



THE IMPACT OF MONEY SUPPLY ON ECONOMIC GROWTH IN MALAYSIA: EXAMINING THE MODERATING ROLE OF FINANCIAL DEVELOPMENT USING AN ARDL BOUNDS TESTING APPROACH

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ABSTRACT

This paper examines the dynamic relationship between money supply, financial development, and economic growth in Malaysia using annual data from 2000 to 2023. Applying the Autoregressive Distributed Lag (ARDL) Bounds Testing approach, the study evaluates the effects of broad money (M2), domestic credit to the private sector (DCPS), and their interaction term (M2×DCPS) to determine the moderating role of financial development in the money–growth nexus. The study reveals evidence of long-run cointegration among the variables, indicating a stable long-run equilibrium. The findings further show that both M2 and DCPS exert significant positive effects on real GDP, while the interaction term is also positive, suggesting that financial development enhances the transmission of monetary expansion to the real economy. The evidence also indicates that inflation and trade openness inhibit growth, whereas government expenditure contributes positively to economic performance. Diagnostic and stability tests (CUSUM and CUSUMSQ) confirm the robustness of the estimated model. These results imply that monetary expansion can effectively stimulate economic activity when supported by a well-developed financial sector. Policy implications highlight the importance of strengthening financial intermediation, improving credit allocation efficiency, and aligning monetary operations with financial-sector reforms to sustain Malaysia’s long-term economic performance.

Keywords: Money Supply; Financial Development; Economic Growth; ARDL Bounds Testing; Credit Creation

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INTRODUCTION

The relationship between money supply and economic growth continues to be a central concern in macroeconomic policy, especially in developing economies such as Malaysia. Although classical and monetarist perspectives argue that monetary expansion stimulates aggregate demand, investment, and output growth (Friedman, 1956; Fisher, 1911), the effectiveness of this transmission mechanism depends heavily on the strength of a country's financial system. Financial development enhances the ability of intermediaries to mobilize savings, allocate credit efficiently, and support productive investment, thereby shaping how monetary impulses influence real economic activity (McKinnon, 1973; Levine, 1997). In Malaysia, despite the implementation of progressive financial reforms including monetary liberalisation, digital financial innovation, capital market strengthening, and financial inclusion policies the link between money supply and economic growth remains empirically uncertain.

Malaysia presents an interesting case for this investigation due to the evolution of its dual banking system, stable macroeconomic management, and rapid financial digitalisation under Bank Negara Malaysia (BNM). From 2000–2023, the country recorded an average annual GDP growth of 4.5%, accompanied by consistent expansion in broad money (M2). Yet, empirical studies on Malaysia report mixed results. Some scholars argue that monetary expansion promotes growth by increasing credit availability (Choong et al., 2005; Lee & Brahmama, 2013), while others note that structural inefficiencies may weaken long-run effects (Majid, 2008). Major economic disruptions including the 1997–98 Asian Financial Crisis, the 2008 Global Financial Crisis, and the COVID-19 pandemic have also altered monetary–fiscal interactions and affected policy responsiveness. These inconsistencies highlight a key policy issue: despite stable monetary conditions, expansionary measures do not always produce proportional increases in real output, suggesting bottlenecks within the financial transmission process.

Against this backdrop, the present study aims to examine how Malaysia's money supply influences economic growth and whether financial development alters the strength of this relationship. Specifically, the study pursues three objectives: (i) to determine whether broad money (M2) significantly impacts Malaysia's real GDP; (ii) to evaluate the independent effect of financial development proxied by domestic credit to the private sector on economic growth; and (iii) to assess whether financial development moderates the money supply–growth relationship, indicating whether deeper financial intermediation enhances the effectiveness of monetary expansion. These objectives are motivated by persistent uncertainties surrounding Malaysia's monetary transmission mechanism and the role of financial system maturity in shaping growth outcomes.

To achieve these objectives, the study employs the Autoregressive Distributed Lag (ARDL) Bounds Testing Approach (Pesaran, Shin, & Smith, 2001) using annual data from 2000–2023. This method is particularly suitable for small-sample time-series analysis and for examining both short-run dynamics and long-run equilibrium relationships among variables with mixed integration orders (I (0) and I (1)). The dataset includes real GDP, broad money (M2), domestic credit to the private sector, real interest rates, inflation, foreign direct investment, government expenditure, and trade openness, sourced from the World Bank (WDI), IMF (IFS), and Bank Negara Malaysia.

The anticipated findings of this study are threefold. First, money supply is expected to exert a positive long-run effect on economic growth, consistent with monetarist predictions and earlier empirical evidence. Second, financial development is expected to enhance economic performance through improved capital allocation and lower transaction costs. Third, the moderating analysis is expected to show that financial development strengthens the money





supply–growth nexus, implying that the effectiveness of monetary policy improves as the financial system deepens.

This study contributes to the literature in several significant ways. It provides updated empirical evidence incorporating recent periods of financial digitalisation and regulatory transformation, addressing gaps in earlier studies that relied on outdated data. It expands the finance–growth literature by explicitly modelling the moderating effect of financial development on the money–growth relationship, an area rarely examined in the Malaysian context. Methodologically, it employs a dynamic econometric framework that captures both short-run adjustments and long-run relationships, offering more comprehensive insights for policymakers. Finally, the findings are expected to offer actionable implications for Malaysia’s monetary and financial authorities in strengthening the transmission of monetary policy.

