ECONOMIC GROWTH AND MILITARY EXPENDITURE NEXUS: EMPIRICAL EVIDENCE FROM ASEAN-10 ECONOMIES

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Abstract:

This study aims to test the causal relationship between military expenditure and economic growth in ASEAN-10 using time-series data covering the period from 1960 to 2023. It revisits existing evidence on the ASEAN-10 economies with updated data on the effects of military expenditure on economic growth. Empirical analysis was conducted using cointegration analysis and causality tests to justify the relationship and direction of causality between the variables. The findings reveal a positive long-run relationship and a unidirectional long-run causality from economic growth to military expenditure in most ASEAN-10 countries. The finding that economic growth drives military expenditure in these countries is significant, as it suggests that defence spending is economically sustainable when aligned with national income. As countries grow wealthier, they gain greater fiscal capacity to invest in security without compromising development priorities. The empirical results support the case for a sustainable defence budget, efficient resource allocation, and expanded opportunities for domestic defence industry development ultimately contributing to long-term economic resilience and self-reliance.

Keywords:

ASEAN-10 Economies, Economic Growth, Gross Domestic Product (GDP), Military Expenditure

Introduction

Over the past decades, the relationship between military expenditure and Economic Growth has been the subject of extensive research and policy debate worldwide. This topic has garnered increasing attention, particularly due to the divergent findings reported by various researchers.

For example (Smith and Smith 1980) argued that military expenditure protects countries from external threats and encourages foreign investment. By contrast, (Deger and Smith 1983) argued on negative effect on eco nomic growth since it transfers resources from the civilian to the defence sector. Additionally, some other studies argued on no evidence of any relationship between military expenditure and economic growth such as (Adams et al. 1991; Alexander 1990;Ram1986; Park 1993).

In definition, military expenditures include all current and capital expenditures on the armed forces, including peacekeeping forces; defence ministries and other government agencies engaged in defence projects; paramilitary forces. SIPRI (2024). Military Expenditure encompasses expenditures include military and civil personnel, including retirement pensions of military personnel and social services for personnel; operation and maintenance; procurement; military research and development; and military aid (in the military expenditures of the donor country). The growing interest of researchers in peace economics is well-founded, as military expenditure remains a significant concern for nations, regardless of their level of development. Allocating resources away from highly productive sectors to enhance security may impact the overall economic output. Conversely, neglecting internal and external security in pursuit of maximizing economic gains in productive sectors can lead to instability in economic growth (Smith, 2020; Dunne & Tian, 2021). Therefore, empirical analysis is essential to assess the economic trade-offs associated with military spending and to provide a more comprehensive understanding of its implications.

Researchers have long examined the impact of military expenditure across various economies, including underdeveloped, developing, and developed nations. Such studies are particularly relevant for countries that have recently gained sovereignty or those that maintain strategic political and economic relations with neighbouring countries (Farzanegan, 2014). Given the geopolitical dynamics of the ASEAN-10 economies, where regional security concerns necessitate substantial military budgets, understanding the relationship between military expenditure and economic growth is crucial. This study aims to empirically analyse the economic implications of military spending within ASEAN-10 countries, considering their interdependent security frameworks, trade relations, and regional stability (Dunne & Perlo-Freeman, 2003; Kollias et al., 2020).

The issue of the topic lies in the fact that existing studies present mixed and often contradictory findings, some argue that military spending stimulates growth, while others find no relationship at all. In the case of ASEAN-10, limited and outdated empirical work has been conducted, leaving a gap in understanding how modern economic realities (post-2000 globalisation, South China Sea disputes, and fiscal pressures from COVID-19 recovery) shape this nexus.

Accordingly, this study addresses the gap by revisiting the ASEAN-10 with data from 1960 until 2023 and robust econometric methods to determine whether military expenditure serves as a growth driver or not in the long run. By clearly situating the issue in the ASEAN context, this research contributes to both theoretical debates and practical policymaking. ASEAN-10 economies which refers to the ten member countries of the Association of Southeast Asian Nations (ASEAN), which include Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Laos, Myanmar, and Cambodia. Since its establishment in 1967, ASEAN has expanded its membership and economic influence, playing a pivotal role in regional stability, economic cooperation, and global trade integration (ASEAN Secretariat, 2022). The ASEAN-

10 economies exhibit significant diversity in terms of economic development, ranging from highly industrialized nations such as Singapore and Malaysia to emerging economies like Myanmar and Cambodia. Collectively, these countries contribute to ASEAN's position as the fifth-largest economy in the world, with a combined GDP exceeding $3.6 trillion as of 2022 (ASEAN Statistics, 2023).

