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THE IMPACT OF EDUCATION EXPENDITURE, HEALTH EXPENDITURE, AND FINANCIAL DEVELOPMENT ON ECONOMIC GROWTH IN MALAYSIA

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Abstract:

This study examines the effect of education expenditure, healthcare expenditure, and financial development on economic growth in Malaysia over the period 1991 to 2024, using annual time series data and the Autoregressive Distributed Lag (ARDL) bounds testing approach. The study is motivated by Malaysia's urgent need to allocate constrained fiscal resources effectively as it approaches the World Bank's high-income threshold. The ARDL bounds test confirms a long-run cointegrating relationship among all four variables. Long-run results reveal that healthcare expenditure exerts a significant positive effect on economic growth, consistent with human capital theory. Education expenditure produces a positive but statistically insignificant long-run effect, while financial development yields a significant negative long-run effect, consistent with the "too much finance" hypothesis. The findings provide evidence-based guidance for Malaysian policymakers: ring-fence healthcare expenditure as a long-run growth investment, reform education spending through performance-based budgeting focused on graduate employability and quality outcomes and implement credit quality regulation to redirect private sector credit from speculative and consumption-driven activities toward high-multiplier productive sectors.

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ARDL, Economic Growth, Education Expenditure, Healthcare Expenditure, Financial Development, Malaysia, Time Series Analysis.



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Introduction

Robust economic growth is essential for improving social welfare, as it raises living standards, reduces poverty level, and strengthen a country's capacity to achieve and sustain high-income economic status. Due to its importance, it remains as one of the central objectives for policymakers, particularly in developing nations. Malaysia has transformed from an agricultural-based economy in the 1960s to an upper-middle-income nation today. For Malaysia to become a high-income economy, it is important for the country to sustain its economic growth. Many studies have been conducted to identify the factors that contributes to the economic growth. Among the various factors influencing economic growth, human capital development has attracted significant attention from researchers and extensively examined in the economic literature (Roslan et al., 2025).

Human capital refers to the accumulated knowledge, skills, abilities, and health attributes embodied in individuals that contributes to greater productivity and innovative capacity. Broadly defined as stock of knowledge, skills, and health possessed by individuals, human capital plays a vital role in increasing productivity and fostering innovation (Osiobe, 2019). Education and healthcare represent the two principles avenues through which human capital is developed and enhanced. In Malaysia, the government has consistently prioritised both sectors in its annual budget allocations, which can also be seen through policies such as Compulsory Education Act of 2003, the establishment of the National Higher Education Fund Corporation (PTPTN) in 1997, and heavily subsidised public healthcare while encouraging private sector participation since the 1980s (Zulkofli et al., 2018). Beyond human capital investment, financial development has also been recognised as a potential catalyst for economic expansion. A well-functioning financial system mobilises savings, allocates capital to productive investments, and enables firms to access credit for expansion and innovation (Levine, 1997). In Malaysia, financial sector development has progressed substantially since the 1990s, particularly following the banking consolidation and capital market reforms implemented after the Asian Financial Crisis.

As an upper-middle-income country still working toward the World Bank's high-income threshold, which requires a GNI per capita of at least US\$13,935 and is projected to be reached between 2027 and 2028 (World Bank, 2025), Malaysia must sustain strong and inclusive economic growth while operating under increasingly tight fiscal constraints. Malaysia

experienced varying rates of economic growth in between 1991 to 2024, punctuated by several external shocks, including the Asian Financial Crisis (1997-1998), Global Financial Crisis (2008-2010) and the COVID-19 pandemic (2020-2021). Malaysia's fiscal space has narrowed considerably in recent years, driven by three compounding pressures. First, debt service charges have risen substantially and continue to consume a growing share of government revenue. According to the Ministry of Finance's Fiscal Outlook and Federal Government Revenue Estimates 2026, debt service charges are projected to reach RM58.3 billion in 2026, representing nearly 14% of the total federal budget, up from RM50.5 billion in 2024, reflecting a 15.5% increase over two years (Ministry of Finance Malaysia., 2026). The Public Finance and Fiscal Responsibility Act 2023 (FRA) legally caps Malaysia's federal government debt at 65% of GDP, with a medium-term target of reducing it to 60% of GDP (Ministry of Finance Malaysia., 2026). As of end-June 2025, Malaysia's statutory debt stood at 62.7% of GDP, only 2.3 percentage points below the statutory ceiling, meaning the government has very limited capacity to borrow further to fund new public programmes (The Edge Malaysia, 2025).

Policymakers need reliable empirical evidence to identify which types of public expenditure genuinely contributes to economic growth, so that scarce fiscal resources can be directed toward the most growth-enhancing activities. This is because previous studies resulted in contradictory findings and different conclusions, and using outdated data. If the relationship remains unresolved, government budget allocations may be misguided, either overfunding a variable that does not drive growth or underfunding one that does. Malaysian policymakers currently lack the reliable and comprehensive empirical evidence needed to make informed decisions about how to allocate public resources under fiscal constraint. This is not merely an academic concern. With debt service charges consuming nearly 14% of the federal budget, the FRA limiting borrowing capacity, and operating expenditure absorbing over 80% of Budget 2026, the cost of misallocating public funds is real and significant. The Malaysian government needs to know whether spending on education expenditure, healthcare expenditure, and financial development actually contributes to economic growth, and this study provides that answer using updated data from 1991 to 2024 and a comprehensive combined model.

