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ASEAN GROWTH DYNAMICS: CHALLENGING THE DOMINANCE OF MONETARY EXPANSION

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Abstract:
This study examines the dynamic relationship between money supply and economic growth in ten ASEAN economies using a modified Quantity Theory of Money framework incorporating inflation and foreign direct investment (FDI). Balanced panel data covering 2000–2024 are analyzed using the two-step System Generalized Method of Moments (SYS-GMM) estimator to account for dynamic adjustment and potential endogeneity. The results show that changes in money supply have a negative and statistically significant effect on economic growth in both the short and long run, suggesting that monetary expansion may constrain economic performance when liquidity is not effectively transmitted to productive economic activity. In contrast, changes in inflation do not significantly affect economic growth, whereas changes in FDI have a positive and statistically significant effect. This positive association is consistent with FDI-related channels involving technology transfer, managerial capabilities, productivity spillovers, and integration into international markets. Significant lagged output coefficients confirm dynamic adjustment in growth. Robustness analysis indicates a significant negative output shift during the 2008–2009 Global Financial Crisis, whereas the COVID-19 pandemic exhibits weaker evidence of an adverse shift in output growth. The findings suggest that ASEAN-10 policymakers should maintain monetary discipline, strengthen institutional conditions that support productive FDI, and enhance macroeconomic resilience to external shocks.

Keywords:
dynamic panel model; money supply; economic growth; GMM; ASEAN.

JEL Classification:
C23, E51, 047

INTRODUCTION

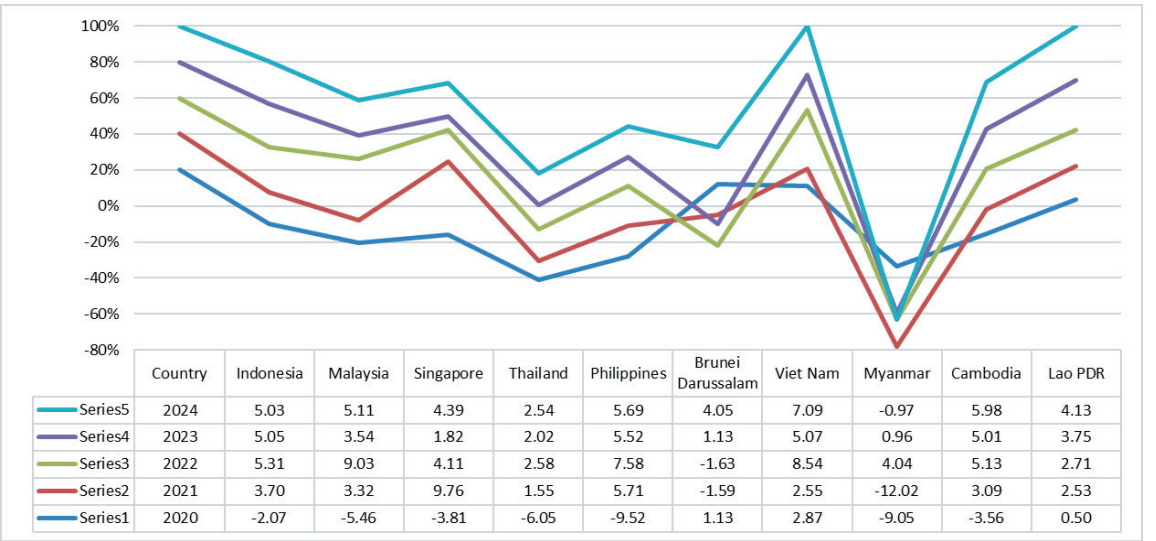
In the short and medium terms, the COVID-19 pandemic had a substantial impact on the world economy. The slowdown in economic growth in many nations as a result of disruptions in household consumption, labor mobility, international trade, and production activity was one of the most prominent effects (Pangestuty & Pulungan, 2023). An economy's total monetary assets at any given time are reflected in the money supply, which has a significant impact on overall economic activity (Challoumis, 2024).

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A key tool for preserving economic stability and promoting economic growth is monetary policy, especially that pertaining to the control of the money supply (Bajrami *et al*., 2025). The dynamics of economic growth in ASEAN from 2020 to 2024 are depicted in Figure 1.

Figure 1. GDP Growth in ASEAN



	Country	Indonesia	Malaysia	Singapore	Thailand	Philippines	Brunei Darussalam	Viet Nam	Myanmar	Cambodia	Lao PDR
Series5	2024	5.03	5.11	4.39	2.54	5.69	4.05	7.09	-0.97	5.98	4.13
Series4	2023	5.05	3.54	1.82	2.02	5.52	1.13	5.07	0.96	5.01	3.75
Series3	2022	5.31	9.03	4.11	2.58	7.58	-1.63	8.54	4.04	5.13	2.71
Series2	2021	3.70	3.32	9.76	1.55	5.71	-1.59	2.55	-12.02	3.09	2.53
Series1	2020	-2.07	-5.46	-3.81	-6.05	-9.52	1.13	2.87	-9.05	-3.56	0.50

Source: World Bank (2026)

Figure 1 illustrates how the COVID-19 pandemic's effects caused major fluctuations in ASEAN economies in 2020 before progressively improving in the years that followed. The majority of ASEAN economies, notably Indonesia (−2.07%), Malaysia (−5.46%), Singapore (−3.81%), Thailand (−6.05%), and the Philippines (−9.52%), had negative growth rates in 2020. Due to movement restrictions during the pandemic, economic activity, international commerce, and foreign direct investment (FDI) flows were disrupted, which is reflected in this fall. Myanmar and a number of other economies that saw severe economic downturns also suffered similar circumstances.

The relationship between the money supply and economic growth has been the subject of conflicting findings in earlier research. According to Matres and Le's (2021) research, the money supply has a negative impact on economic growth, indicating that, under some circumstances, excessive monetary expansion may stifle economic growth. On the other hand, research by Vo and Tran (2023), Bajrami *et al.* (2025), and Pal and Nigam (2025) discovered that the money supply significantly and favorably influences economic growth. These results imply that expansionary monetary policy can boost the economy. The disparity in empirical findings suggests that there is still debate in the literature regarding the connection between the money supply and economic growth.

The relationship between monetary conditions and economic growth has long been central to macroeconomic theory and empirical research. Among the key macroeconomic variables, the money supply, inflation, and FDI represent distinct channels through which economic performance may be influenced. The relationship between inflation and economic growth, for example, is generally nonlinear and context dependent. Although moderate inflation may coexist with or even support economic activity, excessive and persistent inflation can undermine economic growth by increasing uncertainty and distorting resource allocation (Baharumshah *et al.,* 2016). Similarly, Owusu and Bündemeier (2025)

suggest that relatively low inflation may be compatible with stronger economic performance, whereas inflation beyond a certain threshold can exert a negative effect on growth. Akinsola and Odhiambo (2017) also document a negative association between inflation and economic growth, particularly in industrialized economies. Evidence from the European Union further indicates that although inflation may not always have a statistically significant effect on GDP growth, persistent price pressures can constrain economic expansion (Pappas & Boukas, 2025).

FDI represents another potentially important determinant of economic growth, although its effects vary across countries and institutional environments. Imleesh *et al.* (2025) find no significant relationship among inflation, foreign investment, and economic growth, while Ramadhanty (2024) reports no discernible effect of FDI on economic growth. In contrast, Jayadi and Prasetyo (2022) and Fajrian *et al.* (2023) find that FDI has a positive and significant effect on economic growth. These contrasting findings suggest that the growth implications of FDI are conditional on the characteristics of host economies and the mechanisms through which foreign-owned firms interact with domestic production systems. FDI may contribute to economic performance through technology transfer, managerial expertise, productivity spillovers, access to international markets, and integration into global value chains (Borensztein *et al*., 1998).