Examining ASEAN-10 is essential for understanding the economic implications of military expenditure within a highly interdependent regional framework. Given their geopolitical significance, security concerns, and varying levels of military investment.
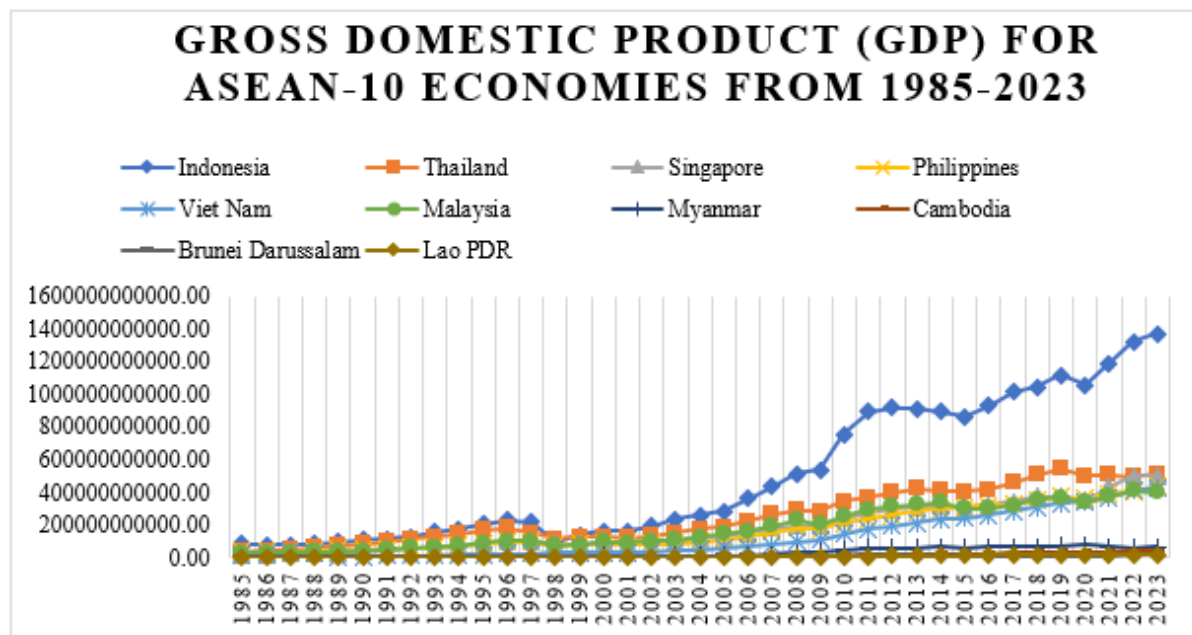

Figure 1: ASEAN-10 Gross Domestic Product (GDP) from 1985 to 2023
Source: World Development Indicators (2025)

As shown in Figure 1, from 1985 to 2023, Indonesia consistently leads ASEAN-10 in GDP, driven by its large population, rich resources, and industrialization (World Bank, 2023). Since 2005, its growth accelerated, especially after 2010, due to a diversified economy and strong domestic demand. The World Bank (2022) highlights Indonesia's resilience during global downturns, supported by consumption and natural assets. Thailand ranks second with stable growth since the early 2000s, supported by structural reforms and trade openness (ADB, 2020). Malaysia follows closely, with strong performance in the late 1990s and 2000s, thanks to industrial upgrading and a robust electrical and electronics sector (Rasiah & Thiruchelvam, 2007).

Singapore, though smaller in size, maintains high GDP through its advanced services, global connectivity, and sound governance (IMF, 2021). The Philippines shows moderate growth, rising faster after 2010, driven by remittances, services, and demographics, though hindered by infrastructure and governance issues (World Bank, 2019).Vietnam stands out with steady growth since the late 1990s, reflecting successful reforms and trade integration. In contrast, Myanmar's GDP remains low due to political instability and weak investment (World Bank, 2021).

Cambodia sees gradual growth post-2000, fueled by textiles, tourism, and construction, but remains vulnerable due to a narrow base (ADB, 2022). Lao PDR records modest gains from hydropower and FDI, though hampered by geography and infrastructure gaps (UNCTAD, 2020).Brunei, despite its high-income status from oil and gas, has one of the lowest GDPs in ASEAN due to its small population and lack of diversification (IMF, 2020).