Due to this, this research is done to achieve three main objectives. The first objective is to examine the effect of education expenditure on economic growth in Malaysia. The second research objective is to examine the effect of healthcare expenditure on economic growth in Malaysia. The third objectives follow with is to examine the effect of financial development on economic growth in Malaysia. This study supports the achievement of SDG 3, which is good health and well-being, SDG 4 on quality education and SDG 8, which supports decent work and economic growth.

The remaining of the paper is structured as follows: the section of literature review to discuss the theoretical and empirical evidence from past studies, research methodology, results and discussions, and finally, the conclusion.

Literature review

This section reviews the theoretical studies and existing literature on the relationship between education expenditure, healthcare expenditure, financial development, and economic growth. This study includes the economic disruption caused by the COVID-19 pandemic in 2020 and 2021 and the subsequent post-pandemic economic recovery from 2022 to 2024. The pandemic

represented an unprecedented shock to Malaysia's economy and public spending patterns, government healthcare expenditure expanded dramatically while education delivery was fundamentally disrupted. These structural changes may have permanently altered the relationships between these variables and economic growth, meaning the findings of previous studies may no longer accurately reflect Malaysia's current economic reality. Policymakers making budget decisions in 2025 and 2026 cannot rely on evidence that ends in 2010 or 2016.

Human Capital Theory

Human capital theory provides the foundational framework for understanding how investments in education and healthcare contribute to economic growth. As summarised by Osiope (2019), the theory posits that individuals acquire skills, knowledge, and health status that enhance their productivity, which in turn translates into higher output and economic growth at the aggregate level. Investments in education, training, and healthcare increase the productive capacity of individuals, similar to how investment in physical capital increases the productive capacity of firms. These investments yield returns over time in the form of higher wages, improved productivity, and greater innovation capacity.

Nelson and Phelps (1965) extended human capital theory by emphasising the role of education in facilitating technological diffusion. They argued that more educated individuals are quicker to adopt new innovations and adapt to technological change. In their theoretical model, the return to education is greater in more technologically progressive economies, and education yields positive externalities beyond private returns. This insight is particularly relevant for developing economies like Malaysia, where technological catch-up is a key driver of growth.

Healthcare is also a critical component of human capital. Bloom et. al. (2001) extended the human capital framework to include health as a fundamental determinant of labour productivity. Healthier workers are physically and mentally more energetic and robust, less likely to be absent from work due to illness, and have stronger incentives to invest in skill development. Their empirical analysis, based on cross-country panel data from 104 countries, found that a one-year improvement in life expectancy contributes to a 4 percent increase in output, confirming that health is a crucial aspect of human capital that has been largely overlooked in previous growth studies (Bloom et. al, 2001).

Supply-Leading Hypothesis

The relationship between financial development and economic growth in this study is grounded in the Supply-Leading Hypothesis, originally proposed by Patrick (1966). Patrick (1966) drew a distinction between two directions of causality between financial development and economic growth. The supply-leading hypothesis posits that the deliberate creation of financial institutions and the expansion of financial services precede and stimulates real economic growth. In other words, a well-developed financial system actively channels resources from savers to productive investors, facilitates risk management, and enables entrepreneurship, thereby driving economic expansion. This is contrasted with the demand-following hypothesis, which suggests that it is economic growth that generates demand for financial services, and the financial sector merely responds passively to the needs of a growing economy.

Economic Growth

Economic growth is widely defined as the increase in the value of goods and services produced by an economy over time. It is most commonly measured using Gross Domestic Product (GDP) or GDP per capita growth in different country contexts (Yahya et al., 2023). Asaleye and Ncanywa (2025) examined sustainable economic growth in South Africa using quarterly data from 1996 to 2023. They found that aggregate human capital had a positive and significant effect on sustainable economic growth. Uddin et.al. (2025) investigated the relationship between physical capital, human capital, and economic growth in BIMSTEC countries from 1990 to 2019 using panel data methods. They found that human capital had a positive and significant effect on economic growth across all model specifications. Bucci et.al. (2025) took a different approach by developing a theoretical model to assess the conditions under which promoting financial literacy, which they treated as a specialized form of human capital, benefits long-run economic growth. Using a discrete-time endogenous growth model calibrated to US economy data from 1950 to 2019, they identified two channels through which human capital affects growth: the "human capital channel" (more human capital increases financial efficiency, incentivizing further human capital accumulation) and the "financial efficiency channel" (financial sector efficiency increases physical capital accumulation). They found that promoting financial literacy becomes growth-enhancing only if the elasticity of financial efficiency with respect to financial literacy exceeds a certain threshold. The study also highlighted that households' failure to internalize the financial literacy externality leads to lower economic growth compared to the social optimum.