The money supply constitutes a central explanatory variable in the present study because of its theoretical foundation in the Quantity Theory of Money (QTM). Changes in the money supply can influence economic activity and price dynamics through monetary transmission mechanisms (Sasongko & Huruta, 2018). Under the QTM, particularly when the velocity of money is assumed to be relatively stable, monetary expansion can affect nominal economic activity through its interaction with prices and real transactions (Moroney, 2002). Brumm (2005) provides empirical support for the continuing relevance of monetary conditions in explaining economic activity, while Friedman (1968) emphasizes the importance of monetary stability for macroeconomic performance. Nevertheless, contemporary monetary transmission is not necessarily mechanical. Changes in money demand and velocity, financial intermediation, productive capacity, exchange rates, and institutional quality can affect how monetary expansion is transmitted to prices and real output. This consideration is particularly important for ASEAN economies, which differ substantially in their financial development, monetary-policy frameworks, institutional environments, and exchange-rate regimes.

The ASEAN region provides a particularly relevant setting for examining these relationships because its economies have experienced substantial structural and financial transformation over the past two decades. Previous empirical studies have produced mixed evidence regarding the effects of monetary and macroeconomic variables on economic growth. Bajrami *et al.* (2025) employ fixed-effects and random-effects approaches to examine the relationships among money supply, inflation, FDI, and economic growth in Balkan economies, while Prasasti *et al*. (2024) apply similar panel techniques to investigate monetary determinants of economic growth in Asia. Kuang *et al*. (2024) likewise employ fixed-effects models to examine macroeconomic relationships in ASEAN-5 economies. These studies provide useful evidence but primarily rely on static panel specifications, which may not fully account for persistence in economic growth or potential endogeneity between macroeconomic variables and output.

An additional consideration is that the 2000–2024 observation period encompasses major global economic disruptions, particularly the Global Financial Crisis (GFC) and the COVID-19 pandemic. These episodes substantially altered financial conditions, liquidity preferences, external demand, supply chains, capital flows, and monetary-policy responses. Consequently, the relationship between money supply, inflation, FDI, and economic growth may not have remained constant throughout the sample period.

Ignoring such structural changes may produce estimates that conceal shifts in monetary transmission and economic dynamics associated with major crises. Incorporating structural-break analysis therefore provides an important robustness dimension by examining whether the estimated relationships remain stable in the presence of major global shocks. This approach is particularly relevant for ASEAN economies because their high degree of trade and financial integration exposes them to changes in global liquidity, external financing conditions, and international economic activity.

Despite the growing literature on monetary conditions and economic growth, relatively limited evidence simultaneously examines money supply, inflation, and FDI within a dynamic ASEAN panel framework while explicitly accounting for major structural disruptions. Existing GMM-based studies tend to focus more narrowly on FDI, financial development, or individual monetary factors rather than integrating these variables within an extended QTM framework (Suci *et al.*, 2024). Moreover, static panel approaches such as FEM and REM may be less suitable for capturing the persistence of economic growth and potential endogeneity arising from the dynamic interaction between macroeconomic conditions and output. The present study addresses this gap by employing a two-step System Generalized Method of Moments (SYS-GMM) estimator and incorporating structural-break analysis associated with the GFC and COVID-19 pandemic.

Accordingly, this study investigates the dynamic effects of changes in money supply, inflation, and FDI on economic growth in ten ASEAN economies over 2000–2024. By extending the QTM framework to incorporate FDI and inflation and by explicitly considering major structural disruptions, the study seeks to provide a more comprehensive assessment of monetary and external determinants of economic growth. The study contributes to the literature in three respects. First, it extends the empirical application of the QTM by examining monetary conditions alongside inflation and FDI within a unified dynamic framework. Second, the use of SYS-GMM enables the analysis to account for dynamic adjustment and potential endogeneity in the relationship between macroeconomic variables and output growth. Third, the incorporation of structural-break analysis provides evidence on whether major global shocks altered the stability of the monetary–growth relationship.

The findings are expected to contribute both theoretically and practically. Theoretically, the study provides evidence on whether the predictions of the QTM concerning monetary conditions and economic activity remain robust in a heterogeneous group of emerging and developing ASEAN economies. Practically, the findings may assist monetary authorities and governments in designing policies that balance monetary discipline, macroeconomic stability, and the productive contribution of FDI. Furthermore, evidence from the structural-break analysis can help policymakers better understand how monetary and growth dynamics may change during periods of major global disruption.

The study first reviews the relevant literature and develops the research hypotheses, followed by a description of the research methodology. The empirical findings are then presented and discussed in relation to the theoretical and empirical literature. Finally, the study concludes by highlighting the main findings, acknowledging its limitations, and outlining directions for future research.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The relationship between the monetary sector and economic activity is explained through the QTM. Fisher (1992) formulated the equation of exchange:

$$MV = PT \quad (1)$$

The theoretical model explaining inflation is expressed by the following equation:

$$P = MV/T \quad (2)$$

Equation (2) indicates that the price level is determined by the interaction among the money supply, velocity of circulation, and the volume of economic transactions. Although MV = PT is fundamentally an accounting identity, its theoretical implications depend on assumptions regarding money velocity and real economic activity. Under the classical QTM, where velocity and real transactions are relatively stable, sustained monetary expansion not matched by corresponding increases in real activity can generate upward pressure on prices. This interpretation is consistent with Friedman's (1968) monetarist view that monetary conditions play a fundamental role in determining inflation over the longer term. However, the QTM does not imply an immediate or proportional relationship between money supply, inflation, and output.

In contemporary financial systems, monetary transmission depends on money demand, velocity, financial intermediation, productive capacity, interest rates, exchange rates, and institutional conditions. These factors are particularly relevant to ASEAN economies because of their substantial heterogeneity in financial development, monetary-policy frameworks, exchange-rate regimes, and institutional quality. Financial liberalization, technological changes, shifts in money demand, and major macroeconomic shocks may further alter the transmission of monetary conditions to prices and real economic activity. Thus, the QTM provides a theoretical foundation rather than a presumption of a mechanically proportional monetary–output relationship.

Empirically, Dash (2025) finds that increases in money supply tend to stimulate output growth in ASEAN economies, suggesting that greater liquidity can facilitate financing and economic transactions. Nevertheless, the effectiveness of this transmission depends on the financial and institutional conditions through which liquidity reaches the real economy. Building on this perspective, the present study extends the QTM framework by examining the relationship between changes in money supply and output growth while incorporating inflation and FDI as additional explanatory variables. Inflation captures price dynamics, whereas FDI represents cross-border foreign-owned economic activity that may contribute to growth through technology transfer, managerial expertise, productivity spillovers, international market access, and global value-chain integration. FDI is conceptually distinct from domestic investment, gross capital formation, and physical capital accumulation. Therefore, its inclusion specifically captures the growth implications of FDI rather than broader domestic capital formation. This extended framework provides a more comprehensive basis for assessing the monetary, price, and FDI-related determinants of economic growth in ASEAN economies.

The conventional monetary perspective provides several channels through which an expansion in money supply may support economic growth. Greater liquidity can ease financing constraints faced by households and firms, reduce the cost of obtaining financial resources, and facilitate transactions. Financial intermediation can subsequently channel available liquidity toward productive economic activities. This argument is consistent with the broader financial-development literature, which emphasizes that well-functioning financial systems can improve the allocation of resources, facilitate investment

financing, and support productivity and economic growth. Levine (2005) argues financial development can influence growth by facilitating information acquisition, mobilizing savings, improving resource allocation, and facilitating the exchange of goods and services. Similarly, Rioja and Valev (2004) find the contribution of financial development to growth varies with the level of financial development, indicating that the effectiveness of financial intermediation is conditional on the institutional and financial environment.

From a monetary perspective, Friedman (1968) emphasizes the importance of monetary stability for macroeconomic performance and argues that substantial and unpredictable monetary disturbances can generate fluctuations in economic activity. The implication is not simply that faster monetary expansion always produces higher real growth, but rather that monetary conditions influence economic activity through a transmission process involving expectations, financial conditions, and aggregate demand. In economies where monetary expansion is consistent with the growth of real productive capacity and is effectively transmitted through the financial system, greater liquidity can support economic activity.

Recent empirical evidence provides support for a positive association between money supply and economic growth. Bajrami *et al.* (2025) find M2 has a positive and statistically significant effect on economic growth across their fixed-effects, random-effects, and GMM specifications. Similarly, Vo and Tran (2023) investigate the role of M2 in economic growth, providing evidence that monetary conditions are relevant to cross-country growth dynamics. The positive relationship is also consistent with the broader evidence linking financial development and economic performance in developing countries. Calderón and Liu (2003) find evidence of a bidirectional relationship between financial development and economic growth, suggesting financial conditions and real economic activity can reinforce one another.