ASEAN-10 GDP trends show clear divergence, with Indonesia, Vietnam, and the Philippines experiencing strong growth due to industrialization, diversification, and policy reforms. In contrast, Brunei and Myanmar lag behind Brunei due to overreliance on oil and gas, and Myanmar due to political instability. Countries like Vietnam, Malaysia, and Indonesia have benefited from structural reforms, while Cambodia, Laos, and Myanmar face growth constraints from narrow economic bases and weak infrastructure. Notably, Singapore maintains high GDP through economic sophistication, unlike resource-dependent Brunei, highlighting the importance of diversification and institutional strength for sustainable growth.
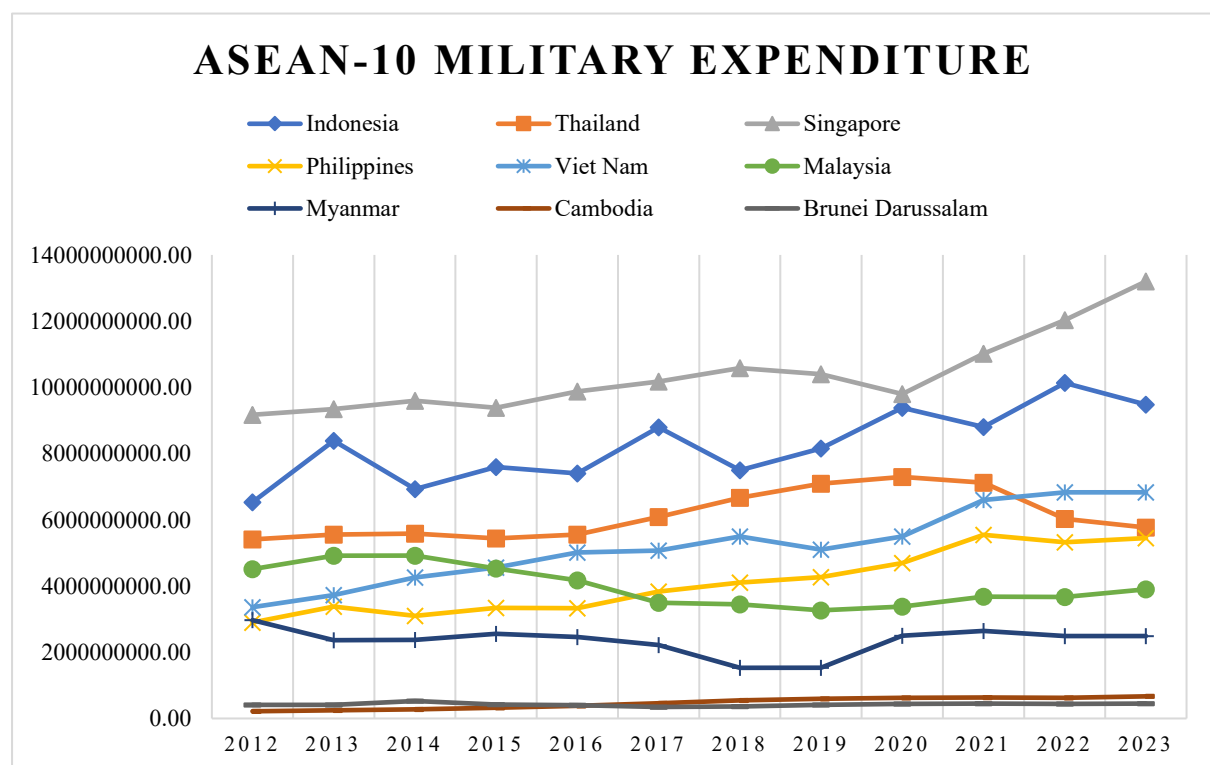
Figure 2: ASEAN-10 Military Expenditure from 2012 to 2023

Source: World Development Indicators (2025)

Figure 2 shows the military expenditure graph, Myanmar exhibits the most significant rise in defence spending, particularly from the early 2000s onward. This sharp increase may be attributed to the country's political instability, military governance, and conflicts with ethnic armed groups (Stockholm International Peace Research Institute [SIPRI], 2023). Myanmar records the highest military spending in recent years, with a sharp increase post-2000. This aligns with military dominance in governance and internal conflicts. Selth (2016) noted the military's central role in politics and national priorities.

Military expenditure trends across Southeast Asia reflect diverse strategic priorities and resource allocation decisions shaped by geography, politics, and external threats. Singapore consistently allocates around 3–4% of its GDP to defence, emphasizing deterrence and technological advancement, largely due to its strategic vulnerabilities and the need to safeguard critical trade routes (Bitzinger, 2013). Indonesia has increased its military spending in line with its archipelagic nature and persistent internal security concerns, recognizing the strategic imperative for a capable defence force (Sukma, 2010). In Thailand, defence allocations remain stable, influenced by the military's entrenched role in politics and the need to manage southern insurgencies (Chambers, 2013). Malaysia's steady yet moderate defence spending aligns with its modernization objectives and commitment to regional stability (Yusof, 2021). Rising tensions in the South China Sea have driven Vietnam to boost defence budgets as part of broader modernization efforts (Thayer, 2009). Despite fiscal limitations, the Philippines has begun increasing its defence expenditure, shifting from U.S. reliance to address insurgencies and maritime disputes (De Castro, 2020). Brunei maintains moderate spending levels, supported by oil revenues, sufficient for internal security and sovereignty protection (Leifer, 2001). In contrast, Cambodia's flat expenditure reflects post-conflict recovery priorities and limited resources (Peou, 2000), while Laos, facing minimal external threats, allocates the least to defence, focusing on domestic development and constrained by economic capacity (UNDP, 2019). These varying trend shows how resource allocation decisions in Southeast Asia's defence sector are tightly interwoven with national strategic imperatives, fiscal capabilities, and evolving regional dynamics.

Literature Review

The ASEAN-10 region, consisting of Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Laos, Myanmar, and Cambodia, presents a unique case for analysing the military expenditure growth nexus. These countries vary in economic development levels, military priorities, and geopolitical strategies, making it essential to assess the heterogeneous effects of defence spending across the region.