Education Expenditure

Education expenditure refers to the federal government's allocation of funds for educational services, including funding for primary, secondary, and tertiary institutions, as well as administration and transfers to students. This study uses the Federal Government Operating Expenditure on Education (in Ringgit Malaysia) as the measure for education expenditure, sourced from the Ministry of Finance Malaysia. A higher value indicates greater government commitment to public education provision.

Several empirical studies have examined the relationship between education expenditure and economic growth in Malaysia, but their findings are not consistent. Hussin et al. (2012) examined the long-run relationship and causality between government expenditure on education and economic growth in Malaysia from 1970 to 2010. Using time series data, they found that education expenditure had a positive and significant long-run effect on economic growth. Zuhairie (2019) examined the impact of healthcare and education on economic growth in Malaysia from 1986 to 2016 using VECM and Granger causality tests. Unlike the two previous studies, the study found that education variables (both public and private primary school enrolment) showed no causal relationship with economic growth in either the short run or long run. Ismeti and Hameli (2026) compared the effect of educational investment on economic growth in Kosovo (a developing economy) and Germany (an advanced economy) using quarterly data from 2010 to 2023. Using Johansen cointegration and VECM, they found that in Kosovo, educational investment had a significant positive effect on economic growth in the long run. Sequeira (2021) examined the relationship between inflation, economic growth, and education expenditure. The study found that education expenditure positively affects economic growth, but this effect can be weakened by high inflation. When inflation is high, the

real value of education spending decreases, reducing its effectiveness in promoting growth. This finding is relevant for Malaysia, where inflation has fluctuated over the study period. This brings to the formation of hypothesis 1:

H1: Education expenditure has a significant effect on economic growth in Malaysia.

Healthcare Expenditure

Healthcare expenditure refers to government spending on health-related services, including preventive care, treatment, and medical administration under public health programmes. This study uses the Federal Government Operating Expenditure on Health (in Ringgit Malaysia) as the measure for healthcare expenditure, sourced from the Ministry of Finance Malaysia. This measure captures the actual allocation of public funds specifically directed toward healthcare by the federal government, making it more reflective of government healthcare policy in Malaysia compared to broader measures that include private spending. A higher value indicates greater government commitment to public healthcare provision. A healthy population is a productive population, and numerous studies have examined the relationship between healthcare expenditure and economic growth.

Zulkofli et al. (2018) investigated the relationship between healthcare expenditure and economic growth in Malaysia from 1971 to 2010. They found that healthcare expenditure had a positive long-run effect on GDP. The effect of healthcare was larger than that of education, meaning that healthcare spending had a stronger impact on economic growth compared to education spending. In the short run, they found bidirectional causality between healthcare expenditure and GDP, meaning that healthcare spending and economic growth influence each other. Esen and Celik Kecili (2022) investigated the effects of health expenditure on economic growth in Turkey from 1975 to 2018. Using time series data, they found a long-run relationship between health expenditure and GDP. They also found that health expenditure influences economic growth in the short run. This means that increases in health spending led to higher economic growth within a short period of time. Penghui et al. (2022) examined the direct and indirect effects of health expenditure on economic growth in China from 2000 to 2017. Using panel data and spatial analysis, they found that health expenditure had a positive direct effect on economic growth. They also found that health expenditure had positive indirect effects (spillover effects), meaning that health spending in one province also benefited economic growth in neighbouring provinces. The study recommended that provinces cooperate to promote the flow of health resources and health human capital across regions. Therefore, hypothesis 2 is:

H2: Healthcare expenditure has a significant effect on economic growth in Malaysia.

Financial Development

Financial development refers to the depth and accessibility of financial institutions and markets in an economy. A well-functioning financial system helps collect savings from households and directs that money to businesses that need it for investment. This allows firms to expand, hire workers, and adopt new technology such as fintech. In the banking sector, fintech improves risk-sharing mechanisms, eradicates debt maturity and financial leverage, and facilitates affordability, mobility, and transaction speed (Roslan et al., 2026). As defined by the World Bank (2023), this study uses domestic credit to the private sector as a percentage of GDP as the

measure for financial development. A higher percentage indicates that more credit is available to private businesses and households, excluding credit to the government and state-owned enterprises.

Zhao and Xia (2025) investigated the impact of financial development on high-quality economic growth in China using data from 31 provinces from 2004 to 2023. They measured financial development as the ratio of bank loans and deposits to regional GDP. They found that financial development had a positive and significant effect on economic growth, with the effect being stronger in eastern regions, and regions with low fiscal support, but was not significant in central and western regions. Qayyum et al. (2025) compared the relationship between financial development and economic growth in India and China from 1980 to 2017. They used three measures: M2/GDP (financial development), M2/M1 (financial innovation), and stock of domestic credit. Their findings showed that in the long run, all three financial variables had negative effects on economic growth for both countries. Isayev (2025) examined the relationship between financial inclusion and economic growth, focusing on the role of non-bank financial services such as microfinance institutions, insurance companies, and investment funds. The study found that financial development, including both bank and non-bank services, plays a positive role in economic growth by improving access to credit for households and small businesses. When more people can access financial services, they can start businesses, buy equipment, and hire workers, leading to higher productivity and growth. Vi et al. (2026) examined the determinants of economic growth in Korea, including the role of financial development. Using ARDL analysis, they found that financial development has a positive effect on economic growth. They also found that financial development works together with energy use, trade openness, and open innovation to promote growth. The study recommended that developing countries should prioritize improving capital market systems and attracting foreign direct investment to strengthen the positive effects of financial development. And finally, hypothesis 3 is:

H3: Financial development has a significant effect on economic growth in Malaysia.