Nevertheless, the theoretical relationship between money supply and real output should not be regarded as universally positive. The effectiveness of monetary expansion depends critically on the monetary transmission mechanism and the institutional and financial structure of the economy. This qualification is particularly relevant to developing and emerging economies. Mishra and Montiel (2012) argue that monetary transmission can be relatively weak in developing economies because financial markets are less developed and traditional interest-rate, bank-lending, asset-price, and exchange-rate channels may operate differently from those in advanced economies. Similarly, Montiel *et al.* (2010) emphasize that weak institutional frameworks, limited securities markets, imperfect banking competition, and high lending costs can impair conventional monetary-transmission channels in low-income economies.

This qualification is particularly important for ASEAN economies because the region encompasses countries with markedly different levels of financial development, institutional capacity, banking-sector depth, and monetary-policy frameworks. Consequently, an increase in M2 does not necessarily imply that additional liquidity will be allocated uniformly toward productive economic activities. Where financial intermediation is inefficient, an expansion in the money supply may not translate proportionally into higher real output because additional liquidity may fail to reach productive firms and households. Instead, changes in money demand or the limited capacity of financial intermediaries to allocate credit efficiently may weaken the transmission of monetary expansion to productive economic activity. Financial innovation can further alter the relationship between monetary aggregates and economic activity by changing money demand and the velocity of circulation. De Gregorio *et al.* (1991) show that financial innovation plays an important role in explaining money-demand behavior in developing countries. The empirical literature also reflects this contextual dependence. While Bajrami *et al.* (2025), de Oña and Le (2021), Jannah *et al.* (2025), Pal and Nigam (2025), and Vo and Tran (2023) provide evidence

of a positive relationship between monetary aggregates and economic growth, differences in country characteristics, estimation periods, monetary regimes, and financial structures imply the magnitude and direction of the relationship may vary. Therefore, the study proposes the following hypothesis:

H1: Money supply has a significant effect on economic growth.

Inflation represents a persistent increase in the general price level and is widely regarded as an important indicator of macroeconomic stability. Its implications for economic growth, however, are not necessarily uniform across economies or inflation regimes. At relatively moderate levels, inflation may coexist with economic expansion because it can reflect increasing aggregate demand and improving economic activity. Nevertheless, persistent or excessive inflation can adversely affect real economic performance by eroding purchasing power, increasing production costs, distorting relative prices, and creating uncertainty regarding future economic conditions. Baharumshah *et al*. (2016) emphasize that the relationship between inflation and economic growth depends on the inflationary environment, while Akinsola and Odhiambo (2017) show that the empirical relationship varies across countries, periods, datasets, and estimation methods.

Several mechanisms can explain why sustained inflation may constrain economic growth. First, higher and more volatile inflation reduces the informational content of relative prices and increases uncertainty surrounding firms' future costs and revenues. This uncertainty can discourage long-term economic decisions and reduce the efficiency of resource allocation. Second, inflation can reduce households' real purchasing power, thereby weakening real consumption when nominal incomes do not adjust proportionally. Third, persistent inflation may increase financing and transaction costs and undermine financial intermediation. Su and Soon (2024) argue that uncontrolled inflation can increase production costs, reduce purchasing power, and discourage productive economic activity. These mechanisms provide a theoretical basis for expecting inflationary pressures to constrain output growth.

The relationship between inflation and growth is nevertheless more appropriately understood as nonlinear rather than uniformly negative. Khan and Senhadji (2001) identify inflation thresholds above which inflation significantly reduces economic growth. Their estimates indicate a threshold of approximately 11–12% for developing economies, suggesting that inflation below the threshold does not necessarily have a statistically significant adverse effect on growth, whereas inflation above the threshold becomes increasingly detrimental. Similarly, Vinayagathasan (2013) finds a threshold of approximately 5.43% for Asian economies, below which inflation has no statistically significant effect on growth and above which inflation significantly impedes economic performance. These findings suggest that the growth consequences of inflation depend critically on the magnitude and persistence of price increases.

This threshold perspective is particularly relevant to the ASEAN context. Using data for the ASEAN-5, Thanh (2015) finds inflation begins to exert a statistically significant negative effect on economic growth when it exceeds approximately 7.84%. The finding indicates that inflation does not necessarily constitute a binding constraint on growth at all levels. Rather, its adverse effects become more pronounced when price pressures exceed the economy's capacity to absorb them. Given substantial differences in monetary institutions, financial development, economic structure, and historical inflation experiences across ASEAN economies, the inflation–growth relationship may consequently differ across countries and over time.

The empirical literature generally provides support for an adverse association between inflation and economic growth, although the magnitude and significance of the relationship remain context dependent. Akinsola and Odhiambo (2017) conclude that the international evidence provides substantial support

for a negative inflation–growth relationship, while also emphasizing considerable cross-country and temporal heterogeneity. More recent evidence reported by Pappas and Boukas (2025), Setiadi (2025), and Wulandari *et al.* (2026) likewise indicates that inflation can negatively affect economic growth. These findings reinforce the argument that maintaining price stability is an important component of an environment conducive to sustained economic expansion.

The mixed evidence also cautions against interpreting inflation as an automatically growth-reducing factor. In economies where inflation remains relatively moderate and predictable, its direct effect on real output may be limited. This possibility is particularly relevant to a heterogeneous ASEAN panel, in which countries may operate under substantially different inflation regimes. Accordingly, the present study does not assume that every increase in inflation necessarily reduces output growth. Instead, it examines whether changes in inflation have a statistically significant effect on economic growth across the ASEAN sample. Thus, the study leads to this hypothesis:

H2: Inflation has a significant effect on economic growth.

FDI can contribute to economic growth through several complementary channels. Foreign-owned firms may introduce technologies and production practices that increase productivity and generate knowledge spillovers to domestic firms. Borensztein *et al.* (1998) argue FDI can contribute to economic growth through technology transfer and productivity enhancement, although the magnitude of these benefits depends on the host economy's absorptive capacity, particularly its level of human capital. Thus, the growth effect of FDI does not arise merely from the volume of foreign financial inflows but from the extent to which host economies are capable of incorporating the knowledge, technologies, and organizational practices associated with foreign firms.

Recent evidence further supports the potential growth-enhancing role of FDI. Le *et al.* (2024) find that FDI contributes positively to economic growth in middle-income economies, suggesting that foreign-owned firms can support economic performance through productivity improvements and integration with international economic activities. Similarly, Wulandari *et al*. (2026) report a positive relationship between FDI and economic growth in both the short and long run. Emako *et al.* (2022) also demonstrate that FDI in the manufacturing sector has a positive and statistically significant effect on economic growth, highlighting the importance of foreign firms in strengthening productive capabilities and facilitating structural transformation in emerging economies.

Nevertheless, the growth effects of FDI are not necessarily universal or automatically positive. The extent to which FDI generates productivity spillovers depends on the characteristics of the host economy, including institutional quality, human capital, domestic firms' absorptive capacity, sectoral composition, and the degree of integration between foreign-owned and domestic enterprises. Foreign firms may also have limited spillover effects when their activities operate largely as enclaves with weak linkages to domestic producers. Consequently, an increase in net FDI inflows does not necessarily translate proportionally into higher domestic output growth.

Consistent with this perspective, several empirical studies report negative or insignificant effects of FDI on economic growth. Ramadhanty *et al*. (2024) and Saidi and Ochi (2023) find FDI may exert a negative and statistically significant effect on economic growth, indicating that the contribution of foreign-owned firms can vary according to country-specific economic and institutional conditions. Similarly, Dinh *et al*. (2019) find FDI may adversely affect economic growth in the short run. These findings suggest that the growth implications of FDI are context dependent and cannot be assumed to be uniformly positive across countries and periods.

This mixed evidence is particularly relevant for ASEAN economies, which differ substantially in terms of financial and institutional development, human capital, domestic market size, industrial structure, natural-resource dependence, and integration into global value chains. Accordingly, the effect of net FDI inflows relative to GDP on economic growth may vary across countries. Nevertheless, given the theoretical mechanisms through which FDI can enhance productivity, technology diffusion, managerial capabilities, and international market integration, the present study expects FDI inflows to be associated with economic growth. Accordingly, the study suggests this hypothesis:

H3: FDI has a significant effect on economic growth.