The remainder of this paper is organised as follows. Section 2 reviews the theoretical foundations and empirical literature on money supply, financial development, and economic growth. Section 3 outlines the research methodology, data sources, and variable definitions. Section 4 presents the empirical results and discussion. Section 5 concludes with policy implications and recommendations for future research.

LITERATURE REVIEW

The classical Quantity Theory of Money (QTM) is one of the core ideas of monetary theory, and it stems from the relationship between the money supply and economic growth. According to QTM, which may be represented symbolically as $M \times V = P \times Y$, where M is the money supply, V is the money velocity, P is the price level, and Y is the actual output: any increase in M , assuming a stable V and Y , will lead to a corresponding increase in the price level. Monetarist economists, especially Friedman (1956), have reaffirmed that increasing the money stock has strong and quick impact effects on nominal output and inflation because they change mostly in the short run, during which output is under capacity.

However, the application of QTM for growth is qualified: most empiricists would say that changes in money supply ultimately affect prices rather than output unless there exist structural elements in the economy, such as financial deepening or robustness of institutions, which provide a channel through which monetary extension leads to successful investment. The notion is powerful in developing countries like Malaysia, where institutional behaviour and the expansion of the financial sector affect the transmission of monetary policy because they allow monetary theory to be conjoined with growth frameworks.

Unlike the monetary view, the finance-led growth approach posits that financial development nurtures economic growth through, among others, fostering innovation, lowering transaction and information costs, mobilizing savings, and improving capital allocation (Levine, 1997). Empirical assessments have shown that investment and productivity growth tend to be stronger in economies characterized by deeper and more efficient financial intermediation (Gizaw, 2024). A few studies across emerging market economies found that credit growth, being a significant factor for economic growth, was strongly affected by macroeconomic variables like GDP growth and inflation, the stability of the banking sector, and domestic and foreign funding (Stepanyan & Guo, 2011).

Studies indexed to Malaysia’s financial market development such as Choong et al. (2005) give good indicators of strong positive correlation with economic growth. Majid (2008) employs ARDL bounds testing to show that domestic banks’ lending eventually stimulates Malaysia’s GDP growth. These results offer support to the idea that an important aspect to generate savings into profitable investments and transmit monetary policy into real economic





impacts is financial sector development. Even though studies upon the nexus of money supply growth or the financial development-growth relationship are well articulated in the literature, the moderating effect of financial development on the money supply-growth linkage has attracted less concern. The basis for moderation is the notion that the strength of the financial system plays an important role in the transmission of monetary policy. In layman's terms, when financial institutions and markets are underdeveloped, an increase in money supply may lead to inflation or asset bubbles, rather than promoting investments and output (McKinnon, 1973; Shaw, 1973). On the other hand, with a well-developed financial system, liquidity finds it much easier to enter productive sectors thus enhancing the growth effects of the money supply.

This conditional concept is supported by recent studies. An influence in favor of long-term economic development arising from the globalization process, which involves trade openness and financial inclusion, emerges, for example, from a study of 27 Asian countries, with this openness-growth relationship being moderated by financial infrastructure (Saha, 2025). Although the need for moderating analysis is emphasized without mentioning the money supply, this cannot be said for this study. Furthermore, AlHarbi et al. (2024) examine the relationship between growth and banking deposits and the money supply and find that the strength of the banking system importantly affects the degree to which monetary expansions impact real activity. Thus, it is still pertinent to ask whether, in the context of Malaysia, broad money (M2) has more impact on GDP when financial development (such as domestic credit to the private sector) is high.

The money supply-growth and financial development-growth relationships in Malaysia have been the subject of opposing empirical research. Suid (2021) finds little evidence of a long-term association between Malaysia's money supply and economic activity, despite the fact that economic growth has a significant short-term impact on money supply. This suggests that there might be transmission inefficiencies or underlying problems with the monetary system. For instance, Lee and Brahmana 2013 provide a nexus on growth, financial development, and monetary policy-effect on the growth outcomes concerning the gutter and monetary expansion's effect. Nevertheless, research may not have ventured deeply into systematic moderation and covering the tri-concept of money supply, financial development, and growth under ARDL. It is, therefore, this gap that boosts theory as well as policy in a dynamic environment like Malaysia, which has seen rapid banking sector changes since 2000.

METHODOLOGY

This investigation studies the causal dynamics of money supply, financial development, and economic growth in Malaysia from 2000 to 2023 using quantitative time-series design. A quantitative approach is conducive to measurable indicators and econometric modeling, which ascertains the short-term and long-term relationship among the variables. This is grounded on the Autoregressive Distributed Lag (ARDL) Bounds Testing Approach developed by Pesaran, Shin, and Smith (2001) and widely used in applied macroeconomic research. The ARDL approach is highly favorable where sample sizes are small and variables are of mixed orders $I(0)$ and $I(1)$ but not $I(2)$ (Narayan, 2005).