Research Method

This study adopts a causal research design as the research objectives are to examine the effect of education expenditure, healthcare expenditure, and financial development on economic growth in Malaysia. This study also uses a quantitative research approach. Quantitative research involves collecting numerical data and analysing it using statistical methods. The data used in this study are numerical (percentages, growth rates, and ratios), and the analysis is conducted using regression techniques in EViews software. The study uses time series data, which means the data are collected for a single country (Malaysia) over a continuous period of time (1991 to 2024). Time series data are chosen because the study aims to examine how changes in the independent variables affect economic growth in Malaysia over time, rather than comparing across different countries. Time series analysis is also suitable for identifying long-run relationships and patterns that develop over many years.

This study uses secondary data obtained from multiple official sources. Nominal GDP data are obtained from the Department of Statistics Malaysia (DOSM). Healthcare expenditure data are obtained from the Ministry of Finance Malaysia. Education and healthcare expenditure data are obtained from the Ministry of Finance Malaysia, and financial development data are

obtained from the World Bank's World Development Indicators (WDI) database. All sources are reliable and widely used in academic research.

The data cover the period from 1991 to 2024, which gives a total of 34 annual observations. The data are collected on an annual basis, meaning there is one observation for each year. A 34-year period is long enough to capture meaningful economic relationships while working well with the ARDL method used in this study.

The research design follows a structured process. First, data for all four variables are collected from their respective sources for the period 1991 to 2024. Nominal GDP is obtained from Department of Statistics Malaysia (DOSM), education and healthcare expenditure are obtained from the Ministry of Finance Malaysia, and financial development data are obtained from the World Bank. Second, the data are prepared for analysis in EViews, including addressing missing values using the Last Observation Carried Forward (LOCF) method within EViews. Specifically, education expenditure (lnEDU) and healthcare expenditure (lnHEALTH) each had one missing value for the year 2024, the final year of the study period. Since no subsequent observation is available beyond 2024, linear interpolation is inapplicable, and LOCF is adopted as the most appropriate method, whereby the 2023 observed value is carried forward to 2024. The robustness of this treatment is validated by re-estimating the model over the 1991–2023 subsample, which produced consistent results. Natural logarithm transformations were then applied to all four variables using the `genr` command. Third, unit root tests are conducted to determine the order of integration of each variable. Fourth, the ARDL model is estimated, and the optimal lag length is selected using the Akaike Information Criterion (AIC). Fifth, the bounds test is conducted to determine whether cointegration exists. Sixth, the long-run coefficients and short-run error correction model are estimated. Seventh, Granger causality tests are performed to determine the direction of causation. Eighth, diagnostic tests (autocorrelation and heteroskedasticity) are conducted to check whether the model is reliable. Finally, the results are interpreted, and conclusions are drawn.

Variables And Measurements

The following indicators were retrieved for Malaysia for the period 1991 to 2024, as shown in Table 1:

Table 1: Variables and Measurements

Variable	Code	Measurement	Source
Nominal (lnGDPN)	GDPN	Natural Log of Nominal GDP at current prices (RM)	DOSM
Education expenditure (lnEDU)	lnEDU	Natural Log of Federal Government Operating Expenditure on Education (RM)	MOF
Healthcare expenditure (lnHEALTH)	lnHEALTH	Natural Log of Federal Government Operating Expenditure on Health (RM)	MOF

Financial development (lnFIN)	lnFIN	Natural Log of Domestic credit to private sector (% of GDP)	World Bank
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Source: Own Work

Econometric Model Specification

This study uses a multiple linear regression model to examine the effect of education expenditure, healthcare expenditure, and financial development on economic growth in Malaysia. The regression equation is written as follows:

$$\ln \text{GDPN}_t = \beta_0 + \beta_1(\ln \text{EDU}_t) + \beta_2(\ln \text{HEALTH}_t) + \beta_3(\ln \text{FIN}_t) + \varepsilon_t$$

Where:

$\ln \text{GDPN}_t$ = Natural logarithm of Nominal GDP (RM) in year t (dependent variable)

$\ln \text{EDU}_t$ = Natural logarithm of Federal Government Operating Expenditure on Education (RM) in year t

$\ln \text{HEALTH}_t$ = Natural logarithm of Federal Government Operating Expenditure on Health (RM) in year t

$\ln \text{FIN}_t$ = Natural logarithm of financial development (domestic credit to private sector, % of GDP) in year t

β_0 = Constant term (intercept)

$\beta_1, \beta_2, \beta_3$ = Coefficients to be estimated for each independent variable

ε_t = Error term in year t

t = Time period (year), ranging from 1991 to 2024

ARDL Estimation Model

The model will be estimated using the Autoregressive Distributed Lag (ARDL) approach. The ARDL approach is an extension of ordinary least squares (OLS) that includes lagged values of both the dependent and independent variables.