RESEARCH METHODOLOGY

This study employs a quantitative research design using secondary panel data. The dataset covers ten ASEAN member countries, such as Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Brunei Darussalam, and Vietnam, over a 25-year period from 2000 to 2024. The sample was selected using purposive sampling, whereby countries were chosen based on specific criteria relevant to the study objectives. The primary selection criteria included the availability of complete data for all research variables throughout the 2000–2024 period and the classification of these countries as developing economies in Southeast Asia. All data were obtained from the official World Bank database.

This study employs five variables consisting of one dependent variable and four independent variables. The operational definitions and measurements of these variables are summarized in Table 1.

Table 1. Measurement of research variables

No.	Variable	Scale	Indicator	Source
1.	Economic Growth	Ratio	Annual GDP growth (%)	World Bank (2026a)
2.	Money Supply	Ratio	M2 (% of GDP)	World Bank (2026b)
3.	Inflation	Ratio	Annual inflation rate (% CPI)	World Bank (2026c)
4.	FDI	Ratio	Net FDI inflows (% of GDP)	World Bank (2026d)

This study adopts a modified version of the QTM by incorporating inflation and FDI as additional explanatory variables. The inclusion of these variables aims to broaden the analysis of the relationship between economic growth and the money supply by considering other macroeconomic factors that may influence economic performance. Inflation is treated as an indicator of price stability that affects purchasing power, while FDI represents cross-border flows associated with foreign-owned enterprises and may contribute to economic growth through technology transfer, managerial expertise, productivity spillovers, access to international markets, and integration into global value chains. The empirical relationship among variables can be expressed as:

$$\text{Output} = f(\text{Money, Price, FDI}) \tag{3}$$

This study employs the System GMM (SYS-GMM), an extension of the First-Difference GMM approach designed to produce more efficient and reliable estimates in dynamic panel data models. The dynamic panel model can be expressed as:

$$\text{Output}_{it} = \alpha_i + \delta\text{Output}_{it}-1 + \beta' X_{it} + u_{it} \tag{4}$$

Notes:

$Output_{it}$ = Economic growth of country *i* at time *t*

δ = Coefficient vector associated with the first lag of the dependent variable

$Output_{it-1}$ = Lagged economic growth

$\beta'(\beta_1, \beta_2, \ldots, \beta_n)$ = Regression coefficients of Money, Price, and FDI

X_{it} = Vector of Money, Price, and FDI of country *i* at time *t*

α_i = Country-specific effects of country *i*

u_{it} = Error term of country *i* at time *t*

To eliminate country-specific fixed effects (μi), the model is transformed into first differences. Lagged levels of the variables are used as instruments. Thus, the System GMM estimator simultaneously estimates:

$$\Delta Output_{it} = \beta_1 \Delta Output_{it-1} + \beta_2 \Delta Money_{it} + \beta_3 \Delta Price_{it} + \beta_4 \Delta FDI_{it} + \Delta\varepsilon_{it} \quad (5)$$

Where:

$$\Delta Output_{it} = Output_{it} - Output_{it-1} \quad (6)$$

The analysis is conducted using STATA software. A two-step System Generalized Method of Moments (SYS-GMM) estimator is employed to address potential endogeneity, dynamic-panel bias, and unobserved country-specific effects. The validity of the instruments is assessed using the Sargan test, while the Arellano–Bond serial-correlation tests are used to examine autocorrelation in the first-differenced residuals, with particular attention to the absence of second-order serial correlation [AR(2)] (Arellano & Bond, 1991). In addition, structural-break analysis is conducted to assess whether the relationships between changes in money supply, inflation, FDI, and economic growth differ during two major global disruptions – the Global Financial Crisis (GFC) and the COVID-19 pandemic. Crisis dummy variables and their interactions with the key explanatory variables are incorporated to capture changes in their marginal effects during these periods. This combination of SYS-GMM estimation and structural-break analysis provides a robust framework for examining both the dynamic relationships and the stability of macroeconomic effects across the 2000–2024 period.

EMPIRICAL RESULTS

The descriptive statistics of the main variables utilized in the analysis, such as output, money supply, price level, and FDI, are shown in Table 2. A thorough picture of the distribution of the variables across cross-sectional units and time periods is given by breaking down the statistics into overall, between-country, and within-country variations. The 250 observations in the dataset span 25 years (T = 25) and 10 nations (n = 10).

Table 2. Descriptive statistics of selected variables

Variable		Mean	Std. dev.	Min	Max
Output	overall	5.014129	3.810343	-12.01637	14.51975
	between		1.974027	0.6144224	7.240196
	within		3.316252	-14.119	14.73751
Money	overall	78.45712	39.29087	12.8571	155.6
	between		35.93404	39.1482	129.5678
	within		19.41585	22.14607	148.1848
Price	overall	4.899082	7.042497	-2.314972	57.07451
	between		4.187166	0.5266437	14.60635
	within		5.809843	-9.816438	47.36724
FDI	overall	5.287773	6.236476	-2.75744	33.30458
	between		5.915628	1.3673	21.27797
	within		2.696655	-9.336535	17.31438

Output growth has an overall mean of 5.014% and a standard deviation of 3.810 percentage points, with values ranging from −12.016% to 14.520%, indicating substantial variation in economic performance across countries and years. The within-country standard deviation of 3.316 exceeds the between-country standard deviation of 1.974, suggesting that fluctuations in growth over time within individual ASEAN economies are more pronounced than persistent differences in their average growth rates. The money supply records a mean of 78.457% of GDP and a standard deviation of 39.291 percentage points, ranging from 12.857% to 155.600%. Its between-country variation (35.934) substantially exceeds its within-country variation (19.416), indicating pronounced cross-country differences in monetary and financial conditions. Inflation has a mean of 4.899% and a standard deviation of 7.042 percentage points, ranging from −2.315% to 57.075%, reflecting episodes of both deflation and exceptionally high inflation. The within-country variation (5.810) is somewhat greater than the between-country variation (4.187), indicating that both time-varying shocks and country-specific conditions contribute to inflation dynamics.

FDI has an overall mean of 5.288% of GDP and a standard deviation of 6.236 percentage points, with values ranging from −2.757% to 33.305%, indicating substantial variation in the magnitude and direction of net FDI flows across country-year observations. The negative minimum indicates an observation in which net FDI outflows exceeded inflows, whereas the maximum reflects exceptionally high net FDI inflows relative to GDP. Notably, the between-country standard deviation (5.916) is considerably higher than the within-country standard deviation (2.697), suggesting that differences in average FDI

inflow intensity across ASEAN economies are more pronounced than year-to-year fluctuations within countries. This pattern indicates that country-specific factors, including market conditions, institutional quality, openness, investment climate, and integration into international production networks, may shape FDI inflows.

The descriptive statistics of the selected macroeconomic variables for 10 ASEAN economies during the time frame of the 25-year observation period are shown in Table 3. An overview of the macroeconomic conditions in each of the sample countries is provided by the data, which provide the average values of output growth, money supply, price levels, and FDI.

Table 3. Descriptive statistics of selected variables, per country (average)

No.	Country	Period	Output	Money	Price	FDI
1.	Cambodia	25	7.240	50.763	3.719	7.632
2.	Indonesia	25	4.890	42.145	5.821	1.367
3.	Lao PDR	25	6.211	44.396	8.767	4.883
4.	Malaysia	25	4.676	129.568	2.091	3.200
5.	Myanmar	25	7.117	39.148	14.606	3.060
6.	The Philippines	25	4.978	66.101	3.923	1.737
7.	Singapore	25	4.796	119.209	1.878	21.278
8.	Thailand	25	3.286	121.395	1.961	2.568
9.	Brunei Darussalam	25	0.614	70.931	0.527	2.342
10.	Vietnam	25	6.333	100.916	5.698	4.811

The results reveal substantial cross-country heterogeneity in output growth and monetary conditions across the ten ASEAN economies. Cambodia (7.240%), Myanmar (7.117%), Vietnam (6.333%), and Lao PDR (6.211%) record the highest average output growth, consistent with the rapid expansion experienced by several emerging ASEAN economies through trade integration, structural transformation, and participation in regional and global production networks. In contrast, Brunei Darussalam records the lowest average growth (0.614%), while Indonesia (4.890%), the Philippines (4.978%), Singapore (4.796%), Malaysia (4.676%), and Thailand (3.286%) exhibit more moderate growth, reflecting their relatively mature economic structures and established production bases. Considerable differences are also evident in the money supply, with Malaysia (129.568), Thailand (121.395), and Singapore (119.209) recording the highest M2-to-GDP ratios, compared with Indonesia (42.145) and Myanmar (39.148). These differences are broadly associated with variation in financial development, financial intermediation, banking-sector depth, financial inclusion, and the structure of financial systems across ASEAN economies. Overall, growth and monetary conditions should be interpreted in light of differences in economic structure, productivity, resource dependence, and exposure to external shocks.