The ASEAN-10 economies collectively form the fifth-largest economic bloc in the world, with a combined GDP exceeding $3.6 trillion as of 2022 (ASEAN Statistics, 2023). However, there is significant variation in defence budgets among member states. For instance, Singapore and Thailand allocate relatively high military budgets, whereas Laos and Cambodia prioritize developmental expenditures over defence. Additionally, regional security concerns, such as territorial disputes in the South China Sea, counterterrorism efforts, and political instability in Myanmar have influenced military spending decisions across ASEAN (Ravenhill, 2017; ASEAN Secretariat, 2022)

This variation underlines the central issue of the topic: whether military expenditure supports or undermines economic growth is not only debated in global literature but also unresolved in ASEAN itself. Some countries appear to benefit from defence-led growth, while others show no link or even adverse effects. Hence, a regional comparative study is required.

Econometric analysis in this study determines whether military expenditure serves as a growth driver or an economic burden in the ASEAN-10 economies. By employing Johensen cointegration analysis and Granger Causality tests as it aims to provide empirical evidence on the cointegration and feedbacks effects of military spending on GDP growth. Several studies have provided empirical evidence supporting a positive impact of military spending on

economic growth. Asseery (1996) found a long-run causal relationship between military expenditure and economic growth in Iraq, suggesting that defence spending played a critical role in shaping the country's economic structure. Similarly, Benoit (1973, 1978) proved that military expenditure improves literacy rates, medical facilities, employment opportunities, and technological innovations, which collectively contribute to economic growth.

In the case of developed economies, Atesoglu (2002) used cointegration analysis for the United States and found that military expenditure had a positive and statistically significant effect on economic growth. Likewise, Kollias et al. (2004b) applied causality tests to analyse data from 1964 to 1999 and reported bidirectional causality between military spending and economic growth. A subsequent study by Kollias et al. (2004a) on EU-15 countries (1961–2000) revealed a positive causality from economic growth to military expenditure, suggesting that wealthier nations allocate higher defence budgets based on economic performance rather than external security threats.

Focusing on broader datasets, Dicle and Dicle (2010) examined 65 countries (1975–2004) and found that 54 nations exhibited bidirectional causality between military expenditure and economic growth. Similarly, Dakurah et al. (2001) found that in 23 countries, there was a unidirectional causal relationship, while in seven cases, there was bidirectional causality.

For specific regional contexts, Yildirim et al. (2005) analysed Middle Eastern economies and Turkey using a dynamic panel data approach (1989–1999) and confirmed the positive impact of military expenditure on economic growth. Feridun et al. (2011) studied North Cyprus (1977–2007) and identified a strong unidirectional causality from military expenditure to economic growth. These findings suggest that, in some cases, military spending contributes to national economic performance through technological spillovers, job creation, and industrial development.

Some research suggests a positive relationship between defence spending and economic growth in certain ASEAN countries (Hirnissa et al., 2009). For example, Hirnissa et al. (Hirnissa et al., 2009) found a long-run relationship between military expenditure and economic growth in Indonesia, Thailand, and Singapore. The study indicated that for Singapore, the causality is bidirectional, while for Indonesia and Thailand, it is unidirectional from military expenditure to economic growth (Hirnissa et al., 2009).

Despite evidence supporting the growth-enhancing effects of military spending, other scholars highlight the potential negative implications of excessive defence budgets. Deger and Sen (1995) argued that military expenditure could crowd out investment in productive sectors such as infrastructure and education, leading to slower economic growth. Heo and Ye (2016) further emphasized that military expenditure may lead to budget deficits and inflation, which negatively impact long-term economic performance.

Research on ASEAN economies has also produced mixed findings. Hirnissa et al. (2009) analysed ASEAN-5 countries and found that Indonesia, Thailand, and Singapore exhibited a long-run relationship between military spending and economic growth. However, no significant relationship was observed in Malaysia and the Philippines, suggesting that the impact of military expenditure may depend on country-specific factors such as institutional quality, governance, and economic structure.

Additionally, Abu-Qarn (2010) examined the Arab-Israel conflict and found no persistent adverse impact of military expenditures on economic growth, challenging the traditional argument that high defence budgets necessarily harm economic development.

However, the impact is not uniform across all ASEAN countries. Some studies have found no significant relationship between military expenditure and economic growth in Malaysia and the Philippines (Hirnissa et al., 2009). This mixed evidence suggests that the relationship may be contingent on country-specific factors such as economic structure, governance, and security context.

In another studies concluded military spending stimulates economic growth through job creation, technological advancements, and infrastructure development (Benoit, 1973; Kollias et al., 2020). Conversely, other research highlights the potential crowding-out effect, where excessive military expenditure diverts resources from more productive sectors such as education, healthcare, and infrastructure, thereby hindering long-term economic growth (Deger & Sen, 1995; Heo & Ye, 2016). Given these contrasting perspectives, further investigation into the impact of military spending is essential, particularly in the context of regional economic blocs such as ASEAN, where security considerations and economic priorities are closely interlinked.

From the literature, it shows three main gaps firstly, lack of updated ASEAN-wide evidence covering all 10 member states with post-2000 data, secondly, methodological inconsistencies in earlier ASEAN studies that limit comparability, and thirdly, insufficient attention to the role of fiscal capacity, governance, and external security dynamics in shaping the ME and GDP nexus. This study seeks to fill these gaps by employing time-series econometric methods on the ASEAN-10, offering new insights into whether economic growth drives military expenditure or vice versa.