The ARDL model is written as follows:

$$\Delta \ln \text{GDPN}_t = \alpha_0 + \sum \alpha_{1i} \Delta \ln \text{GDPN}_{\{t-i\}} + \sum \alpha_{2i} \Delta \ln \text{EDU}_{\{t-i\}} + \sum \alpha_{3i} \Delta \ln \text{HEALTH}_{\{t-i\}} + \sum \alpha_{4i} \Delta \ln \text{FIN}_{\{t-i\}} + \lambda_1 \ln \text{GDPN}_{\{t-1\}} + \lambda_2 \ln \text{EDU}_{\{t-1\}} + \lambda_3 \ln \text{HEALTH}_{\{t-1\}} + \lambda_4 \ln \text{FIN}_{\{t-1\}} + \varepsilon_t$$

Where:

Δ = the first difference (change from previous year)

Σ = the sum of lagged terms

i = the number of lags (past years included)

λ_1 to λ_4 = coefficients for the level terms (used in the bounds test)

ε_t = the error term

Result and Discussions

This study examined the effect of education expenditure, healthcare expenditure, and financial development on economic growth in Malaysia from 1991 to 2024, using the Autoregressive Distributed Lag (ARDL) bounds testing approach.

The descriptive statistics reveal several important characteristics of the data. For economic growth, $\ln\text{GDPN}$ has a mean of 13.3227 and ranges from a minimum of 11.8140 to a maximum of 14.4742, reflecting Malaysia's steady expansion of nominal GDP over the study period. The relatively large standard deviation of 0.8022 compared to the other variables indicates that nominal GDP experienced more variation over time, which is expected as the economy grew substantially from 1991 to 2024. For education expenditure, $\ln\text{EDU}$ has a mean of 2.9603 and a relatively small standard deviation of 0.1465, suggesting that government education spending as a proportion of total expenditure remained fairly stable throughout the study period without large fluctuations. Similarly, financial development ($\ln\text{FIN}$) has a mean of 4.7698 and the smallest standard deviation of 0.1433, indicating that domestic credit to the private sector as a percentage of GDP was also relatively consistent over time. Healthcare expenditure ($\ln\text{HEALTH}$) shows the highest standard deviation of 0.9686 among the independent variables, suggesting that federal government health spending experienced the most variation over the 34-year period. This may reflect changes in healthcare policy, budget priorities, and the impact of major events such as the COVID-19 pandemic in 2020 and 2021.

All four variables show negative skewness, meaning the distributions are slightly left-skewed, most values are clustered toward the higher end of the range, with a few lower values pulling the tail to the left. The kurtosis values for $\ln\text{GDPN}$, $\ln\text{EDU}$ and $\ln\text{HEALTH}$ are close to 3 or below, suggesting approximately normal distributions. However, $\ln\text{FIN}$ shows a higher kurtosis of 5.2851, indicating a more peaked distribution with heavier tails than normal. This is shown in Table 2 below:

Table 2: Descriptive Statistics

	$\ln\text{GDPN}$	$\ln\text{EDU}$	$\ln\text{HEALTH}$	$\ln\text{FIN}$
Mean	13.3227	2.9603	9.0967	4.7698
Median	13.4425	2.9860	9.2728	4.7713
Maximum	14.4742	3.2544	10.3249	5.0658
Minimum	11.8140	2.6418	7.2882	4.3008
Standard Deviation	0.8022	0.1465	0.9686	0.1433
Skewness	-0.2719	-0.5219	-0.3204	-0.4642
Kurtosis	1.8316	3.2712	1.7272	5.2851
Observation	34	34	34	34

Source: EViews 10 output

Three research objectives (RO1, RO2, RO3) were developed to investigate the individual effects of each independent variable on Nominal GDP. The ARDL bounds test confirmed the existence of a long-run cointegrating relationship among all four variables, with an F-statistic

of 9.4331 exceeding the upper critical bound at the 1% significance level. Table 3 shows the long-run coefficients.

Table 3: Unit Root Test Results

Variable	ADF Level (p)	ADF 1 st Diff (p)	PP Level (p)	PP 1 st Diff (p)	Order
lnGDPN	0.6687	0.0005***	0.5313	0.0000***	I(1)
lnEDU	0.3085	0.0001***	0.3453	0.0000***	I(1)
lnHEALTH	0.0903	0.0005***	0.1105	0.0000***	I(1)
lnFIN	0.6672	0.0862*	0.0253**	0.0000***	I(1)

*Note: *, **, *** denote significance at 10%, 5%, and 1% level respectively. All tests include trend and intercept. ADF lag length selected using AIC with maximum 4 lags. PP bandwidth selected using Newey-West Automatic with Bartlett Kernel. Finite sample critical values from Narayan (2005) used for bounds test.*

Source: Eviews 10 output

Prior to estimating the ARDL model, unit root tests were conducted to confirm the order of integration of all variables. Table 3 presents the results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. All four variables are non-stationary at level but stationary at first difference, confirming integration of order one, I(1). No variable is I(2), satisfying the prerequisite for ARDL bounds testing.