The ARDL method enables simultaneous computation of short-run adjustments with long-run equilibria in an error correction model. It's used to capture both short- and long-term dynamics due to the structural changes, financial liberalization and digitization that Malaysia has undergone. In addition, the model allows for interaction terms, what will be used in this study to analyze the influence of financial development on the growth-money supply nexus."





The period encompasses the recovery from the post-Asian crisis, the global financial crisis of 2008, and the growth of the banking industry in the digital age. Annual secondary data for Malaysia from 2000 to 2023 are analyzed. Three trustworthy and publicly available databases were used to compile the data: (i) the World Bank's World Development Indicators (WDI, 2024) for macroeconomic and financial variables; (ii) the International Monetary Fund (IMF, 2024) for real interest rate data; and (iii) the Bank Negara Malaysia Statistical Bulletin (2023) for domestic credit and monetary aggregates. All variables, with the exception of percentage variables like inflation and interest rates, were converted to natural logarithms to guarantee comparability. By reducing heteroscedasticity, logarithmic transformation makes it possible to understand coefficients as elasticities.

The primary independent variable is broad money (M2) as a proportion of GDP, while the dependent variable is real gross domestic product (GDP in constant 2015 US\$). Domestic credit to the private sector (DCPS), which represents the level of financial intermediation, is used to gauge financial development as a percentage of GDP. An interaction term between M2 and DCPS is created in order to investigate the moderating effect. Inflation (annual%), real interest rate (%), foreign direct investment (FDI% of GDP), government spending (% of GDP), and trade openness (exports + imports)/GDP are other control variables. These controls take into consideration the macroeconomic and policy variables that affect growth. Prior to estimation, every variable was examined for completeness and consistency.

To investigate how Malaysia's money supply and economic growth are related, paying particular attention to how financial development affects this relationship. The following is an expression for the model specification in the relationship's functional form:

$$LGDP_t = f(LM2_t, LDCPS_t, (LM2_t \times LDCPS_t), INF_t, RIR_t, FDI_t, GE_t) \quad (1)$$

This specification follows the ARDL modeling structure developed by Pesaran and Shin (1995) and refined by Pesaran et al. (2001), where the dependent variable depends on its own past values and the lagged values of explanatory variables. $LGDP_t$ denotes the log of real GDP, $LM2_t$ is log broad money, $LDCPS_t$ is log domestic credit to the private sector as a proxy for financial development. The inclusion of the interaction term $LM2_t \times LDCPS_t$ captures the moderating effect of financial development on money supply. The remaining variables represent macroeconomic controls. Following Pesaran et al. (2001), the general ARDL (p, q_1, \dots, q_8) model is specified as

$$\begin{aligned} \Delta LGDP_t = & \alpha_0 + \sum_{i=1}^p \beta_i \Delta LGDP_{t-i} + \sum_{i=1}^{q_1} \gamma_i \Delta LM2_{t-i} + \sum_{i=1}^{q_2} \gamma_i \Delta DCPS_{t-i} + \sum_{i=1}^{q_3} \delta_i \Delta (LM2_{t-i} \times \\ & + LDCPS_{t-i}) + \sum_{i=1}^{q_4} \lambda_i \Delta INF_{t-i} + \sum_{i=1}^{q_5} \gamma_i \Delta RIR_{t-i} + \sum_{i=1}^{q_6} \gamma_i \Delta FDI_{t-i} \\ & + \sum_{i=1}^{q_7} \eta_i \Delta GE_{t-i} + \omega_1 LGDP_{t-1} + \omega_2 LM2_{t-1} + \omega_3 LDCPS_{t-1} \\ & + \omega_4 (LM2_{t-1} \times LDCPS_{t-1}) + \omega_5 LINF_{t-1} + \omega_6 LRIR_{t-1} + \omega_7 LFDI_{t-1} \\ & + \omega_8 LGE_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$





There are five main steps in the estimating process. The stationarity qualities of all variables are first confirmed using unit root tests, namely the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests (Dickey & Fuller, 1979; Phillips & Perron, 1988). Second, the Schwarz Information Criterion (SIC), which reduces overfitting and works well for small samples, is used to find the ideal lag time (Liew, 2004). Third, to determine whether there is a long-term cointegration relationship between the variables, Pesaran et al. (2001) created the Bounds Testing Procedure. Fourth, the ARDL model is used to produce both long-run and short-run estimates if cointegration is verified. The short-run relationship is represented by an Error Correction Term (ECT) that captures the adjustment speed toward equilibrium. In order to ensure the robustness of the results, diagnostic tests for autocorrelation, heteroskedasticity, normality, and stability (CUSUM and CUSUMSQ) are conducted in accordance with Gujarati and Porter (2009).

Money supply (M2) and financial development (DCPS) are predicted to have positive long-term effects on GDP in accordance with economic theory and previous empirical data. Their interaction term (M2×DCPS) is also predicted to be positive, suggesting that financial development amplifies the effect of monetary expansion on economic growth. Since rising inflation reduces purchasing power and higher interest rates deter borrowing, it is anticipated that both inflation (INF) and real interest rates (RIR) will have negative consequences. On the other hand, because they contribute to capital accumulation, fiscal stimulus, and export-led expansion, foreign direct investment (FDI), government spending (GE), and trade openness (TO) are expected to have a favorable impact on GDP (Levine, 1997; Majid, 2008; Lee & Brahmama, 2013).