Data and Methodology
Data used in this study are annual basis which cover the period of 1985 to 2023 and the variables are Gross Domestic Product (GDP) and Military Expenditure (ME). Data were collected from World Bank Development Indicators (World Bank, 2014). GDP is at 2005 constant US $ prices and military expenditure is considered as a percentage of economic growth. All variables are transformed into the natural logarithmic form in order to capture growth effects (Katircioglu, 2009).

Methodology
The Augmented Dickey–Fuller (ADF) performed to determine the order of integration of the variables (Dickey and Fuller, 1981 and the Johansen test is employed to estimate the possible long-run equilibrium relationship between these variables (Johansen and Juselius, 1990). At last, Granger causality test is used to analyze the direction of the causal relationship between the variables (Granger, 1988).

Empirical Model
This study suggests that Military Expenditure might also be affected by GDP in the case of Asean-10. Thus, the fundamental equation for this study can be shown as follows:

GDP = f(ME)   (1)

Where military expenditure (ME) is the function of Gross Domestic Product (GDP). The variables in the formula can be transferred into the logarithmic form in order to capture impacts of growth as mentioned before;

$$In\ GDP = \beta_0 + \beta_1 \ln ME + \varepsilon_t \quad\quad (2)$$

Where at time t, lnME and lnGDP are the natural log of military spending and real income respectively. ε_t represents the error term, β_0 is constant coefficient which is the intercept of the equation and β_1 is the coefficient of lnGDP and represents the slope of the equation.

Unit Root Tests

Unit root tests are used to check whether time series variables are. We employ widely used unit root tests, namely Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1981) to determine the level of integration of the variables under investigation. The ADF test is widely used in econometric studies due to its ability to handle more complex error structures than the basic Dickey-Fuller test by including lagged difference terms. Enders (1995) suggests using models with both trend and intercept as a starting point for such tests. The formula is as follows:

$$\Delta y_t = a_0 + \lambda_{yt-1} + a_2 t + \sum_{i=2}^{p} \beta_j \Delta y_{t-i-1} + \varepsilon_t \quad\quad (3)$$

Where y is the dependent variable, a is the drift, t is trend, ε is a noise and p represents the lag level. In order to ensure that the errors are white noise, the number of lags "p" of the dependent variable should be determined by using the Akaike Information Criteria (AIC) or some other alternative criteria (Katircioglu et al., 2007). ADF tests apply t-test for λ. Null hypothesis of these tests is the series is non-stationary. If the series is stationary at level, the series is called integrated of order zero, I(0). When the series is stationary at first differences, it is called integrated of order one, I(1).

Cointegration Tests

In this part, the possible long-run equilibrium relationship between the variables is investigated. The present research is based on Johansen methodology that is used to test cointegration among variables those have the same order of integration. Minimum one co-integrating vector is required in order to have co-integration between variables. Johansen test takes its initial point in the vector auto regression (VAR) of order p given by;

$$y_t = \mu + A_1 y_{t-1} + \cdots + A_P y_{t-p} + \varepsilon_t \text{for } t = 1, \ldots, T \quad\quad (4)$$

Where yt, yt-1,…,yt-pare vectors of level and lagged values of P variables respectively which are I(1) in the model; A1,…, Apare coefficient matrices with (PXP) dimensions; μ is an intercept vector, ε_t is a vector of random errors. Johansen (1988) and Johansen and Juselius (1990) suggest that trace statistics are obtained by using the Eigen values. The trace statistic (λtrace) could be estimated by the formula below;

$$\lambda_{trace} = -T\Sigma Ln(1 - \lambda_i)i = r + 1, \ldots, n - 1 \quad\quad (5)$$

The null hypotheses are given as follows;

H0: r = 0   H1: r ≥ 1

H0: r ≤ 1   H1: r ≥ 2

H0: $r \leq 2$ H1: $r \geq 3$

Granger Causality Tests

This test is performed in order to identify the direction of the causal relationship between ME and GDP. The casual relationships can be either unidirectional or bi-directional. This test estimates the following equations assuming there is no correlation between u1t andu2t.

$$GDP_t = \sum_{i=1}^{n} a_i ME_{t-i} + \sum_{j-1}^{n} \beta_j GDP_{t-j} + u_{1t} \tag{6}$$

$$ME_t = \sum_{n=1}^{n} \lambda_i ME_{t-i} + \sum_{j-1}^{n} \delta_j GDP_{t-j} + u_{2t} \tag{7}$$

Empirical Results

Unit Root Test

According to ADF series are stationary at the first differences which means series are integrated of order one, (1).
The following table indicates the results of ADF tests:

