On the other hand, the findings on operating expenses show that not all types of public expenditures lead to effective multipliers. This result aligns with previous researches indicating that recurrent expenditure may have a detrimental effect on growth (Aluthge et al., 2020; Onifade et al., 2020; Daniel & Oruta, 2021). From the standpoint of Wagner's Law, the fiscal-growth relationship may be regarded as endogenous, with economic performance and crisis affecting the increase of public expenditure. The results align with previous researches that supports Wagner's Law, especially in developing nations (Senawi & Sulaiman, 2020; Adesanya & Bankole, 2024).

VAR Granger Causality Test (with crisis dummy)

Figure 10 shows Granger causality results. Asset acquisitions affect GDP. Debt service charges, grants and transfers, and supplies and services affect emoluments. GDP affects economic services. Debt service charges affect defence and security. Asset acquisitions, other expenditures, and subsidies affect debt service charges. Subsidies affect other expenditures. Defence and security, debt service charges, and asset acquisitions affect pensions. GDP, grants and transfers, and subsidies influence social services. Economic services affect subsidies. Asset acquisitions affect supplies and services. There are mutual effects between GDP and general administration, defence and security and emoluments, and supplies and services and social services.
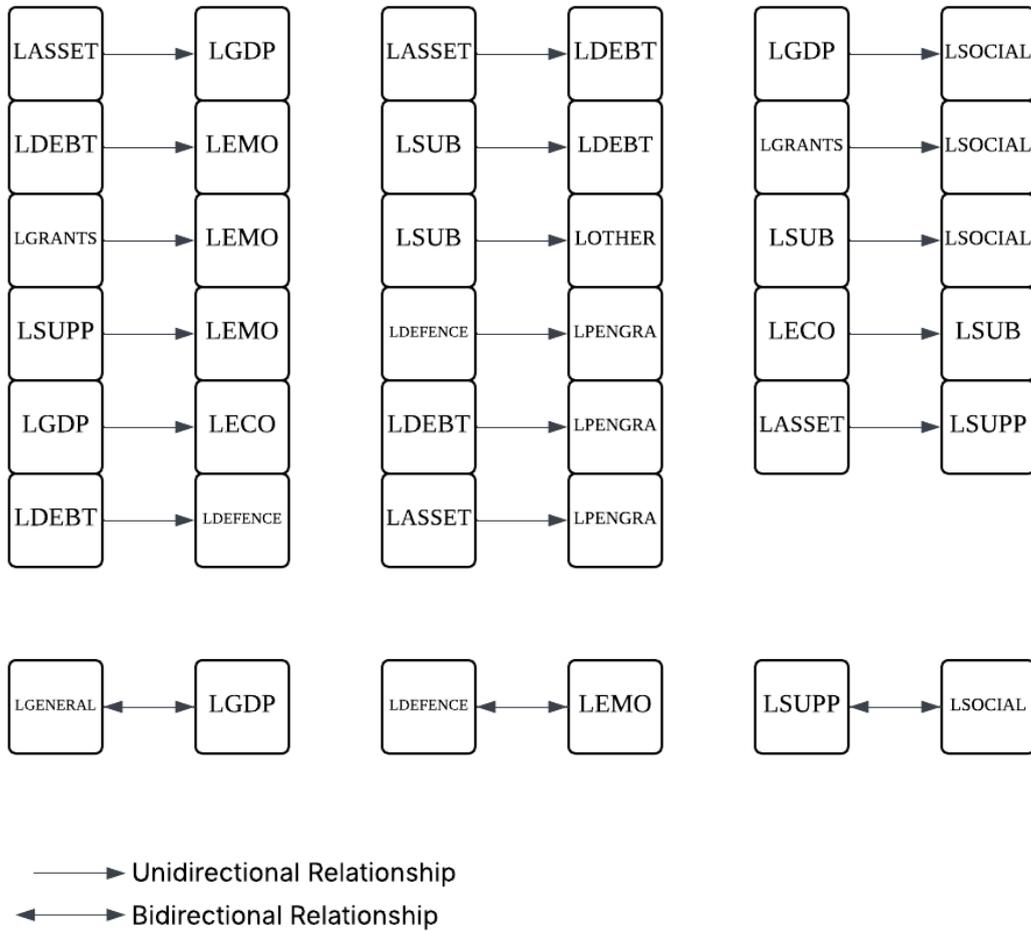
Fig. 10. Causality Type (with crisis dummy)