Substantial heterogeneity is likewise observed in inflation and FDI. Myanmar records the highest average inflation rate (14.606%), followed by Lao PDR (8.767%) and Indonesia (5.821%), whereas Brunei Darussalam (0.527%), Singapore (1.878%), and Thailand (1.961%) exhibit comparatively greater price stability. These differences may reflect variations in exchange-rate arrangements, fiscal and monetary conditions, domestic supply constraints, commodity-price exposure, and institutional capacity. Regarding FDI, Singapore records the highest average net FDI inflow at 21.278% of GDP, reflecting its distinctive

position as a regional and global hub supported by strong financial infrastructure, international connectivity, institutional conditions, and integration into global production networks. Cambodia (7.632%), Lao PDR (4.883%), and Vietnam (4.811%) also record relatively high FDI inflows, potentially reflecting their participation in export-oriented manufacturing, infrastructure, natural-resource activities, and regional production networks, whereas Indonesia (1.367%) and the Philippines (1.737%) record comparatively lower FDI inflows relative to GDP. These patterns highlight the substantial cross-country differences in price dynamics and FDI intensity within the ASEAN panel.

The pairwise correlation matrix between the four main variables utilized in the analysis, such as output, money supply, price level, and FDI, are shown in Table 4. Prior to the econometric computations, the correlation coefficients offer initial information about the direction and strength of the associations between the variables.

Table 4. Correlation analysis

Variable	Output	Money	Price	FDI
Output	1.0000			
Money	−0.3169***	1.0000		
Price	0.2449***	−0.3237***	1.0000	
FDI	0.0932	0.3152***	−0.1124	1.0000

*Note: ***significant at 1% level.*

The correlation analysis indicates that money supply is negatively and significantly correlated with output ($r = -0.3169$, $p < 0.01$), suggesting that higher money-supply levels are associated with lower output during the sample period, although this descriptive relationship should not be interpreted causally and may reflect macroeconomic imbalances or inflationary pressures. In contrast, price levels are positively and significantly correlated with output ($r = 0.2449$, $p < 0.01$), indicating that higher output is associated with higher price levels, potentially reflecting demand-driven economic activity. FDI has a positive but statistically insignificant correlation with output ($r = 0.0932$), suggesting that its contribution may become more evident after controlling for other factors in the multivariate model. Among the explanatory variables, money supply is negatively and significantly correlated with price levels ($r = -0.3237$, $p < 0.01$), while it is positively and significantly correlated with FDI ($r = 0.3152$, $p < 0.01$), indicating an association between greater FDI activity and higher monetary aggregates. Meanwhile, FDI and price levels exhibit a weak negative and statistically insignificant correlation ($r = -0.1124$).

The panel unit root (stationarity) test findings for the model's variables such as output, money supply, price level, and FDI are shown in Table 5. Using modified t-statistics, the test assesses whether unit roots exist at both the level form (I(0)) and the first-difference form (I(1)). In panel data analysis, stationarity testing is crucial to make sure there are no stochastic patterns in the variables that could produce erroneous regression results.

Table 5. Panel stationarity test

Variable		I(0)	I(1)	Conclusion	
I(0)	I(1)	Adjusted t	Adjusted t	I(0)	I(1)
Output	ΔOutput	−4.9992***	−7.8709***	H_0 Rejected	H_0 Rejected
Money	ΔMoney	−3.0500***	−5.0673***	H_0 Rejected	H_0 Rejected
Price	ΔPrice	−2.6342***	−9.9882***	H_0 Rejected	H_0 Rejected
FDI	ΔFDI	−3.3345***	−7.2701***	H_0 Rejected	H_0 Rejected

*Note: ***significant at 1% level.*

The adjusted t-statistics indicate that all variables are statistically significant at the 1% level, with the level-form test statistics of −4.9992 for output, −3.0500 for money supply, −2.6342 for price, and −3.3345 for FDI, exceeding the critical values and allowing rejection of the null hypothesis of a unit root. The null hypothesis of non-stationarity is likewise rejected for the first-differenced variables (ΔOutput, ΔMoney, ΔPrice, and ΔFDI), confirming strong stationarity properties across the panel. These results suggest that the variables do not follow a random-walk process and that their statistical properties remain sufficiently stable over time, reducing the risk of spurious relationships. Accordingly, the stationarity evidence supports the suitability of the variables for subsequent dynamic panel estimation using the GMM approach employed in this study.

The dynamic panel model's estimation results using the First-Difference GMM (FD-GMM) and System GMM (SYS-GMM) estimators are presented in Table 6. The model examines how prices, FDI, and monetary variables affect changes in output (ΔOutput) in both the short and long term.

Table 6. Dynamic panel and Model Specification Test

Variable/Fit Statistics	Dependent Variable: ΔOutput					
	FD-GMM	Long-Run Effect		SYS-GMM	Long-Run Effect	
		L1.ΔOutput	L2.ΔOutput		L1.ΔOutput	L2.ΔOutput
ΔMoney	−0.2402 (0.000)***	−0.1668 (0.000)***	−0.1834 (0.000)***	−0.2340 (0.000)***	−0.1593 (0.002)***	−0.1902 (0.000)***
ΔPrice	0.0211 (0.602)	0.0147 (0.602)	0.0161 (0.602)	0.0531 (0.137)	0.0362 (0.176)	0.0432 (0.191)
ΔFDI	0.2981 (0.000)***	0.2070 (0.000)***	0.2275 (0.000)***	0.2681 (0.001)***	0.1825 (0.022)**	0.2179 (0.009)***
L1.ΔOutput	−0.4403 (0.000)***			-0.4690 (0.025)**		
L2.ΔOutput	−0.3100 (0.000)***			−0.2304 (0.147)		
Wald-test	180.79 (0.000)***			1,054.48 (0.000)***		
Sargan Test	193.67 (0.1234)					
AB test AR(1)				−1.7597 (0.0785)*		
AB test AR(2)				−1.2192 (0.2227)		

*Note: *, **, and *** indicate significant at 10%, 5%, and 1% levels.*

The empirical findings indicate that changes in money supply (ΔMoney) have a negative and statistically significant effect on output growth under both estimation approaches, supporting H1. The short-run coefficients are −0.2402 ($p < 0.01$) for FD-GMM and −0.2340 ($p < 0.01$) for SYS-GMM, while the long-run coefficients remain negative and statistically significant, ranging from −0.1593 to −0.1902 across the estimators and lag specifications. This persistent negative relationship suggests that monetary expansion may not be efficiently transmitted into productive economic activity and may instead be associated with macroeconomic imbalances or inflationary pressures that constrain output growth. In contrast, changes in price levels (ΔPrice) have no statistically significant effect on output growth, leading to the rejection of H2. The short-run coefficients are positive but insignificant for both FD-GMM ($\beta = 0.0211$; $p = 0.602$) and SYS-GMM ($\beta = 0.0531$; $p = 0.137$), and the corresponding long-run effects are likewise insignificant, indicating that inflation changes do not exhibit a statistically detectable direct effect on output growth during the study period.