Table 1: ADF Unit Roots

Indonesia	lnGDP	Lag	lnME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1st Level				
tT (ADF)	-5.53*	(0)	-5.13*	(0)
tm (ADF)	-5.67*	(0)	-4.95*	(0)
t (ADF)	-3.40*	(0)	-4.97*	(0)
Malaysia	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-1.92	(0)	-3.11	(0)
tm (ADF)	-0.23	(0)	-0.11	(0)
t (ADF)	5.23	(0)	-0.42	(0)
1st Level				
tT (ADF)	-2.51*	(0)	-4.23*	(0)
tm (ADF)	-4.77*	(0)	-3.55*	(0)
t (ADF)	-1.30*	(0)	-3.17*	(0)
Philippines	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1st Level				
tT (ADF)	-2.11*	(0)	-2.33*	(0)
tm (ADF)	-4.77*	(0)	-3.65*	(0)
t (ADF)	-2.10*	(0)	-1.47*	(0)

Singapore	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1ˢᵗ Level				
tT (ADF)	-1.11*	(0)	-2.11*	(0)
tm (ADF)	-3.57*	(0)	-4.95*	(0)
t (ADF)	-2.40*	(0)	-4.97*	(0)
Thailand	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.56	(0)	-2.78	(0)
tm (ADF)	-2.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1ˢᵗ Level				
tT (ADF)	-2.22*	(0)	-4.33*	(0)
tm (ADF)	-3.57*	(0)	-3.55*	(0)
t (ADF)	-2.11*	(0)	-3.33*	(0)
Brunei	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1ˢᵗ Level				
tT (ADF)	-2.22*	(0)	-2.13*	(0)
tm (ADF)	-1.67*	(0)	-3.55*	(0)
t (ADF)	-3.41*	(0)	-3.77*	(0)
Vietnam	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-3.59	(0)
1ˢᵗ Level				
tT (ADF)	-5.53*	(0)	-5.13*	(0)
tm (ADF)	-5.67*	(0)	-4.95*	(0)
t (ADF)	-3.40*	(0)	-4.97*	(0)
Laos	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-2.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1ˢᵗ Level				
tT (ADF)	-1.13*	(0)	-2.13*	(0)
tm (ADF)	-4.67*	(0)	-3.55*	(0)
t (ADF)	-2.11*	(0)	-1.27*	(0)
Myanmar	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)

tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1st Level				
tT (ADF)	-2.33*	(0)	-1.13*	(0)
tm (ADF)	-4.27*	(0)	-3.25*	(0)
t (ADF)	-2.11*	(0)	-2.27*	(0)
Cambodia	ln GDP	Lag	ln ME	Lag
Statistics (Level)				
tT (ADF)	-2.92	(0)	-2.78	(0)
tm (ADF)	-0.15	(0)	-0.65	(0)
t (ADF)	4.16	(0)	-0.59	(0)
1st Level				
tT (ADF)	-2.55*	(0)	-4.23*	(0)
tm (ADF)	-5.77*	(0)	-3.55*	(0)
t (ADF)	-1.14*	(0)	-3.67*	(0)

Notes: where Y represents GDP which stands for gross domestic product; ME is military expenditure by government; IJT represents the most common model with a trend and intercept; IJ3 is the second approach with intercept and without trend; IJ represents the most limited model without trend and intercept. Numbers in parentheses show lag lengths. * Indicates the rejection of the null hypothesis at 1% level.

Cointegration Analysis

After performing the unit root test, it's found that all the series are stationary at their first differences. Thus, Johansen co-integration analysis is applied in order to check the possible long-run equilibrium relationship among variables. Results of the test are shown in the following table.

Table 2: Johansen Test for Cointegration

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	5 Percent Critical Value	1 Percent Critical Value
Indonesia				
None*	0.768674	31.12422	15.41	20.04
Malaysia				
None*	0.768674	21.12422	10.41	15.01
Philippines				
None*	0.45689	29.787	11.32	9.21
Singapore				
None*	0.36579	12.456	9.56	5.67
Thailand				
None*	0.43521	10.678	7.56	16.78
Brunei				
None*	0.5646	10.786	8.76	15.67
Vietnam				
None*	0.6789	7.9786	6.78	7.67
Laos				
None*	0.4576	6.5678	4.76	6.87
Myanmar				
None*	0.3456	18.555	9.45	11.21
Cambodia				
None*	0.5888	16.898	12.65	22.22

Note: ** shows the rejection of the null hypothesis at 5% level of alpha

According to the Johansen cointegration test, the null hypothesis of there is no co-integrating vector in the proposed model is rejected and concluded that there is at least one co-integrating vector. In other words, there might be a long-run equilibrium relationship between military expenditure and economic growth in all ASEAN economies except for Vietnam, Laos and Myanmar.

Granger Causality Test
Cointegration relationship between variables is confirmed by the Johansen method. Granger Causality tests should be run in order to find the direction of the causal relationship among variables. Findings are shown in the Table 3.