Impulse response function (with crisis dummy)

In Figure 11, GDP responds to LEMO innovation with a slight early drop, then turns positive and stabilizes from period 20, showing a lasting moderate boost. LECO shocks cause a strong, steadily rising and stable positive impact. LDEFENCE has a mild, consistent positive effect. LDEBT shocks cause a sharp early rise, peaking by period 10, then stabilizing positively. LASSET initially lifts GDP but then suppresses it negatively throughout. LGENERAL has a consistently negative impact, flattening after an early fall. LGRANTS shows a small, steady positive effect. LOTHER is near zero but slightly negative, suggesting a weak negative influence. LPENGRA yields a minor but consistent positive response. LSOCIAL has a lasting, mild negative impact. LSUB causes a brief rebound after a decline but stays negative. LSUPP maintains a stable, slight negative effect. GDP's own shock response is strong and positive, indicating high persistence.

Response to Cholesky One S.D. (d.f. adjusted) Innovations
95% CI using analytic asymptotic S.E.s
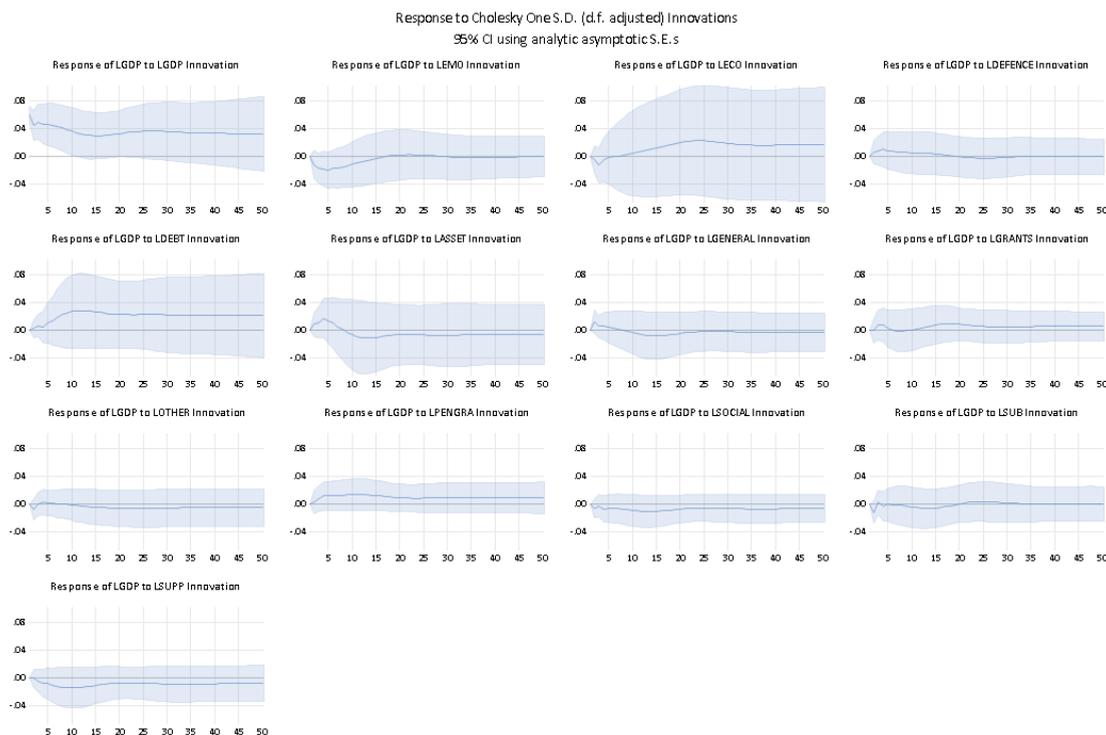
Note: Estimation from E-views 13.
Fig. 11. Impulse response function (with crisis dummy)

Variance decomposition (with crisis dummy)