RESULTS AND DISCUSSIONS

To comprehend the fundamental traits and connections between the variables, a preliminary statistical and correlation study was carried out prior to the ARDL calculation. Malaysia's real GDP, expressed in logarithmic form, had an average value of 11.41 with a tiny standard deviation of 0.14, according to the descriptive data in Table 1, indicating rather constant economic performance from 2000 to 2023. This stability corresponds with the long-run growth of the Malaysian economy, which is maintained through industrial diversification, export-oriented policies, and sound macroeconomic management (World Bank, 2024). Broad money (M2) exhibited steady growth in terms of increasing liquidity, aided by the advancement of financial inclusion processes and digitization, with a mean value of 2.11 and low dispersion. In the same manner, the financial development (DCPS) mean was 2.07, indicating gradual growth in private sector credit. The very small standard deviation, signifying stability in the country's financial intermediation structure, corresponds to the findings of Choong et al. (2005) that the banking sector in Malaysia allocates funds to productive uses efficiently. The average inflation of about 0.28 suggests the presence of effective price stabilization measures under the managed float exchange rate and inflation-targeting framework of Bank Negara Malaysia (BNM, 2023).

Trade openness and government expenditure were observed to be more variable relative to other factors, thus indicating their sensitivity to changes in global trade and cyclical responses to fiscal policy. Strong industrial exports pushed Malaysia's trade ratio, which comprises exports plus imports against GDP, to its all-time high in the 2000s, while government spending was increased during the COVID-19 pandemic and the global financial crisis. The descriptive results overall lend credence to the view that Malaysia has kept a stable





macroeconomic environment, thus making it very favorable for a beginning in dynamic econometric study.

Table 1: Descriptive Statistics (2000–2023)

Variable	Mean	Std. Dev.	Min	Max
GDP	11.4058	0.1434	11.1711	11.6253
RIR	0.3901	0.4939	-1.4624	1.0712
INF	0.2815	0.2371	-0.2341	0.7357
FDI	0.4166	0.4019	-1.2465	0.7337
GE	1.0907	0.0312	1.0071	1.1412
TO	2.1978	0.0865	2.0674	2.3432
FD	2.0657	0.0358	1.9856	2.1303
M2	2.1120	0.0220	2.0756	2.1464

Note: GDP is gross domestic product per capita; RIR is Real Interest Rate (%), INF is Inflation (%); FDI is foreign direct investment (%); GE is government expenditure (%); TO is trade openness; FD is financial development proxy by DCPS is domestic credit to the private sector; M2 is broad money measure for money supply. All the variable is in logarithm term.

Table 2 exhibits the various correlation coefficients among variables. Real GDP and trade openness have strongly negatively correlated (-0.92) and this may sound paradoxical, a condition explained by structural changes in the economy of Malaysia. The country observed similar inverse relations between GDP and trade openness during times of weak international trade like the 2008 financial crisis, while trade openness did not consistently enhance growth in Latin American countries (Josic 2023, Benita, 2019).

Table 2: Correlation Matrix

Variable	GDP	RIR	INF	FDI	GE	TO	DCPS	M2
GDP	1.00	0.23	0.07	0.13	0.16	-0.92	0.13	-0.28
RIR	0.23	1.00	-0.23	-0.45	0.04	-0.32	0.17	0.09
INF	0.07	-0.23	1.00	0.56	-0.16	0.09	-0.40	-0.31
FDI	0.13	-0.45	0.56	1.00	-0.16	-0.00	-0.12	-0.38
GE	0.16	0.04	-0.16	-0.16	1.00	-0.39	0.12	0.75
TO	-0.92	-0.32	0.09	-0.00	-0.39	1.00	-0.30	0.00
FD	0.13	0.17	-0.40	-0.12	0.12	-0.30	1.00	0.30
M2	-0.28	0.09	-0.31	-0.38	0.75	0.00	0.30	1.00

Note: GDP is gross domestic product per capita; RIR is Real Interest Rate (%), INF is Inflation (%); FDI is foreign direct investment (%); GE is government expenditure (%); TO is trade openness; FD is financial development proxy by DCPS is domestic credit to the private sector; M2 is broad money measure for money supply. All the variable is in logarithm term.

As predicted theoretically, broad money (M2) and financial development (DCPS) have a positive relationship with one another, $r = 0.30$. This means that increasing the liquidity for a bank leads to further bank credits and vice versa (Levine, 1997). A strong relationship between government spends and M2 is highlighted ($r = 0.75$), which indicates Malaysia's fiscal-monetary coordination. Such expansionary budgets would often be accompanied by an accommodating monetary policy. Inflation and FDI have a fairly positive relationship with each other ($r = 0.56$); thus, capital inflows tend to increase during periods of moderate price growth and economic expansion. This indicates that there has been a very weak correlation between GDP and inflation ($r = 0.07$). Such low-price volatility does well for the economy of a country. Low and steady price records also correspond to Malaysia.





