ADAPTIVE MANAGEMENT APPROACHES IN ASEAN ECONOMIES: NAVIGATING INFLATION, UNEMPLOYMENT, AND ECONOMIC GROWTH DYNAMICS

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Abstract

The primary objective of this study is to explore the impact of inflation and unemployment on the economic growth of ASEAN countries. This investigation employs panel data and utilizes the Autoregressive Distributed Lag (ARDL) model for estimation and result analysis. The study employs the test for cointegration to establish the presence of a long-term relationship in the model. Consequently, both long-term and short-term ARDL models are estimated. The long-term results reveal a significant and negative impact of inflation and unemployment on economic growth in ASEAN countries. In the short term, unemployment and inflation are found to have different effects on economic growth in ASEAN countries. Based on these findings, it is recommended that authorities should prioritize credible inflation-targeting policies, while the government should create opportunities to enhance the skills and capacity of the population.

Keywords: Economic growth, Inflation, Unemployment, ARDL.

1. INTRODUCTION

Every nation strives to achieve economic growth and development, measured by the continuous expansion of goods and services production leading to wealth accumulation. This growth yields a plethora of benefits, including increased income, elevated living standards, improved healthcare, and enhanced education. Moreover, it fortifies a country's financial stability, enabling the implementation of poverty reduction initiatives and fostering societal well-being. Sustainable growth forms the bedrock of economic development.

Although a universally acknowledged theoretical connection between inflation and economic growth is lacking, scholars have articulated various theories to elucidate the potential consequences of both high and low inflation rates. These theories exhibit differing perspectives on the short-term and long-term implications. In the short term, elevated inflation rates might coincide with a surge in economic growth owing to increased aggregate demand (Motley, 1994). Nonetheless, prolonged periods of high and erratic inflation can breed market unpredictability, curb investments, and result in the inefficient allocation of productive resources. Irrespective of the time horizon considered, inflation ultimately precipitates macroeconomic instability and imposes significant economic costs. It's imperative to note that these perspectives, although diverse, converge on the overarching impact of inflation on economic stability and productivity.

Over recent decades, the global economy has witnessed significant fluctuations, particularly due to various global economic crises that have hampered economic growth and resulted in elevated inflation in numerous countries. Vietnam, for instance, has encountered a cycle characterized by "low growth - high inflation." This situation emerged due to an excessively optimistic outlook on high growth and imprudent monetary utilization, leading to escalated inflation that detrimentally impacted economic growth. Acknowledging the profound influence of inflation fluctuations on macroeconomic policies, the Vietnamese government has redirected its focus since 2011 toward a new monetary policy – a targeted inflation policy, aimed at prioritizing the maintenance of a stable and reasonable inflation rate.

The execution of a targeted inflation objective involves a multifaceted process. Initially, the Central Bank must delineate a specific point or range for inflation targets. Various global studies have suggested the existence of an inflation threshold across different countries, supported by research conducted by Sarel (1996), Khan and Senhadji (2001), Drukker et al. (2005).

Similarly, high unemployment rates signify an underutilization of human resources and can have adverse consequences on economic productivity and development. Unemployment serves as a pivotal factor warranting in-depth analysis to comprehend economic patterns, thereby devising strategic frameworks for stabilizing economies and fostering their growth and development. Widely regarded as one of the most adverse conditions impacting human societies, unemployment has multifaceted implications for both the economy and society (Habees & Rumman, 2012). Equally, Adarkwa, Donkor, and Kyei (2017) emphasize that unemployment poses a grave challenge for most nations, giving rise to various economic and social issues, such as diminished government revenue from income taxes, wasted work hours, and societal challenges like theft and prostitution. The essence of unemployment hinges upon a country's structure and its developmental stage, be it classified as developed, developing, or underdeveloped (Soylu, Çakmak, & Okur, 2017).

Anghel, Anghelache, and Manole (2017) elucidate that unemployment, as a macroeconomic indicator, reflects a nation's inefficiency in utilizing its abundant labor force effectively. This signifies that despite a significant number of active job seekers with the capability to contribute to the labor market, many struggle to secure employment (Yilmaz, 2005).