Table 14 shows LGDP as the dependent variable over periods 1-50. In period 1, the LGDP variation is fully from its own shock. This falls to 78.12% (period 4), 71.58% (period 8), and 52.49% (period 50). LDEBT impact grows from 0.57% (period 4) to 18.80% (period 50), becoming the strongest. LECO rises from 1.58% to 9.90%. LEMO peaks early at 7.82% (period 8), then drops to 2.01%. LPENGRA rises from 1.63% to 4.13%. LASSET declines from 3.83% to 2.39%. LGRANTS grows slightly to 1.30%. LGENERAL drops to 0.74%. LSOCIAL rises to 2.05%. LSUB, LSUPP, and LOTHER remain small but steady. CU grows from 20.42% (period 4) to 46.43% (period 50), showing a rising influence of public spending shocks on GDP.

Table 14. Variance decomposition (with crisis dummy)

Yearly Relative Variance in: ΔLGDP

Period (Yearly)							Due to Innovation in:							
	ΔLGDP	ΔLEMO	ΔLECO	ΔLDEFENCE	ΔLDEBT	ΔLASSET	ΔLGENERAL	ΔLGRANTS	ΔLOTHER	ΔLPENGRA	ΔLSOCIAL	ΔLSUB	ΔLSUPP	ΔCU
1	**100**	0	0	0	0	0	0	0	0	0	0	0	0	0
4	**78.1206**	5.7606	1.5814	1.6010	0.5669	3.8246	1.6309	0.8497	0.4834	1.6291	0.7888	1.1646	0.5367	20.4177
8	**71.5782**	7.8150	0.8446	1.7003	4.9386	3.3092	0.9673	0.4809	0.2659	3.2315	1.1172	0.6453	2.2144	27.5802
12	**63.5741**	6.6842	0.9474	1.4868	11.5695	2.9673	0.8722	0.3839	0.2185	4.3063	1.7660	0.7006	3.6496	35.5553
20	**55.1475**	4.4533	3.9949	1.0767	16.6610	3.0649	1.2643	1.2211	0.5075	4.6839	2.4082	0.7319	3.6954	43.7661
30	**53.3994**	3.0693	8.3980	0.7872	17.5061	2.6643	0.9211	1.2694	0.8426	4.1493	2.0557	0.6001	3.2606	45.5521
40	**52.9617**	2.4209	9.2070	0.6167	18.2689	2.4901	0.8040	1.2688	0.9099	4.1593	2.0605	0.4715	3.2848	45.9614
50	**52.4855**	2.0110	9.8994	0.5115	18.7950	2.3880	0.7375	1.2964	0.9650	4.1317	2.0489	0.3928	3.2545	46.4337

Notes: The last column provides the percentage of forecast error variances of each variable explained collectively by the other variables. The column in bold represents the impact of their own shock.

Note: Estimation from E-views 13.

5.   CONCLUSION

This study examines the long-term and short-term impacts of public expenditure on Malaysia's economic growth from 1981 to 2023, employing the Autoregressive Distributed Lag (ARDL) model. This research integrates both normal and crisis eras, including the 1998 Asian Financial Crisis, the 2009 Global Financial Crisis and the 2020 COVID-19 pandemic, to conduct a dual-period analysis that differentiates the behaviour of fiscal policy under varying macroeconomic conditions. The results indicate that specific elements of public expenditure, including emoluments, economic services and general administration, consistently enhance GDP growth. These domains facilitate institutional stability, infrastructure advancement and governmental functions.

Conversely, expenditures on social services and subsidies frequently exhibit minimal or adverse results, indicating inefficiency and constrained economic production. In times of crisis, remuneration and overall administration are essential for economic stabilization, whereas subsidies lose their effectiveness. The results validate a long-term cointegration between public expenditure and GDP, signifying a persistent link despite economic disturbances. Short-term repercussions are also apparent, particularly from compensation, loan servicing costs and economic services. The findings of this study highlighting the significance of strategic fiscal planning, recommending a reallocation of resources to sectors with shown long-term advantages and reevaluating less influential spending, particularly during economic recessions.