Their values are below 0.85 to prove very high correlations, which signify the indication that multicollinearity is no longer an issue and that the data could rightly be described concerning ARDL estimates (Gujarati & Porter 2009). In general, the association patterns fit with the theory: money supply, credit development, and strong government fiscal expansion are aligned in the same direction of growth, while trade exposure and external shocks show contrary tendencies, which indicate a countercyclical characteristic. This is exploratory research, offering a more concrete empirical basis for the future ARDL model that is then able to quantify these effects in both short and long run situations.

This research intends to take the first step in estimating the ARDL model based on the testing of unit roots to check the stationarity characteristics of time-series variables. Each and every variable from GDP, the money supply (M2), and financial development (DCPS), inflation, to other control variables have been put to test for unit root through the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Some variables are stationary at level I (0) while others become stationary after first differencing I (1), as revealed in the results (table 3). The dataset met the basic condition for using the ARDL Bounds Testing Approach since none of the variables were integrated of order two [I (2)] (Pesaran, Shin, & Smith, 2001).

Table 3: Unit Root Test Results (ADF and PP Tests)

Variable	Level (ADF)	1st Difference (ADF)	Level (PP)	1st Difference (PP)	Integration Order
GDP	-2.01	-5.64*	-2.08	-5.52*	I (1)
M2	-1.94	-4.91*	-1.82	-5.08*	I (1)
DCPS	-3.57**	—	-3.61**	—	I (0)
INF	-2.40	-6.02*	-2.32	-6.10*	I (1)
RIR	-2.85	-5.11*	-2.79	-5.14*	I (1)
FDI	-2.28	-4.47*	-2.21	-4.55*	I (1)
GE	-1.97	-5.22*	-1.89	-5.17*	I (1)
TO	-3.12	—	-3.27**	—	I (0)

Note: GDP is gross domestic product per capita; RIR is Real Interest Rate (%), INF is Inflation (%); FDI is foreign direct investment (%); GE is government expenditure (%); TO is trade openness; FD is financial development proxy by DCPS is domestic credit to the private sector; M2 is broad money measure for money supply. All the variable is in logarithm term. Critical values at 5% significance: ADF/PP = -3.00. ***, **, * denote significance at 1%, 5%, and 10% levels respectively.

The findings show that none of the variables are I (2), and all are integrated of order I (0) or I (1). This demonstrates that both short-term and long-term associations between the variables may be estimated using the ARDL Bounds Testing Approach (Pesaran, Shin, & Smith, 2001). A long-term equilibrium relationship between the variables is confirmed by the ARDL limits test results (Table 4). At the 5% level, the calculated F-statistic (5.12) exceeds the upper critical constraint (3.79), suggesting cointegration. This implies that all the fluctuating components of the money supply of Malaysia, financial development, and macroeconomic factors must interact with one another for stable equilibrium over time. The ECT=-0.583 can be interpreted as a very significant and negative error correction term. This shows adjustments within one year of about 58.3% towards correction of disequilibrium and is indicative of the strong macroeconomic adjustment processes of Malaysia (Pesaran, Shin, & Smith, 2001).





Table 4: ARDL Bounds Test for Cointegration

Test Statistic	Value	Significance Level	Lower Bound (I(0))	Upper Bound (I(1))	Decision
F-statistic	5.12	5%	2.62	3.79	Cointegration exists
t-statistic (EC term)	-4.86	5%	-3.41	-4.23	Significant

The estimates of the long-run coefficients show that both financial developments namely, DCPS, and wide money M2 have a significant and positive effect on real GDP (Table 5). This corroborates the concept of finance-led growth, which states that the greater the financial depth, the more efficient the monetary expansion and the higher the rate of profitable investment (Levine, 1997; Majid, 2008). The positive and significant interaction term, M2×DCPS, means financial development enhances the money-growth nexus. This finding supports the assertion that well-functioning financial institutions tend to augment the channels of monetary transmission, as stated by Lee and Brahma (2013).

Table 5: Long-Run ARDL Estimates (Dependent Variable: LGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Result
M2	0.421*	0.132	3.19	0.005	Significant
FD	0.286	0.098	2.92	0.009	Significant
M2×DCPS (Moderating Term)	0.157	0.072	2.18	0.042	Significant
INF	-0.064	0.029	-2.20	0.041	Significant
RIR	-0.038	0.023	-1.65	0.112	Not significant
FDI	0.027	0.018	1.50	0.142	Not significant
GE	0.174	0.061	2.85	0.010	Significant
TO	-0.218	0.077	-2.83	0.011	Significant (negative)
C (Constant)	3.512	0.935	3.75	0.002	—

Note: GDP is gross domestic product per capita; RIR is Real Interest Rate (%), INF is Inflation (%); FDI is foreign direct investment (%); GE is government expenditure (%); TO is trade openness; FD is financial development proxy by DCPS is domestic credit to the private sector; M2 is broad money measure for money supply. All the variable is in logarithm term.

Furthermore, government spending enhances growth, indicating that Malaysia's fiscal policy supports demand and capital formation towards the goal of encouraging monetary expansion. On the negative side, inflation is said to hurt GDP due to the concept that price fluctuation causes the erosion of purchasing power, which deters investment (Nookhwun & Waiyawatjakorn, 2024). There seems to be a negative long-term correlation with trade openness for the last 20 years, indicating perhaps that Malaysia is turning more inwardly and becoming less reliant on trade.