Conversely, changes in FDI (ΔFDI) have a positive and statistically significant effect on output growth, supporting H3. The short-run coefficients are 0.2981 ($p < 0.01$) under FD-GMM and 0.2681 ($p < 0.01$) under SYS-GMM, while the positive long-run effects range from 0.1825 to 0.2275 across both estimators and lag specifications. These results indicate that greater FDI inflows are associated with stronger output performance over both short and longer horizons, potentially through technology transfer, productivity spillovers, managerial expertise, and integration into international markets. The lagged dependent variables further confirm the dynamic nature of output adjustment: FD-GMM produces negative and significant coefficients for L1.ΔOutput ($\beta = -0.4403$; $p < 0.01$) and L2.ΔOutput ($\beta = -0.3100$; $p < 0.01$), while SYS-GMM yields a significant first lag ($\beta = -0.4690$; $p < 0.05$) but an insignificant second lag ($\beta = -0.2304$; $p = 0.147$). These findings suggest that current output growth responds to previous growth conditions, with the adjustment effect becoming weaker at longer lags.

In terms of model validity, the overall explanatory power of the regression is confirmed by the Wald test statistics, which strongly reject the null hypothesis that all slope coefficients are jointly equal to zero in both models ($p < 0.01$). The null hypothesis of legitimate over-identifying limitations cannot be rejected, according to the Sargan test's probability value of 0.1234. The validity of the instrumental variables utilized in the GMM estimation is supported by this outcome.

The validity and consistency of the two-step System GMM estimator are further assessed using the Sargan and Arellano–Bond specification tests. The Sargan test evaluates the joint validity of the instruments under the null hypothesis that the instruments are uncorrelated with the error term. Thus, a statistically insignificant Sargan test indicates that the null hypothesis of instrument validity cannot be rejected, supporting the appropriateness of the instrument set. In addition, the Arellano–Bond test examines serial correlation in the first-differenced residuals. As expected in first-differenced dynamic panel models, the AR(1) test provides limited evidence of first-order serial correlation ($z = -1.7597$, $p = 0.0785$). More importantly, the AR(2) test is statistically insignificant ($z = -1.2192$, $p = 0.2227$), indicating that there is no evidence of second-order serial correlation in the differenced residuals. The absence of AR(2) serial correlation is particularly important because the validity of lagged instruments in the GMM framework depends on the absence of second-order serial correlation in the differenced disturbances. Taken together with the insignificant Sargan statistic, these diagnostics support the validity of the moment conditions and the consistency of the System GMM specification.

To assess whether the relationships between monetary conditions, prices, FDI, and output remained stable over the study period, the analysis incorporates a structural-break specification to account for two major global shocks: the 2008–2009 Global Financial Crisis (GFC) and the 2020–2021 COVID-19 pandemic. Accordingly, the structural-break model introduces crisis-period dummy variables and their interactions with the main explanatory variables. The structural-break specification is estimated alongside the baseline model to determine whether the main relationships remain stable after accounting for these extraordinary periods. Thus, the structural-break model is specified as follows:

$$\begin{aligned}\Delta Output_{it} = {} & \beta_1 \Delta Output_{it-1} + \beta_2 \Delta Output_{it-2} + \beta_3 \Delta Money_{it} + \beta_4 \Delta Price_{it} + \beta_5 \Delta FDI_{it} + \\ & \gamma_1 GFC_t + \gamma_2 COVID_t + \delta_1 (GFC_t \times \Delta Money_{it}) + \delta_2 (GFC_t \times \Delta Price_{it}) + \delta_3 (GFC_t \times \Delta FDI_{it}) + \\ & \theta_1 (COVID_t \times \Delta Money_{it}) + \theta_2 (COVID_t \times \Delta Price_{it}) + \theta_3 (COVID_t \times \Delta FDI_{it}) + \alpha_i + \varepsilon_{it}\end{aligned} \quad (7)$$

The results are further evaluated using individual and joint structural-break tests to assess whether the estimated relationships exhibit parameter stability over the 2000–2024 observation period.

Table 7. Structural break analysis during GFC and COVID-19 pandemic

Independent Variable/Fit Statistics	Dependent Variable: ΔOutput			
	Coeff.	Robust std. err.	t-stat	Prob.
ΔMoney	−0.1378	0.0404	−3.41	0.008***
ΔPrice	0.0180	0.0194	0.93	0.377
ΔFDI	0.2166	0.0510	4.24	0.002***
GFC	−2.7778	0.5942	−4.67	0.001***
COVID	−2.2693	1.0820	−2.10	0.065*
GFC×ΔMoney	0.0225	0.0729	0.31	0.765
GFC×ΔPrice	−0.0387	0.0620	−0.62	0.548
GFC×ΔFDI	−0.1235	0.0793	−1.56	0.154
COVID×ΔMoney	−0.2501	0.1408	−1.78	0.109
COVID×ΔPrice	0.1409	0.2153	0.65	0.529
COVID×ΔFDI	0.0346	0.4618	0.08	0.942
L1.ΔOutput	−0.5419	0.0700	−7.74	0.000***
L2.ΔOutput	−0.3672	0.0379	−9.70	0.000***
GFC structural-break test: F(3, 9) = 1.72 ; Prob > F = 0.2312				
COVID structural-break test: F(3, 9) = 3.47 ; Prob > F = 0.0641*				
Joint structural-break test: F(6, 9) = 6.38 ; Prob > F = 0.0073***				

*Note: *, **, and *** indicate significant at 10%, 5%, and 1% levels.*

The structural break analysis indicates that major global crises affected the output dynamics of the ASEAN economies, although the effects differ between crisis periods. The coefficient of the GFC dummy is negative and statistically significant ($\gamma = -2.7778$, $p = 0.001$), indicating a substantial downward shift in output during the 2008–2009 global financial crisis. The COVID-19 dummy is also negative ($\gamma = -2.2693$) but statistically significant only at the 10% level ($p = 0.065$), suggesting weaker evidence of a pandemic-induced level shift. The individual interaction terms associated with the GFC are statistically

insignificant, and the corresponding joint test confirms the absence of a significant slope break ($F(3,9) = 1.72$, $p = 0.2312$). For COVID-19, the individual interaction terms are likewise insignificant, although their joint test provides marginal evidence of parameter instability at the 10% level ($F(3,9) = 3.47$, $p = 0.0641$). Importantly, the joint test of all six crisis-related interaction terms is statistically significant at the 1% level ($F(6,9) = 6.38$, $p = 0.0073$). This finding indicates that the overall slope structure of the model changed significantly when the GFC and COVID-19 periods are considered jointly, suggesting that the relationships between monetary conditions, prices, FDI, and output were not completely stable over the 2000–2024 period.

DISCUSSIONS

The finding of a negative and statistically significant effect of changes in the money supply on economic growth in both the short and long run differs from the conventional expectation that monetary expansion can stimulate economic activity by increasing liquidity, facilitating credit expansion, and supporting aggregate demand. It suggests the effect of monetary expansion on real output growth is conditional on the effectiveness of monetary transmission and on the institutional and financial structures through which additional liquidity is intermediated. The Quantity Theory primarily establishes a relationship between money, prices, and nominal economic activity; whether changes in money translate into sustained changes in real output depends on the flexibility of prices, productive capacity, financial intermediation, and the broader monetary-policy environment. The heterogeneous empirical evidence reinforces this interpretation. Bajrami *et al.* (2025) report a positive effect of money supply on economic growth in the Western Balkans, whereas Pal and Nigam (2025) identify only a weak negative association between M3 and GDP growth in India. Similarly, Vo and Tran (2023) show that the relationship between money supply and economic growth differs across developed, developing, and emerging economies. These contrasting findings indicate the growth effects of monetary expansion are context dependent rather than universally positive or negative.

For ASEAN economies, an important explanation lies in the heterogeneity of monetary transmission through financial intermediaries. An expansion in monetary aggregates can stimulate output only if additional liquidity is effectively transmitted to households and firms and ultimately supports consumption, investment, and productive capacity. ASEAN-specific evidence indicates that this transmission is neither uniform nor complete. Hamid and Yunus (2020) find that monetary policy affects consumer and commercial lending, whereas mortgage and corporate lending exhibit weaker responses. This heterogeneous response across credit segments implies that changes in aggregate liquidity do not necessarily translate proportionally into credit directed toward productive activities. Similarly, Lerskullawat (2017) demonstrates that the bank-lending channel operates across ASEAN-5 economies but that its strength is conditioned by bank capitalization, liquidity, bank size, and the development of banking and capital markets. Consequently, the negative coefficient observed in this study may partly reflect limitations in the credit-transmission mechanism, whereby monetary expansion does not necessarily result in a corresponding increase in productive credit.