From a policy perspective, the results offer significant direction for fiscal policy of Malaysia, amid increasing operational commitments and limited fiscal capacity. This is due to different types of spending have different effects on economic growth. Fiscal planning should focus on categories that lead to substantial growth productivity. This is prominent for development spending on economic services and strategic public administration capacity. At the same time, spending items that are linked to weak or negative growth outcomes should be looked at again. In practical terms, this means rebalancing the way money is spent by protecting productive development funds and keeping running expenses from growing too quickly. In addition, subsidy programs should be made more efficient by better targeting procedures that cut down on leakage and ensure distribution more efficiently, especially when it comes to protecting disadvantaged people. Malaysia should improve public financial management through outcome-based budgeting, procurement optimization, and better governance to make sure that development funds are used effectively and lead to demonstrable results. This would help public expenditure have the biggest influence on growth. Finally, because debt service charges are getting higher, fiscal policy should make long-term resilience stronger by improving debt sustainability management to keep fiscal space and make the economy less vulnerable to shocks in the future.

6.   CONTRIBUTION OF AUTHORS

Kong Yeong Cheng carried out research, wrote and revised the article. Jerome Kueh Swee Hui supervised research progress.

7.   FUNDING

8.   CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflicts of interest.

9.   ACKNOWLEDGEMENT

10.   REFERENCES

Abdelli, H., Gheraia, Z., Sekrafi, H., & Abid, M. (2024). The asymmetric impact of government expenditure on economic growth: Evidence from a NARDL model. *International Journal of Advanced and Applied Sciences, 11*(3), 92–101. https://doi.org/10.21833/ijaas.2024.03.010

Adesanya, B. M., & Bankole, F. A. (2024). Government expenditure and economic growth nexus: Empirical evidence from the Nigerian economy. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4779681

Ahuja, D., & Pandit, D. (2020). Public expenditure and economic growth: Evidence from the developing countries. *FIIB Business Review, 9*(3), 1–9. https://doi.org/10.1177/2319714520938901

Aisyah, S., Suarmanayasa, I. N., Efendi, B. R. W., & Harsono, I. (2024). The impact of fiscal policy on economic growth: A case study of Indonesia. *Management Studies and Entrepreneurship Journal, 5*(2), 3773–3782. https://journal.yrpipku.com/index.php/msej/article/view/4619

Aluthge, C., Jibir, A., & Musa, A. (2020). Impact of government expenditure on economic growth in Nigeria, 1970–2019. *CBN Journal of Applied Statistics, 11*(2), 139–174. https://dc.cbn.gov.ng/jas/vol11/iss2/6

Assenova, K. (2022). Effectiveness of public spending before and during the COVID-19 pandemic. *Global Economics Science, Special Issue*, 42–49. https://doi.org/10.37256/ges.232021942

Baharuddin, S. S. (2021). The impact of COVID-19 on Malaysian economic performance. *International Journal of Advanced Research in Economics and Finance, 3*(3), 205–218. https://myjms.mohe.gov.my/index.php/ijaref/article/view/15712

Bredino, S., Fiderikumo, P., & Agbarakwe, H. (2022). Public expenditure and economic growth in Nigeria: An empirical analysis. *International Journal of Advanced Academic Research, 8*(11), 180–187. https://www.researchgate.net/publication/365960017_PUBLIC_EXPENDITURE_AND_ECONOMIC_GROWTH_IN_NIGERIA_AN_EMPIRICAL_ANALYSIS

Buthelezi, E. M. (2023). Impact of government expenditure on economic growth in different states in South Africa. *Cogent Economics & Finance, 11*(1), Article 2209959. https://doi.org/10.1080/23322039.2023.2209959

CEIC. (2024). Gross Domestic Product (GDP): Malaysia, 1981–2023 [Data set]. CEIC Data Manager. Retrieved from https://insights-ceicdata-com.remotexs.unimas.my/Name-your-insight/myseries

Daniel, S. U., & Oruta, L. I. (2021). Government expenditure and economic growth in Nigeria: A disaggregated analysis. *Traektoriâ Nauki = Path of Science, 7*(11), 4022–4034. https://doi.org/10.22178/pos.76-6

Department of Statistics Malaysia. (2024). Sektor awam: Statistik sosioekonomi [Data set]. Portal Rasmi Kementerian Ekonomi. Retrieved from https://ekonomi.gov.my/ms/statistik-sosioekonomi/statistik-ekonomi/sektor-awam