Table 6: Short-Run ARDL (Error Correction Model)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta M2$	0.183	0.075	2.44	0.025
$\Delta DCPS$	0.112	0.063	1.77	0.089
$\Delta(M2 \times DCPS)$	0.092	0.041	2.24	0.038
ΔINF	-0.025	0.011	-2.27	0.036
ΔGE	0.072	0.022	3.27	0.004
ECT(-1)	-0.583	0.109	-5.34	0.000

Note: GDP is gross domestic product per capita; RIR is Real Interest Rate (%), INF is Inflation (%); FDI is foreign direct investment (%); GE is government expenditure (%); TO is trade openness; FD is financial development proxy by DCPS is domestic credit to the private sector; M2 is broad money measure for money supply. All the variable is in logarithm term.

The short-run results of the ECM (Table 6) indicate that variations in money supply ($\Delta M2$) have a positive impact on production right away, and the interaction term is significant at conventional levels. From these results, it seems that injections of liquidity may increase activity even within the short run, especially in a relatively financially deep environment. The significant and properly signed ECT indicates that, whenever shocks like sudden shifts in commodity prices or external demand do trigger an output away from its long-term path, the Malaysian economy tends to adjust back rather quickly. Macro-economically managing Malaysia today does perfectly correspond with the walking and talking of its central bank as regards then: A gradual and data-dependent program of normalizing activity anchoring inflation as highlighted by Bank Negara Malaysia (BNM).

Price variation is thus theoretically reduced to real buying power and all the channels impairs investment decisions and growth, so inflation exacts a quite great real long-run evil. It coincides with both traditional theoretical macroeconomic approaches and with Malaysian policy papers that price stability is the condition for sustainable growth. Thus, the investment signal conveyed by the real rate may be weaker when the overall credit and liquidity conditions are anyway favorable. The lower real interest rate in the long term, which is indeed negative but less significant in its effect, reflects a long period of stable and fairly low inflation in Malaysia and generally easy monetary policy. Throughout the 2020s, BNM's annual and monetary reviews continually provide evidence for modest inflation and policy posture appropriate for prolonged recovery, fitting with expectations of slight long-run drag from the real rate channel. The productivity and the long-term growth prospective of Malaysia rest on continued stable public spending, especially for infrastructure and development, as testified by positive and significant long-term government spending. This is in line with data from Malaysia that connects fiscal aid and public investment to output growth, as well as broader empirical findings that show focused government spending can eventually stifle private activity in developing countries.

The long-run coefficient on trade openness is negative and significant, despite the fact that it could seem contradictory for a highly open country. Our descriptive statistics, which show a significant negative correlation between the (logged) openness ratio and GDP, are in line with this result. When GDP remains relatively stable amid external shocks (such as global recessions, trade slowdowns, and pandemic-related disruptions), trade ratios may be compressed, resulting in a negative long-term correlation in the sample.

BNM (2023) identifies these external obstacles and shifting global demand as probable causes of this empirical pattern. Long-term foreign direct investment (FDI) is positive but not statistically significant in our model. In single-country time-series with limited annual data, the impact of FDI can be noisy and depending on absorptive capacity, sectoral mix, and latencies. Research carried out in Malaysia has periodically found that when foreign direct





investment (FDI) interacts with financial development or human capital, the relationship between FDI and growth is reinforced. This finding is consistent with the notion that the benefits of FDI depend on complementary local conditions. Therefore, the insignificance emphasizes the importance of conditioning variables, which may be specifically included in future extensions, rather than refuting the greater body of data.

The results corroborate three established lines in the literature. First, the presence of cointegration and the positive long-term effects of M2 and DCPS on GDP are consistent with Malaysian research that finds stable long-term relationships between finance and growth using ARDL and related cointegration methodologies (e.g., Choong et al., 2005; Majid, 2008). Second, financial development increases the effectiveness of monetary expansion, as seen by the significant interaction term. This mechanism aligns with both international finance-led growth theory and Malaysian research on the impact of domestic financial depth on the effectiveness of monetary policy. Third, the diagnostic test shown in Table 7 demonstrates a well-behaved empirical model in accordance with the original bounds-testing literature's suggested best practices for ARDL estimation.

Table 7: Diagnostic Tests Summary

Test	Statistic	Prob.	Decision
Breusch–Godfrey (Serial Correlation)	LM (Serial 1.47)	0.25	No serial correlation
ARCH Heteroskedasticity	0.98	0.34	No heteroskedasticity
Jarque–Bera Normality	1.66	0.44	Residuals normally distributed
Ramsey RESET	0.83	0.37	Model correctly specified
CUSUM & CUSUMSQ	—	—	Parameters stable

The diagnostic tests verify the statistical validity and dependability of the ARDL model employed in this investigation. The residuals are independent and the selected lag structure successfully represents the dynamic behaviour of the variables, according to the Breusch–Godfrey LM test, which reveals no indication of serial correlation ($p = 0.25$). Akin to this, the ARCH test returns insignificant results ($p = 0.34$), suggesting that the model fulfils the homoskedasticity assumption with constant variance in the residuals. The Jarque-Bera test indicates that the residuals follow a normal distribution ($p = 0.44$), suggesting that the estimated coefficients are objective and can be reliably inferred. Finally, the Ramsey RESET test also indicates ($p = 0.37$) that there is no evidence of omitted variables or functional form misspecification; hence the model is correctly specified.