The interpretation is further strengthened by the substantial heterogeneity in financial development and monetary-policy effectiveness across ASEAN economies. The countries included in the sample differ considerably in financial depth, banking-sector structure, capital-market development, financial inclusion, institutional capacity, and monetary-policy frameworks. Such differences can cause a common monetary shock to generate substantially different real-sector responses. Karim *et al.* (2021) demonstrate

that financial development affects monetary-policy effectiveness differently across Singapore, Malaysia, and the Philippines. Their findings indicate that greater financial development can either strengthen or weaken monetary transmission depending on the country and the financial-development indicator employed. Accordingly, this is evidence of a uniform contractionary response to money-supply expansion in every ASEAN economy. This distinction is particularly important when interpreting a regional panel estimate, because country-specific institutional and financial characteristics may substantially influence the direction and magnitude of monetary transmission.

Institutional and banking-sector characteristics provide another layer of explanation. Hamid and Zulkhibri (2019) find that the bank-lending channel is stronger in the CLMV economies (Cambodia, Lao PDR, Myanmar, and Vietnam) than in the more financially developed ASEAN-5 economies, while bank ownership and bank-specific characteristics further influence monetary transmission. Khan *et al.* (2016) likewise demonstrate that bank competition and institutional conditions, including regulatory quality, government effectiveness, political stability, and financial freedom, shape the transmission of monetary policy through bank lending. These findings highlight that money creation and effective financial intermediation are not equivalent processes. In economies where institutional capacity and financial intermediation are relatively constrained, an increase in monetary aggregates may have a limited effect on productive credit. Conversely, in economies with deeper and more diversified financial systems, monetary impulses may be transmitted through multiple channels, including bank lending and capital markets. The negative coefficient in the present study may therefore capture the consequences of heterogeneous institutional and financial environments within the ASEAN panel.

A related explanation concerns the efficiency of capital allocation. Monetary expansion can enhance economic growth when additional liquidity is allocated toward productive investment, technological upgrading, entrepreneurship, and capacity expansion. However, greater financial liquidity does not necessarily imply greater allocative efficiency. Where financial intermediation is affected by information asymmetries, and weak institutional safeguards, additional liquidity may be directed toward consumption, low-productivity activities, or financial and real-estate assets rather than productivity-enhancing investment. This mechanism provides an important perspective for interpreting the contrasting coefficients obtained in this study: money supply is negatively associated with output growth, whereas FDI has a positive and statistically significant effect. The contrast suggests that productive consequences of financial resources depend not merely on their availability but also on their allocation and utilization. Supporting this argument, Haini (2020) finds that financial institutions contribute to economic growth in ASEAN economies and that institutional quality complements financial development, indicating that the growth benefits of financial intermediation depend on the institutional environment. Moreover, Ho and Saadaoui (2022) identify a nonlinear relationship between bank credit and economic growth in ASEAN, whereby credit contributes positively to growth below a certain threshold but becomes statistically insignificant beyond that threshold. This evidence indicates that increasing the volume of financial resources does not necessarily produce proportionate gains in real economic activity.

The negative association may also be related to financial instability and the accumulation of macro-financial imbalances. Monetary expansion that is not accompanied by corresponding improvements in productive capacity may contribute to excessive credit growth, risk-taking, or asset-price pressures. These effects can ultimately weaken financial-sector resilience and reduce the efficiency of resource allocation. The International Monetary Fund (2018) emphasizes that rapid credit expansion in ASEAN can generate systemic vulnerabilities because credit booms may be accompanied by declining investment quality and increasing financial-sector risks. These concerns are particularly relevant to ASEAN economies

because their increasing financial integration exposes domestic financial conditions to international liquidity cycles, capital-flow reversals, and exchange-rate movements. Deb *et al*. (2021) similarly highlight the importance of capital flows and balance-sheet effects in transmitting financial shocks across Asian emerging markets, while conventional monetary-policy transmission may be relatively weak. Thus, monetary expansion may interact with external financial conditions in ways that reduce its effectiveness in generating sustained real output growth.

The interpretation should also account for financial liberalization, financial innovation, and instability in the demand for money. The relationship between monetary aggregates and economic activity is unlikely to remain constant when financial systems undergo structural transformation. Dekle and Pradhan (1997) document instability in the relationship among money growth, economic activity, and inflation in Indonesia, Malaysia, Singapore, and Thailand. Their evidence suggests that monetary aggregates may not maintain a stable relationship with real economic activity over time. This consideration is particularly relevant to the present 2000–2024 sample, which encompasses substantial financial deepening, technological changes in financial intermediation, increased capital-market integration, and major global financial disruptions. Consequently, an observed increase in the money supply may not necessarily represent an equivalent increase in liquidity available for productive investment. Changes in money demand, financial intermediation, and portfolio preferences can alter the relationship between monetary aggregates and real economic activity.

The negative coefficient can be interpreted within the institutional and financial context of ASEAN. The contrasting international evidence supports this cautious interpretation. Bajrami *et al.* (2025) find a positive relationship between money supply and economic growth in the Western Balkans, whereas Pal and Nigam (2025) report only a weak negative association between M3 and GDP growth in India. Vo and Tran (2023) similarly document substantial differences in the money–growth relationship across developed, developing, and emerging economies. These differences suggest that the effect of monetary expansion depends on the extent to which additional liquidity is transformed into productive economic activity. In the ASEAN context, this transformation is likely to be conditioned by the depth and structure of financial markets, bank characteristics, institutional quality, financial stability, and the efficiency of capital allocation.

Inflation does not have a statistically significant effect on output growth in the ASEAN panel. Although the estimated coefficients are positive, their magnitudes are economically small and statistically insignificant across both lag specifications and estimation approaches. This finding indicates that, on average, changes in inflation do not exhibit a systematic linear association with output growth across the ten ASEAN economies over the study period. It suggests that the growth consequences of inflation may depend on the level, persistence, and volatility of price increases, as well as on country-specific monetary and institutional conditions.

The finding differs from a substantial body of empirical literature documenting adverse effects of inflation on economic growth. Baharumshah *et al.* (2016) and Akinsola and Odhiambo (2017) emphasize that persistent and unstable inflation can undermine economic performance by reducing purchasing power, increasing uncertainty, distorting relative prices, and weakening investment incentives. More recent evidence by Su and Soon (2024), Pappas and Boukas (2025), Setiadi (2025), and Wulandari *et al*. (2026) likewise reports negative effects of inflation on economic growth. These mechanisms suggest that sustained inflation can become detrimental when price instability raises the costs and uncertainty associated with consumption, production, and long-term economic decisions.

However, the insignificant coefficient obtained in the present study is compatible with an important strand of the literature arguing that the inflation–growth relationship is nonlinear and threshold dependent. Khan and Senhadji (2001) demonstrate that inflation does not necessarily exert a statistically significant negative effect on growth below a critical threshold, whereas inflation above the threshold significantly reduces economic growth. Their estimates place the threshold at approximately 11–12% for developing economies. Similarly, Vinayagathasan (2013) identifies an inflation threshold of approximately 5.43%, below which inflation has no statistically significant effect on growth but above which inflation becomes growth-reducing.

This threshold perspective is particularly relevant to the present ASEAN sample. Thanh (2015) finds an inflation threshold of approximately 7.84% for the ASEAN-5, above which inflation significantly impedes economic growth. Thus, a statistically insignificant average coefficient in the present linear model does not necessarily contradict the existence of an adverse inflation–growth relationship. Instead, it may indicate that the pooled linear specification does not distinguish between low- and high-inflation regimes. If a substantial proportion of country-year observations remained below the inflation level at which inflation becomes economically damaging, the estimated average effect could reasonably be statistically insignificant.

The descriptive statistics provide some support for this interpretation. The average inflation rate for the full sample is 4.899%, although considerable cross-country and temporal variation exists. This aggregate mean is below the thresholds reported for developing economies by Khan and Senhadji (2001) and for ASEAN-5 economies by Thanh (2015), while remaining close to the threshold identified for Asian economies by Vinayagathasan (2013). These comparisons should not be interpreted as evidence that a specific threshold applies mechanically to the present sample since the thresholds are model-, sample-, and period-specific. Nevertheless, they provide a plausible explanation for why inflation may not exhibit a significant average linear effect on output growth in the current specification.