El Aissaoui, Z., Dkhissi, A., & Hda, M. (2024). The impact of public spending on economic growth in Morocco from 1960 to 2022: An ARDL bounds approach. *Asian Journal of Economic Modelling, 12*(3), 203–215. https://doi.org/10.55493/5009.v12i3.5168

Emeru, G. M. (2023). Effect of public expenditure on economic growth in the case of Ethiopia. *The Scientific World Journal, 2023*(1), Article 9305196. https://doi.org/10.1155/2023/9305196

Fitriani, N. Y., Roza, F., & Saputra, R. D. (2024). Effect of health spending, grant spending, and taxes on economic growth on Sumatra in 2019–2021. *Proceedings of the 3rd International Conference on Economics, Business, and Management Research (ICEBMR)*, *3*, 579–589. https://e-conf.usd.ac.id/index.php/icebmr/icebmr2024/paper/view/3755

Gebreyesus, S. A. (2022). The impact of government expenditure budget on economic growth in the case of Ethiopia. *Journal of Economic and Social Development, 9*(1), 18–24. https://www.jesd-online.com/dokumenti/upload/separated/JESD_9_1-23-29.pdf

Handayani, J., Lubis, I., & Ginting, R. (2022). Analysis of public consumption, population growth, and government expenditure on the economic growth in North Sumatera Province. *International Journal of Research and Review, 9*(6), 59–67. https://doi.org/10.52403/ijrr.20220609

IMF. (2022). Making debt work for development and macroeconomic stability (PPEA 2022/019). International Monetary Fund. https://www.imf.org/-/media/Files/Publications/PP/2022/English/PPEA2022019.ashx

IMF. (2023). *Fossil Fuel Subsidies.* International Monetary Fund. https://www.imf.org/en/Topics/climate-change/energy-subsidies

Joseph, F. I., Akujor, J. C., Nwankwo, K. C., & Ukangwa, J. U. (2023). Effect of government expenditure and value-added tax on economic growth in Nigeria. *Asian Journal of Economics, Business and Accounting, 23*(16), 25–40. https://doi.org/10.9734/AJEBA/2023/v23i161024

Kim, J., Wang, M., Park, D., & Castillejos Petalcorin, C. (2021). Fiscal policy and economic growth: Some evidence from China. *Review of World Economics, 157*(3), 555–582. https://doi.org/10.1007/s10290-021-00414-5

Le, M. P., & Tran, T. M. (2021). Government education expenditure and economic growth nexus: Empirical evidence from Vietnam. *Journal of Asian Finance, Economics and Business, 8*(7), 413–421. https://doi.org/10.13106/jafeb.2021.vol8.no7.0413

Mai, P. Q. (2023). The impact of government spending on economic growth in Vietnam. *Journal of Finance & Accounting Research, 5*(24), 1–10. https://scholar.dlu.edu.vn/thuvienso/bitstream/DLU123456789/221043/1/CVv266S5A2023005.pdf

Okang, H. O., Ita, A. J., Dunsin, O. M., Ekpo, N. S., & Chike, E. C. (2020). Government capital expenditure and economic growth in Nigeria. *International Journal of Economics and Financial Management, 5*(2), 67–76. https://www.researchgate.net/profile/Asukwo-Joseph-Ita/publication/366327540_Government_Capital_Expenditure_and_Economic_Growth_in_Nigeria/links/64dcca2278e40b48bd4ed4ba/Government-Capital-Expenditure-and-Economic-Growth-in-Nigeria.pdf

Olaoye, O. O., Eluwole, O. O., Aziz, A., & Afolabi, O. O. (2020). Government spending and economic growth in ECOWAS: An asymmetric analysis. *The Journal of Economic Asymmetries, 22*, e00180. https://doi.org/10.1016/j.jeca.2020.e00180

Olayiwola, S. O., Bakare-Aremu, T. A., & Abiodun, S. O. (2021). Public health expenditure and economic growth in Nigeria: Testing of Wagner's hypothesis. *African Journal of Economic Review, 9*(2), 130–150. https://www.ajol.info/index.php/ajer/article/view/205923

Olonite, O. A., Gurowa, S. U., Ibrahim, K. F. A., & Ajewole, J. O. (2021). Public spending and economic growth performance: Evidence from Nigeria. *International Journal of Research - GRANTHAALAYAH, 9*(7), 1–14. https://doi.org/10.29121/granthaalayah.v9.i7.2021.4043