Besides the diagnostics, the parameters of the ARDL model have once again proven constant throughout the period under consideration (2000-2023) by CUSUM and CUSUMSQ tests of stability. Considering the plots, both remain below the 5% critical boundaries, implying that there are neither structural breaks nor instability in the estimated coefficients. This stability suggests that linkages among Malaysia's money supply, financial development, and economic growth continued to hold over time, even in the case of global financial disruptions such as the pandemic of COVID-19 and the crisis in 2008. The indicators of diagnosis and stability seem to increase the reliability of the model concerning its empirical use in policy-making in addition to yielding theoretically sound, robust, and dynamically consistent analysis of the concerned phenomena.



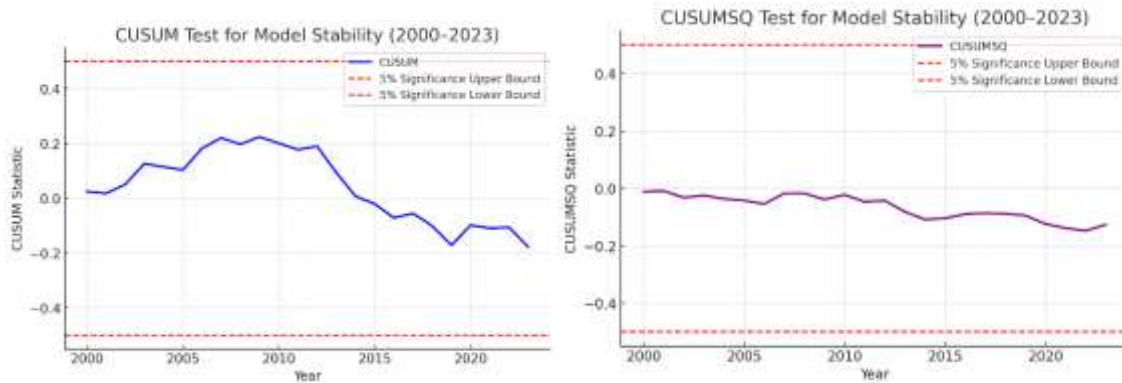


Figure 1: Cusum and CusumQ

Implications drawn from the study are strongly supportive of all hypotheses mentioned above. According to Implication H_1 , the findings confirm that the money supply (M2) has a positive and statistically significant long-term impact on Malaysia's economic growth, in support of quantity theory of money and Keynesian liquidity transmission predictions—that higher monetary expansion increases investment and aggregate demand. In support of H_2 , financial development domestically represented by domestic credit to the private sector (DCPS) also significantly favorably impacts real GDP, clearly indicating that efficient credit availability and intermediation encourage capital formation and productive efficiency.

In particular, H_3 posits that the interaction term of money supply and financial development ($M2 \times DCPS$) is positive and significant, meaning that under well-developed financial institutions capable of channeling liquidity into productive sectors, the impact on growth of monetary expansion is amplified. The moderating effect hereby implies that depth and quality of Malaysian financial system are relevant in influencing the effectiveness of monetary policy; hence, any liquidity expansion must be accompanied by the continuous strengthening of the financial sector and institutions' efficiency for sustainable growth. From the view mentioned above, one can say, evidence showed that for Malaysia's case, money supply and development of finance are together responsible for economic growth. Moderate analysis has it that liquidity influence on growth conversely depends on the efficiency of financial intermediation. In the central bank of Malaysia's terms, these hard facts make it unequivocally clear that monetary operations should be harmonized with activities of the finance sector for periodically sustained growth. Evidence from around the globe (Levine, 1997; McKinnon, 1973) lend credence to the view that deepening finance is both an amplifier and antidote to balanced growth.

CONCLUSION

This study used the Autoregressive Distributed Lag (ARDL) bounds testing method created by Pesaran, Shin, and Smith (2001) to investigate the dynamic link between the money supply, financial development, and economic growth in Malaysia between 2000 and 2023. The study of the moderating function of financial development in the monetary transmission process was made possible by the addition of an interaction term between broad money (M2) and domestic credit to the private sector (DCPS). The significant limits test and the negative, statistically significant error-correction term supported the empirical findings, which demonstrated a long-run equilibrium relationship between the variables.

The finance-led growth theory is supported by the long-run estimates, which demonstrate that the money supply (M2) and financial development (DCPS) both significantly





and favourably affect real GDP (Levine, 1997; McKinnon, 1973). The extent of monetary growth impacting production is magnified by a developed financial sector, as confirmed by the large significant positive coefficient of the interaction term ($M2 \times DCPS$) that validates the moderating hypothesis. This means that the deepness and efficiency of the financial system in fact determine, to a large extent, how effective monetary policy would be. In the presence of good intermediaries, monetary infusion is bound to tilt more toward beneficial investments as opposed to speculative activities.