Table 3: Granger Causality Test

Indonesia			
Lag Length	Null Hypothesis	F-statistics	prob.
1	LNME does not Granger Cause LNGDP	0.09111	0.0003
	LNGDP does not Granger Cause LNME	8.51735	0.0080
Malaysia			
1	LNME does not Granger Cause LNGDP	0.08174	0.7776
	LNGDP does not Granger Cause LNME	8.51735	0.0060
Philippines			
1	LNME does not Granger Cause LNGDP	0.08174	0.7776
	LNGDP does not Granger Cause LNME	6.51111	0.1078
Singapore			
1	LNME does not Granger Cause LNGDP	0.07173	0.0555
	LNGDP does not Granger Cause LNME	8.51735	0.0080
Thailand			
1	LNME does not Granger Cause LNGDP	0.08174	0.7776
	LNGDP does not Granger Cause LNME	4.51711	0.0106
Brunei			
1	LNME does not Granger Cause LNGDP	0.08174	0.7776
	LNGDP does not Granger Cause LNME	8.51735	0.0080
Vietnam			
1	LNME does not Granger Cause LNGDP	0.11174	0.6656
	LNGDP does not Granger Cause LNME	8.51735	0.1245
Laos			
1	LNME does not Granger Cause LNGDP	0.6789	0.1111
	LNGDP does not Granger Cause LNME	9.7767	0.2223
Myanmar			
1	LNME does not Granger Cause LNGDP	0.12319	0.2346
	LNGDP does not Granger Cause LNME	7.8888	0.1278
Cambodia			
1	LNME does not Granger Cause LNGDP	0.88781	0.33334
	LNGDP does not Granger Cause LNME	6.57889	0.4566

The null hypothesis of lnGDP does not Granger cause lnME is rejected at 1% level of alpha which means economic growth of the selected country Granger causes military expenditure. In other words, a change in economic growth in the country may lead to a change in military expenditure. According to Granger causality results, there is no causal relationship running from military expenditure to economic growth. So, there is a unidirectional relationship running from GDP to military expenditure and any bidirectional relationship isn't observed in the current study. Refer Table 4 for the summary of the results.

Table 4: Granger Causality Interlink

Country	ME → GDP (p-value)	Causality	GDP → ME (p-value)	Causality	Type of Causality
Indonesia	0.0003	Yes	0.0080	Yes	Bidirectional (GDP <>ME)
Malaysia	0.7776	No	0.0060	Yes	Unidirectional (GDP → ME)
Philippines	0.7776	No	0.1078	No	No causality
Singapore	0.0555	Yes	0.0080	Yes	Unidirectional (GDP → ME)
Thailand	0.7776	No	0.0106	Yes	Unidirectional (GDP → ME)
Brunei	0.7776	No	0.0080	Yes	Unidirectional (GDP → ME)
Vietnam	0.6656	No	0.1245	No	No causality
Laos	0.1111	No	0.2223	No	No causality
Myanmar	0.2346	No	0.1278	No	No causality
Cambodia	0.33334	No	0.4566	No	No causality

Empirical Findings

The Granger causality test results for the ASEAN-10 countries reveal varying dynamics between Military Expenditure (LNME) and Economic Growth (LNGDP). Among the ten, Indonesia stands out with evidence of bidirectional causality, indicating that military spending and GDP growth mutually reinforce each other suggesting that defence investments may contribute to economic development, while a growing economy enables greater military outlays. In contrast, Malaysia, Singapore, Thailand, and Brunei exhibit unidirectional causality from GDP to military expenditure, implying that defence budgets in these countries are largely driven by economic performance and fiscal capacity. Notably, in Singapore, the causality from military expenditure to GDP is borderline significant at the 10% level, hinting at a potential but weaker link. On the other hand, the Philippines, Vietnam, Laos, Myanmar, and Cambodia show no significant causality in either direction, suggesting that military spending has minimal short-run influence on economic output or vice versa in these economies. These differences likely reflect structural disparities in defence policy, economic size, and security priorities across ASEAN countries.

The results of the Granger causality analysis between Military Expenditure (LNME) and Economic Growth (LNGDP) across ASEAN-10 countries are supported by existing literature. In particular, Indonesia shows strong evidence of bidirectional causality, where both military spending and GDP growth influence one another. This finding aligns with Hirnissa et al. (2009), who reported a similar relationship in their study on ASEAN-5 countries, and is further reinforced by Dunne and Tian (2013), who note mutual reinforcement between defence expenditure and growth in certain developing countries. For Malaysia, Singapore, Thailand,

and Brunei, the test results indicate unidirectional causality from GDP to military expenditure, suggesting that economic expansion enables greater fiscal space for defence allocations. This pattern is consistent with the findings of Frederiksen (1991), who observed GDP driven military expenditure in Malaysia and Singapore, as well as with Dunne, Smith, and Willenbockel (2005), who emphasize the role of macroeconomic conditions in shaping defence budgets in middle-income economies.

Notably, Singapore exhibits a borderline result from military expenditure to GDP at the 10% significance level, indicating a potential, albeit weaker, reverse linkage. In contrast, countries such as the Philippines, Vietnam, Laos, Myanmar, and Cambodia show no significant causality in either direction, reflecting the limited role of military spending in influencing economic growth or vice versa in these contexts. These results may be attributed to relatively low levels of military investment, institutional constraints, or structural economic characteristics. As highlighted by Benoit (1978), the impact of defence spending on economic growth is more likely to be positive in countries with adequate governance, industrial capacity, and strategic investment alignment factors that may be absent or inconsistent in some lower-income ASEAN states. Collectively, these empirical outcomes provide a nuanced understanding of the defence-growth nexus in Southeast Asia, reinforcing the need for country-specific policy approaches when evaluating the economic implications of military expenditure. However, significant investments in military capabilities have also exerted pressure on the natural environment (Saudi et al., 2024), particularly due to high military emissions from energy-intensive operations. As such, while leveraging military strength for economic growth, policymakers must integrate environmental considerations to ensure resilient and sustainable development.