Table 4: ARDL Bounds Test Results

Significance	Lower I (0)	Upper I (1)	F-Statistic	Decision
10%	2.676	3.586	9.4331	Cointegration confirmed
5%	3.272	4.306	9.4331	Cointegration confirmed
2.5%	3.588	4.760	9.4331	Cointegration confirmed
1%	4.614	5.966	9.4331	Cointegration confirmed

Note: k = number of independent variables = 3. Finite sample critical values from Narayan (2005), n = 30.

Source: EViews 10 output

Following confirmation that all variables are I (1), the ARDL bounds test was conducted to determine whether a long-run cointegrating relationship exists. Table 4 presents the bounds test results using Narayan (2005) finite sample critical values for n = 30 and k = 3.

Table 5: Long-Run Coefficients (Levels Equation)

Variable	Coefficient	Std. error	Prob.
C	10.7235	1.7957	0.0000
(lnEDU)	0.0313	0.1543	0.8418

(lnHEALTH)	0.6689***	0.0416	0.0000
(lnFIN)	-0.6694*	0.3498	0.0737

Note: *, **, *** denote significance at 10%, 5%, and 1% level respectively.

Source: EViews 10 output

Table 6 shows the short-run ECM results for all variables:

Table 6: Short-Run ECM Results (Full)

Variable	Coefficient	Std. error	Prob.
CointEq(-1)	-0.6256	0.2254	0.0135
D(LNGDPN(-1))	0.374408	0.225373	0.1161
D(LNEDU)	-0.145856**	0.059674	0.0265
D(LNEDU(-1))	0.081480	0.070746	0.2664
D(LNEDU(-2))	0.083956	0.062807	0.2000
D(LNHEALTH)	0.088685	0.121790	0.4770
D(LNHEALTH(-1))	-0.582838***	0.152544	0.0015
D(LNHEALTH(-2))	-0.595082***	0.121167	0.0002
D(LNHEALTH(-3))	-0.504564***	0.156306	0.0053
D(LNHEALTH(-4))	0.504564***	0.156306	0.0053
D(LNFIN)	-0.510728***	0.146735	0.0031
D(LNFIN(-1))	0.433140**	0.156714	0.0138
D(LNFIN(-2))	-0.201654	0.202913	0.3351
D(LNFIN(-3))	-0.231486*	0.121386	0.0746

Note: Note: *, **, *** denote significance at 10%, 5%, and 1% level respectively. D(.) denotes first difference. (-1), (-2), (-3) denote one-, two- and three-year lags respectively.

Source: EViews 10 output

With respect to RO1, education expenditure (lnEDU) was found to have a positive but statistically insignificant long-run effect on Nominal GDP (coefficient = +0.0313, $p = 0.8418$). H1 is therefore rejected. Although the direction of the coefficient is positive and consistent with human capital theory, the effect is not strong enough to be considered statistically meaningful. In the short run, however, education expenditure showed a significant negative effect (coefficient = -0.1459, $p = 0.0265$), suggesting that the immediate fiscal cost of education spending temporarily reduces GDP before longer-term human capital gains can materialise. The insignificant long-run effect of education expenditure (coefficient = +0.0313, $p = 0.8418$) does not mean education is economically irrelevant. It means that the current structure of Malaysia's education expenditure, dominated by operating costs such as emoluments, administration, and transfers, is not generating measurable returns to GDP growth within the 34-year study period. This finding signals a misallocation problem: Malaysia is spending a substantial share of its budget on education inputs without ensuring that those inputs translate into economically productive outputs. The short-run negative effect of education expenditure in the current year (coefficient = -0.1459, $p = 0.0265$) further confirms that education spending imposes an immediate fiscal cost before any productivity return materialises. This is consistent with human capital theory, the payoff from education accrues over a long and uncertain future horizon, but it also means that simply increasing the education budget under fiscal constraint

is economically unjustifiable without structural reform to improve the productivity of that spending.

With respect to RO2, healthcare expenditure (lnHEALTH) was found to have a positive and highly significant long-run effect on Nominal GDP (coefficient = +0.6689, $p = 0.0000$). H2 is therefore supported. A 1% increase in federal government healthcare expenditure is associated with a 0.6689% increase in Nominal GDP in the long run, representing the strongest and most robust finding of this study. This means that for every 1% increase in federal government healthcare expenditure, Malaysia's Nominal GDP increases by approximately 0.67% in the long run. This confirms that investment in public healthcare strengthens workforce productivity and human capital over time, translating into measurable economic output.