Another possible explanation concerns improvements in monetary-policy frameworks and the anchoring of inflation expectations across ASEAN economies. Dany-Knedlik and Garcia (2018) find evidence of stronger forward-looking inflation dynamics and better-anchored inflation expectations in the major ASEAN economies following improvements in monetary-policy frameworks after the Asian Financial Crisis. They also report that the quantitative influence of cyclical fluctuations and import prices on inflation dynamics diminished over time. Such developments may have reduced the extent to which moderate inflation generates uncertainty and real-sector distortions. When inflation expectations are relatively well anchored, economic agents may be better able to incorporate anticipated price changes into wage-setting, pricing, production, and consumption decisions, thereby reducing the immediate adverse effects of moderate inflation on output.

Nevertheless, caution is warranted in attributing the insignificant result exclusively to improved monetary-policy credibility. The ASEAN economies remain highly heterogeneous in terms of monetary regimes, exchange-rate arrangements, financial development, institutional quality, and exposure to external price shocks. Moreover, inflation in developing economies can be influenced by supply-side factors, including food and energy prices, exchange-rate movements, and production bottlenecks. Consequently, the observed inflation rate may capture a combination of demand-side and supply-side forces whose effects on real output differ across countries and periods.

The negative and statistically significant effect of changes in the money supply on economic growth, alongside the statistically insignificant effect of price changes, may initially appear contradictory to the conventional monetary transmission mechanism underlying the QTM. However, the identity function is an accounting identity rather than a presumption of a stable or proportional causal relationship between money growth, inflation, and real output. The transmission of monetary expansion depends on the behavior of money demand and velocity, the efficiency of financial intermediation, productive capacity, exchange-rate conditions, and institutional quality. Thus, the divergent effects observed in this study may reflect the heterogeneous and imperfect transmission of monetary expansion to output and prices across ASEAN economies.

This issue is particularly relevant to ASEAN economies, where financial systems have undergone substantial structural transformation and remain heterogeneous. Dekle and Pradhan (1997) document instability in the relationships among money growth, economic activity, and inflation in Indonesia, Malaysia, Singapore, and Thailand following financial liberalization, suggesting that changes in money supply do not necessarily translate proportionally into changes in prices or output. Moreover, Karim *et al.* (2021) show that financial development affects monetary-policy effectiveness differently across Singapore, Malaysia, and the Philippines. Consequently, the pooled ASEAN coefficient may mask substantial cross-country differences in monetary transmission through bank lending, capital markets, and exchange rates.

The insignificant effect of price changes may also reflect the importance of structural and supply-side determinants of inflation. In developing economies, inflation can be influenced by food and energy prices, exchange-rate movements, production bottlenecks, and financial-market conditions. Ötker *et al.* (2009) emphasize the importance of these structural factors in shaping inflation dynamics in emerging and developing economies. Thus, monetary conditions may affect financial or real-sector activity without generating a sufficiently uniform inflation response across ASEAN economies.

Institutional quality and financial-sector development may condition the effectiveness of monetary transmission. Huang and Wei (2006) highlight the importance of institutional quality for monetary-policy effectiveness in developing economies, while Haini (2020) demonstrates that institutional quality complements financial development in supporting economic growth. These arguments suggest that the negative effect of money supply on growth and the insignificant effect of price changes are not necessarily contradictory. Rather, they indicate that monetary expansion in heterogeneous ASEAN economies may be transmitted unevenly to real activity and prices, with the resulting outcomes shaped by financial, structural, and institutional conditions.

Furthermore, the results indicate that changes in net FDI inflows have a positive and statistically significant effect on economic growth. This finding suggests that increases in FDI relative to GDP are associated with higher output growth in the ASEAN economies during the study period. The finding indicates that foreign investment inflows constitute an important channel through which ASEAN economies can access external financial resources, technologies, managerial capabilities, and international production networks.

The positive association is consistent with the theoretical argument that FDI can contribute to host-country productivity through channels that extend beyond the direct financial resources associated with foreign-owned firms. Borensztein *et al.* (1998) argue that FDI can enhance economic growth through technology transfer and productivity improvements, although the magnitude of these benefits depends on the host economy's absorptive capacity, particularly human capital. Similarly, Le *et al.* (2024) find that FDI contributes positively to economic growth in middle-income economies, while Emako *et al.*

(2022) demonstrate that FDI in manufacturing can support economic growth in emerging economies. Wulandari *et al.* (2026) likewise report a positive relationship between FDI and economic growth over both the short and long run. These findings suggest the growth-enhancing effects of FDI may arise from the interaction between foreign-owned enterprises and the productive capabilities of host economies.

The finding is particularly relevant to ASEAN economies because the region has become increasingly integrated into regional and global production networks. The relatively strong positive association between FDI and output growth suggests that foreign investment may have supported economic expansion through greater participation in internationally oriented production activities. However, the magnitude of these benefits is likely to differ across countries because ASEAN economies vary substantially in terms of human capital, infrastructure, institutional quality, domestic firm capabilities, and the depth of linkages between foreign-owned and domestic enterprises. Therefore, the positive coefficient should not be interpreted as implying that FDI automatically generates economic growth in all circumstances.

CONCLUSIONS

This study examines the dynamic effects of money supply, inflation, and FDI on economic growth across ten ASEAN economies during 2000–2024 using a two-step SYS-GMM estimator. The findings show that changes in money supply have a negative and statistically significant effect on economic growth, suggesting that monetary expansion does not necessarily translate into higher output when monetary transmission, financial intermediation, and institutional conditions are heterogeneous. Changes in inflation are statistically insignificant, indicating that inflation does not exhibit a significant average linear effect on output growth, potentially reflecting moderate inflation levels and nonlinear or country-specific inflation dynamics. In contrast, changes in FDI have a positive and statistically significant effect on economic growth, highlighting the potential contribution of foreign-owned activities through technology transfer, productivity spillovers, managerial capabilities, and global value-chain integration. The significant lagged output coefficient further confirms the dynamic nature of growth adjustment. Finally, the structural-break analysis associated with the Global Financial Crisis and COVID-19 pandemic indicates that monetary–growth relationships are not invariant over time and may be influenced by major global disruptions. The findings emphasize the importance of context-sensitive monetary management, effective financial intermediation, and an enabling environment for FDI in supporting sustainable economic growth in ASEAN.

The findings provide several theoretical and policy implications. The results indicate that the relationship between money supply and economic growth is context dependent, while the insignificant inflation effect suggests that monetary transmission does not necessarily follow a uniform money–price–output mechanism across heterogeneous ASEAN economies. The positive effect of FDI highlights the importance of cross-border knowledge, technology, and productivity spillovers. Moreover, the structural-break evidence demonstrates that these relationships may change during major disruptions, such as the Global Financial Crisis and the COVID-19 pandemic. From a policy perspective, monetary expansion should therefore be aligned with productive capacity, financial-sector conditions, and macroeconomic stability, while FDI policies should emphasize not only attracting inflows but also strengthening human capital, infrastructure, institutional quality, technological capabilities, and linkages between foreign-owned and domestic firms. During systemic shocks, flexible monetary and macroprudential responses are also essential.

Several limitations should be acknowledged. The model does not explicitly incorporate other important growth determinants, including financial development, institutional quality, human capital, trade openness, and technological innovation. Aggregate country-level data may also mask cross-country, sectoral, and FDI-specific heterogeneity. Although SYS-GMM addresses important dynamic-panel and endogeneity concerns, potential omitted-variable bias and unobserved heterogeneity cannot be completely excluded. In addition, the structural-break analysis focuses on the Global Financial Crisis and COVID-19 pandemic and may not capture other country-specific structural changes.

Future research could extend the analysis by incorporating additional structural and institutional variables and applying nonlinear, threshold, panel VAR, and regime-switching approaches to examine whether monetary and inflation effects vary across economic regimes. Further research could also disaggregate FDI by sector, origin, destination, and type of foreign-owned activity, while comparative studies across ASEAN and other emerging economies could provide deeper insights into how financial structures, institutional conditions, and major economic shocks shape the monetary–growth relationship.

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