Table 5: Summary of Findings for ASEAN-10 Economies

Country	Cointegration (GDP–ME)	Causality Direction	Interpretation
Indonesia	Yes	Bidirectional (GDP ↔ ME)	Growth and defence spending reinforce each other
Malaysia	Yes	GDP → ME	Defence budgets depend on economic performance
Philippines	Yes	None	No causal link detected
Singapore	Yes	GDP → ME (ME → GDP weak at 10%)	Strong economy drives defence, weak reverse effect
Thailand	Yes	GDP → ME	Economic expansion drives military allocations
Brunei	Yes	GDP → ME	Oil-driven economy sustains defence spending
Vietnam	No	None	Limited link between economy and defence spending
Laos	No	None	Defence not linked to growth
Myanmar	No	None	Defence spending rises, but no growth causality
Cambodia	Yes	None	Weak economic–defence connection

Table 5 summarizes the main findings. It shows that while Indonesia exhibits mutual reinforcement between economic growth and defence spending, most ASEAN countries demonstrate unidirectional causality from GDP to military expenditure. Several lower-income economies show no significant causal relationship, highlighting heterogeneity in the nexus across ASEAN.

Conclusions and Recommendations

This study provides empirical insights suggesting that the economic benefits of military expenditure in ASEAN-10 economies may materialize over an extended period rather than immediately, consistent with earlier findings that defence-led growth tends to emerge in the long run rather than the short run (Dunne & Tian, 2013; Hirnissa et al., 2009). Given the complex and context-dependent nature of the military expenditure and economic growth nexus, policy recommendations are proposed to help ASEAN-10 governments formulate more balanced and development-oriented defence strategies. Encouraging efficiency in defence spending is crucial, as the economic impact of military expenditure depends not only on the amount spent but also on how effectively resources are allocated (Heo & Ye, 2016; Deger & Sen, 1995). Efficient spending achieved through reforms, transparency, and investment in innovation can yield positive externalities such as technological advancement, employment, and industrial development (Benoit, 1978; Yildirim, Sezgin, & Öcal, 2005). Conversely, inefficient military expenditures may lead to resource misallocation, fiscal leakages, and lower productivity, particularly in developing economies (Dunne, Smith, & Willenbockel, 2005; Smith, 2020).

In contributing to the broader defence growth nexus literature, this research extends empirical knowledge by offering updated ASEAN-10 wide coverage for the period 1960–2023, thereby addressing calls for more regionally comprehensive and contemporary analyses (Dicle & Dicle, 2010; Dunne & Tian, 2021). The methodological application of Johansen cointegration and Granger causality tests strengthens the empirical reliability of the findings (Katircioglu, 2009). At a practical level, the study provides policymakers with nuanced insights into how economic performance influences fiscal space for defence allocations, thus supporting evidence-based budgeting and sustainable security strategies (ASEAN Secretariat, 2022; IMF, 2022).

The findings carry important implications for ASEAN policymakers. They imply that defence spending is fiscally sustainable only when supported by robust economic growth, confirming arguments that defence budgets are endogenous to macroeconomic capacity (Atesoglu, 2002; Kollias, Paleologou, & Tzeremes, 2020). As such, governments should prioritize long-term growth to prevent defence allocations from crowding out investment in productive sectors such as education, healthcare, and infrastructure (Deger & Smith, 1983; Heo & Ye, 2016). Furthermore, the study underscores the importance of regional cooperation through shared defence initiatives such as joint military exercises and collective security arrangements, which can reduce duplication of efforts and alleviate the fiscal burden of unilateral military spending (Ravenhill, 2017; Dunne & Perlo-Freeman, 2003).

While this study advances understanding of the military expenditure–growth relationship in ASEAN, it is not without limitations. Its focus on GDP and military expenditure alone excludes other relevant factors such as institutional quality, education expenditure, arms imports, and political stability, which prior research has shown to influence the defence growth nexus (Hirnissa et al., 2009; Abu-Qarn, 2010). Additionally, data availability issues in smaller

ASEAN economies presented challenges, consistent with limitations highlighted in other cross-country military expenditure studies (Farzanegan, 2014).

Future research should expand the model to incorporate a broader set of macroeconomic and governance variables and test alternative econometric approaches such as ARDL or panel VAR, which are well-suited to capturing both short-run and long-run dynamics (Pesaran, Shin, & Smith, 2001). Another promising avenue is to explore the environmental implications of defence spending, given the growing evidence on the ecological toll of military activities (Saudi et al., 2024). Comparative work with other regional blocs such as the EU, African Union, or SAARC could also provide valuable benchmarks, helping to situate ASEAN's defence growth dynamics within a wider global perspective (Kollias et al., 2004; Dunne & Tian, 2021).

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