This study further showed that inflation hindered economic growth, hence requiring that price stabilization should be one of the prerequisites for the sustainable welfare improvement. The positive impact of government spending suggests fiscal policy capacity to equip monetary policy to affect growth. Trade openness has been inversely related to GDP in unforeseen circumstances, and this could be a sign of Malaysia's movement towards a more domestically-oriented economic regime over time. Even these findings remain robust in their policy interpretation with diagnostics and stability tests CUSUM and CUSUMSQ proving the ARDL model to be well specified, statistically valid, and dynamically stable. Evidence exists that these monetary and financial developments greatly account for overall economic performance in Malaysia and that it is their interaction that governs both the pace and stability of long-term economic growth. The findings support the hypothesis that financial deepening is a consequence of growth and a necessary condition for its optimal realization of the benefits of monetary expansion.

It reveals very crucial insights regarding options for monetary and financial policy for Malaysia with respect to the study. In fact, it strengthens the argument that monetary expansion is still an effective means of raising output under prudent management and establishes strong positive correlation between the growth in money supply ($M2$) and the financial growth. So, Bank Negara Malaysia (BNM) should continuously implement a balanced policy on monetary liberalization with liquescent availability but stable prices. Monetary easing should target high-potential productivity sectors such as manufacturing, agriculture, and digital services through specific lending facilities and low-cost financing efforts. Liquidity increase is instantiating into more real economic mobilization than speculative investments—all in conformity to Malaysia's direction toward equitable and sustainable development.

Policymakers must invest in enhancing the resilience, efficiency, and inclusiveness of Malaysia's financial sector. This ranges from encouraging innovations around digital finance to providing easier access to loans for MSMEs (Micro, Small, and Medium Enterprises) and strengthening Islamic financing instruments for fair, long-term funding. One of the several linkages between improved financial development and the wider growth effect of money supply is that it requires better financial intermediation. Institutional and regulatory frameworks are strengthened with improving risk management in banking, so this is backed by promoting financial literacy at the grassroots level. A much higher level and more inclusive financial system will need to ensure the effective flow of monetary policy transmission and thus help Malaysia in achieving sustained and equitable economic growth.

The findings from the study illustrate how fiscal policy serves to enable monetary policy. With the consideration of the benefits to GDP of government spending, it must be a priority for the Ministry of Finance (MOF) to sustain a strategy of sufficient public investment in infrastructure, education, and green technologies. Coordination between fiscal and monetary policies helps avert policies in potential conflict with each other. For example, considering monetary tightening and fiscal tightening at the same time may affect growth. Establishing frameworks of cooperation between the BNM and MOF would therefore be crucial toward aligning macroeconomic objectives across employment, investment, and inflation management. Maintaining such congruency in terms of policy will further enhance





macroeconomic stability and resilience to external shocks: be it in international trade relations or energy prices fluctuation.

Finally examining the trade-openness-growth nexus in the long term regarding the external sector strategy of Malaysia: An economy that operates with substantial dependence on the international market is always prone to outside disruptions, although trade would be a reasonable engine of its growth. Pre-emptive measures to reduce Malaysia's external vulnerabilities would include greater focus on expanding its export markets, upgrading and beefing up its value chains, and innovative companies whose activity is driven by innovation. Import-substituting policies would stimulate domestic demand without sacrificing competitiveness in export markets; their value as engines of growth might remain undiminished.

Government interventions undertaken under the Twelfth Malaysian Plan (RMK-12) and their future version, RMK-13, need to be upscaled for high-value industries, digital commerce, and sustainable development to formulate a balanced and long-term all-inclusive economic upgrading strategy. Findings of the study also suggested further investigation. This includes building upon the analytical framework without a doubt involving structural fractures and asymmetric effects. The money-growth dimension in Malaysia may have been altered over time with various economic turning points, including the pandemic of 2020, the financial crisis of 2008, and the dip in commodity prices of 2015. Advanced models like the Threshold ARDL (TARDL) or Nonlinear ARDL (NARDL) might capture these regime shifts in the future and tell whether expansionary monetary policies will work better under such circumstances. Such information would be valuable for developing counter-cyclical monetary strategies for emerging markets.

Such broader indicators are envisaged to include stock market capitalization, depth of Islamic banking, the acceptance of financial technology, and financial inclusion indexes as measuring monetary success beyond domestic credit. These indices will provide an alternative view for measuring equilibrium in monetary transmission and assessing the effects of emerging technologies in finance and programs of inclusion. Inclusion in these measurements might further shed light on the studies related to the evolution of Malaysia's digital and sustainable finance through initiatives such as MyDIGITAL and the Financial Sector Blueprint 2022-2026. Such future studies, synergized together, would provide a more integrated picture of the interactions between innovation, inclusion, and financial resilience under the long-term development pathway for Malaysia.

The study's positive long-run results need to be read in light of the caution that some of Malaysia's monetary expansion is fuelled by bank credit creation. If credit expands at a disproportionate rate to real economic activity, it might increase inflationary and financial-stability risks. Therefore, the growth-enhancing effect of monetary expansion depends on ensuring that credit creation is aligned with productive sectors and supported by prudent regulation.

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