However, the short-run coefficients at lags one, two, and three years are all negative and significant (-0.5828 , -0.5951 , and -0.5046 respectively), indicating that the productivity benefits of healthcare investment take several years to materialise. The contemporaneous coefficient $D(LNHEALTH)$ is positive but statistically insignificant (0.0887 , $p = 0.4770$), suggesting no immediate effect in the current year. This creates a critical fiscal risk: under pressure from rising debt service charges projected at RM58.3 billion in 2026 and an operating expenditure share exceeding 80% of the total federal budget, policymakers may be tempted to cut healthcare allocations in the short run to achieve fiscal consolidation targets. The empirical evidence from this study strongly warns against this. Short-run cuts to healthcare expenditure will suppress GDP growth in the medium term precisely when Malaysia is attempting to cross the World Bank high-income threshold.

With respect to RO3, financial development (lnFIN) was found to have a negative long-run effect on Nominal GDP (coefficient = -0.6694 , $p = 0.0737$). This result is borderline significant at the 10% level only and does not meet the conventional 5% significance threshold. H3 is therefore weakly supported at the 10% significance level and should be interpreted with caution. The negative direction, while contrary to the Supply-Leading Hypothesis, is consistent with the "too much finance" phenomenon, whereby excessive private sector credit expansion fuels consumption and speculative activity rather than productive investment. In the short run, financial development showed a significant negative effect in the current year (coefficient = -0.5107 , $p = 0.0031$) that partially reversed in the following year (coefficient = $+0.4331$, $p = 0.0138$).

The significant negative long-run effect of financial development on Nominal GDP (coefficient = -0.6694 , $p = 0.0737$) points to a structural misalignment in how private sector credit in Malaysia is being allocated. Domestic credit to the private sector as a percentage of GDP ranged between approximately 69% and 158% over the study period, which is exceptionally high by regional and emerging economy standards. The empirical evidence suggests that this credit expansion has not translated into proportionate GDP growth, consistent with the "too much finance" hypothesis documented by Qayyum et al. (2025) and the broader finance-growth literature, which finds that beyond a threshold level, additional credit fuels consumption, property speculation, and financial sector rent-seeking rather than productive capital formation.

To validate the reliability of the ARDL model, a battery of diagnostic and stability tests was conducted. Table 6 presents the results.

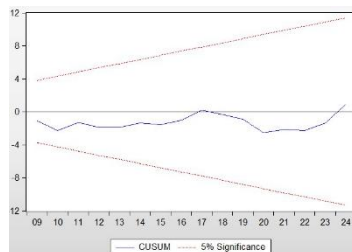
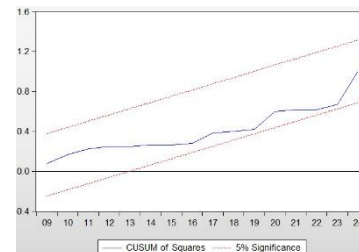
Table 7: Diagnostic and Stability Tests

Test	Statistic	p-value	Decision
Serial Correlation (BG-LM, 2 lags)	F = 0.0900	0.9145	No serial correlation
Heteroskedasticity (BPG)	F = 1.1125	0.4141	Homoskedasticity confirmed
Normality (Jarque-Bera)	JB = 0.5169	0.7722	Residuals are normally distributed
Functional Form (Ramsey RESET)	F = 1.4661	0.2447	No functional form misspecification
CUSUM	—	—	Within 5% bounds
CUSUM of Squares	—	—	Within 5% bounds

Note: BG-LM = Breusch-Godfrey Serial Correlation LM Test. BPG = Breusch-Pagan-Godfrey Heteroskedasticity Test. CUSUM and CUSUM of Squares confirm parameter stability throughout 1991–2024.

Source: EViews 10 output

The Jarque-Bera normality test produces a statistic of 0.5169 with a probability of 0.7722, confirming that the null hypothesis of normally distributed residuals is not rejected. The Ramsey RESET test yields an F-statistic of 1.4661 with a probability of 0.2447, confirming that the null hypothesis of correct functional form is not rejected. Together, these results indicate that the ARDL model residuals are normally distributed and that the linear log-log specification is appropriate, with no evidence of omitted non-linear terms or functional form misspecification.

**Figure 1: CUSUM Test****Figure 2: CUSUM of Squares Test**

Source: EViews 10 output

The CUSUM test shows the cumulative sum of recursive residuals remaining within the two critical boundary lines at the 5% significance level throughout the entire sample period from 1995 to 2024. The null hypothesis of parameter stability is therefore not rejected. This confirms that the ARDL model coefficients are stable over time and that no structural break is detected in the data despite major economic shocks including the Asian Financial Crisis (1997–1998), the Global Financial Crisis (2008–2009), and the COVID-19 pandemic (2020–2021).

The CUSUM of Squares test shows the cumulative sum of squared recursive residuals remaining within the two critical boundary lines at the 5% significance level throughout the entire sample period. The null hypothesis of variance stability is therefore not rejected. This

confirms that the residual variance of the ARDL model remains stable over time, providing additional evidence of structural stability and model robustness.