Onifade, S. T., Çevik, S., Erdoğan, S., Asongu, S., & Bekun, F. V. (2020). An empirical retrospect of the impacts of government expenditures on economic growth: New evidence from the Nigerian economy. *Economic Structures, 9*, Article 6. https://doi.org/10.1186/s40008-020-0186-7

Onotaniyohwo, F. O., & Iyaji, D. (2020). Public infrastructure expenditure and economic growth in Nigeria: A test of the Big Push theory. *International Journal of Current Research in the Humanities, 24*, 365–380. https://www.ajol.info/index.php/ijcrh/article/view/259779

Paudel, R. C. (2023). Capital expenditure and economic growth: A disaggregated analysis for Nepal. *Cogent Economics & Finance, 11*(1), Article 2191449. https://doi.org/10.1080/23322039.2023.2191449

Poku, K., Opoku, E., & Ennin, P. A. (2022). The influence of government expenditure on economic growth in Ghana: An ARDL approach. *Cogent Economics & Finance, 10*(1), Article 2160036. https://doi.org/10.1080/23322039.2022.2160036

Popescu, C. C., & Diaconu, L. (Maxim). (2021). Government spending and economic growth: A cointegration analysis on Romania. *Sustainability, 13*(6575), 1–16. https://doi.org/10.3390/su13126575

Rahman, M. A. (2023). The impact of government expenditure on economic growth: A study of SAARC countries. *SSRN Electronic Journal*. https://ssrn.com/abstract=4344848

Sama, M. C., Oumar, S. B., & Ndam, N. L. (2024). Public spending and sustainable economic development. *Studies in Economics and Finance*. https://doi.org/10.1108/SEF-02-2024-0095

Senawi, N. F., & Sulaiman, N. F. C. (2020). The relationship between government expenditure on selected sectors towards economic growth in Malaysia. *Universiti Malaysia Terengganu Journal of Undergraduate Research, 2*(3), 83–92. https://doi.org/10.46754/umtjur.v2i3.169

Sinha, J. K. (2022). Public expenditure for agricultural development and the economic growth of Bihar (1981–2019). *Asian Journal of Economics and Finance, 4*(4), 411–424. https://doi.org/10.47509/AJEF.2022.v04i04.04

Sriningsih, S., Suriadi, I., & Fatimah, S. (2023). Government expenditure according to functions and economic growth in Indonesia. *East Asian Journal of Multidisciplinary Research, 2*(5), 1933–1956. https://doi.org/10.55927/eajmr.v2i5.3957

The Star. (2024, October 21). *Budget 2025: A message of fiscal stability, growth*. The Star. Retrieved from https://www.thestar.com.my/business/business-news/2024/10/21/budget-2025-a-message-of-fiscal-stability-growth

The Star. (2024, September 18). *Measures needed to enhance Malaysia's economic resilience, says economist*. The Star. Retrieved from https://www.thestar.com.my/news/nation/2024/09/18/measures-needed-to-enhance-malaysia039s-economic-resilience-says-economist

UNCTAD. (2023). A world of debt 2024. United Nations Conference on Trade and Development. https://unctad.org/publication/world-of-debt

Yusuf, A. B., Muhammed, S., & Alkali, M. (2023). An empirical investigation of government expenditure on economic growth: Evidence from 1981–2021. *Journal of Arid Zone Economy, 1*(3), 39–51. https://resources.jaze.com.ng/index.php/jaze/article/view/34

Zulkifli, S. A. M., Effendi, N. A., & Shafai, N. A. (2022). The impact of government expenditure on economic growth in Malaysia. *Advances in Business Research International Journal, 8*(1), 21–32. https://ir.uitm.edu.my/id/eprint/49486/

About the Authors

Kong Yeong Cheng, is undergraduate student at Faculty of Economics and Business, Universiti Malaysia Sarawak, specializing in business economics. He can be contacted at kongyeongcheng0625@gmail.com

Jerome Swee Hui Kueh, is Associate Professor at Faculty of Economics and Business, Universiti Malaysia Sarawak, specializing in applied macroeconomics and international economics. He can be contacted at kshjerome@unimas.my