As a robustness check, the ARDL model was re-estimated over the shortened sample period 1991 to 2023, excluding the final year in which missing values for education and healthcare expenditure were addressed using the Last Observation Carried Forward (LOCF) method. The AIC selected ARDL (4, 1, 4, 3) as the optimal specification for the shortened sample over 29 usable observations. The bounds test produced an F-statistic of 11.7623, substantially exceeding the upper critical bound of 5.966 at the 1% significance level, confirming cointegration. The long-run coefficients retained their directional signs and significance: healthcare expenditure remained positive and highly significant ($\beta = 0.7319$, $p = 0.0000$), education expenditure remained statistically insignificant ($\beta = -0.0011$, $p = 0.9860$), and financial development remained negative and significant ($\beta = -0.3167$, $p = 0.0266$). The error correction term of -1.0760 ($p = 0.0006$) confirms rapid adjustment back to long-run equilibrium. These results confirm that the core findings of the main model are not driven by the LOCF-estimated 2024 observation and are robust to the exclusion of that data point.

Conclusion

The ARDL bounds test confirmed the existence of a long-run cointegrating relationship among all four variables, the economic growth, healthcare expenditure, education expenditure and financial development. The empirical results reveal that healthcare expenditure is the most important and reliable driver of long-run economic growth among the variables examined. A 1% increase in federal government healthcare expenditure is associated with a 0.6689% increase in Nominal GDP in the long run, a finding that is statistically highly significant and consistent with human capital theory. This finding confirms that a healthy workforce is a productive workforce, and that Malaysia's sustained investment in public healthcare from 1991 to 2024 has made a meaningful contribution to its economic performance. Policymakers should ring-fence healthcare allocations within a dedicated multi-year spending envelope under the Medium-Term Fiscal Framework, with spending reoriented toward preventive care, rural healthcare infrastructure, and digital health systems to maximise long-run GDP multiplier effects.

Education expenditure, on the other hand, does not show a statistically significant long-run effect on Nominal GDP in this study, leading to the rejection of H1. While this does not diminish the importance of education as a social priority, it signals a misallocation problem: the current structure of education spending, dominated by recurrent operating costs, is not generating measurable GDP returns. Policymakers should shift toward performance-based budgeting that links allocations to graduate employment outcomes and redirects resources toward TVET and STEM programmes aligned with the New Industrial Master Plan 2030.

Financial development is found to have a significant but negative long-run effect on economic growth, consistent with the "too much finance" argument. This finding suggests that the Malaysian financial system, despite its depth and development, may be channelling a disproportionate share of credit toward consumption and property rather than productive investment. Structural reforms are needed to improve the productive quality of credit allocation: Bank Negara Malaysia should strengthen macroprudential tools to moderate credit in low-multiplier sectors such as speculative property and consumer financing, establish

targeted incentive frameworks to direct lending toward SMEs and high-multiplier industries, and deepen capital markets as alternative long-term financing channels to reduce the economy's over-reliance on bank credit.

However, this study has several limitations that should be acknowledged. First, the study is constrained by a relatively small sample size of 34 annual observations covering the period 1991 to 2024. Time series analyses based on small samples may yield less precise coefficient estimates and reduce the statistical power of tests such as the Granger causality test. Second, the study relies solely on annual data, which may not capture the full dynamics and short-run adjustments that occur within a given year. Economic policy responses and their effects on GDP can unfold at quarterly or even monthly frequencies. The use of quarterly data, if available and consistent for all four variables over the entire study period, could provide more precise estimates of the short-run dynamics and a more reliable Granger causality analysis. Third, the choice of proxies for each variable introduces measurement limitations. Domestic credit to the private sector as a percentage of GDP is a commonly used but imperfect proxy for financial development, as it measures credit quantity rather than the quality, efficiency, or direction of financial intermediation. Similarly, federal government operating expenditure on education and healthcare captures government spending but does not directly measure the quality of education delivered or health outcomes achieved. Future studies could consider alternative proxies such as health-adjusted life years (HALYs) or the Human Capital Index for a more refined measurement. Fourth, this study uses a single-country time series design, which limits the generalisability of findings to other countries or regions. The specific institutional, political, and structural characteristics of Malaysia, such as its particular mix of public and private healthcare, the composition of its financial sector, and its education funding priorities, may influence the findings in ways that are not replicable in other development contexts. Cross-country panel studies that compare Malaysia with similar economies in Southeast Asia could provide broader insights.

Overall, this study contributes to the empirical literature on the determinants of economic growth in Malaysia by providing updated and comprehensive evidence covering a 34-year period that includes major economic shocks such as the Asian Financial Crisis, the Global Financial Crisis, and the COVID-19 pandemic. The findings offer actionable insights for Malaysian policymakers seeking to optimise government spending and financial sector policy to support sustained and inclusive economic growth. Future research incorporating quarterly data, additional financial development proxies, non-linear methods, and institutional quality variables could further deepen the understanding of these relationships.

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