Economic growth denotes the augmentation in a nation's Gross Domestic Product (GDP), evaluated by considering the contributions of its populace to the nation's income or capital (Piketty, 2014). According to Jhingan (2003), economic growth involves a sustained increase in the actual per capita income of individuals within a nation, driven by an expansion in the production of goods and services. It is widely acknowledged as a pivotal fiscal tool for poverty alleviation, narrowing income disparities in society, improving people's quality of life, and augmenting a nation's overall prosperity (Ademola & Badiru, 2016; Dfid, 2008).

The correlation between unemployment and economic growth (Gross Domestic Product) has long been a focal point for most economies (Nguyen, 2016). The imperative objectives of reducing unemployment rates and accelerating a nation's economic growth have been pivotal concerns in recent decades (Daly & Hobijn, 2010; Soylu et al., 2017). Economic growth serves as a crucial metric in mitigating unemployment and counteracting its potential threat. Economic progress generates opportunities for new businesses, thus creating jobs, reducing unemployment, and alleviating poverty within a nation. Consequently, most countries strive to lower unemployment rates through policy frameworks aimed at igniting entrepreneurial initiatives to generate more job prospects, ultimately driving greater economic progress (Habees & Rumman, 2012).

Economic growth

The ASEAN countries have been proactively employing policy measures aimed at promoting a combination of swift and consistent economic growth, reducing poverty and inequality, and achieving macroeconomic stability through the creation of job opportunities. However, in spite of these endeavors, the growth rates in these countries have exhibited erratic trends. According to data provided by the World Bank, spanning from 1996 to 2021, the growth rates within the ASEAN region have fluctuated within a range of -17% to 15%. Additionally, many of these nations grapple with low levels of investment, high unemployment rates, and macroeconomic instability characterized by a weak exchange rate and surging inflation.
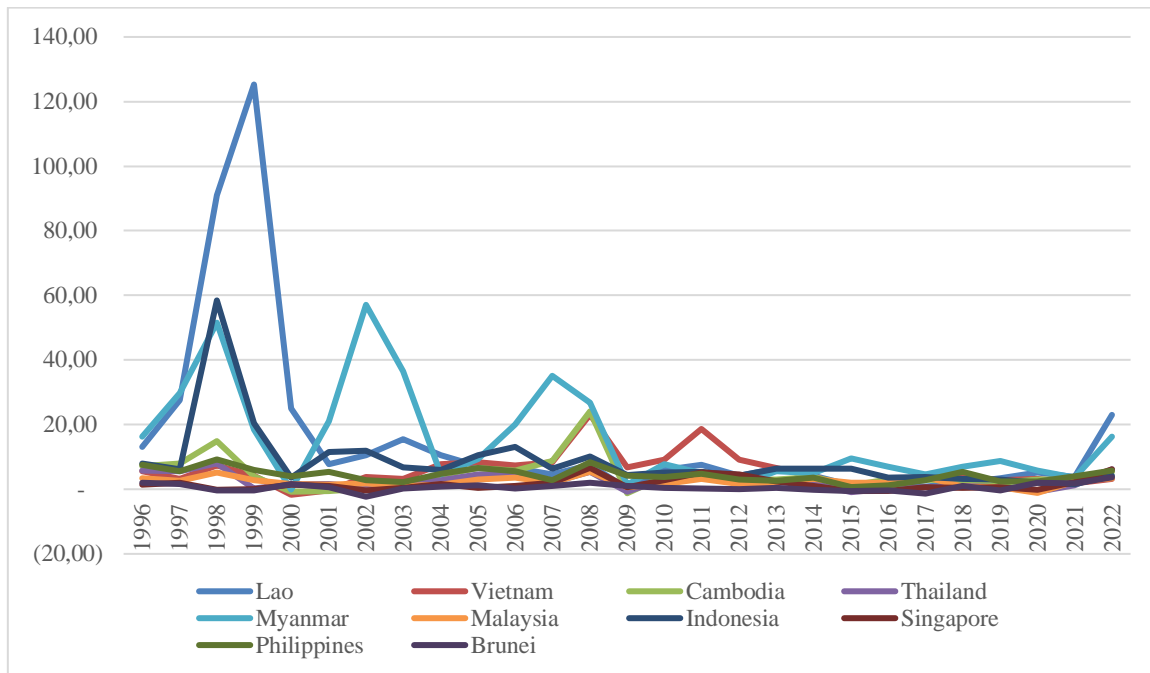
Figure 1. The GDP growth rate of ASEAN countries
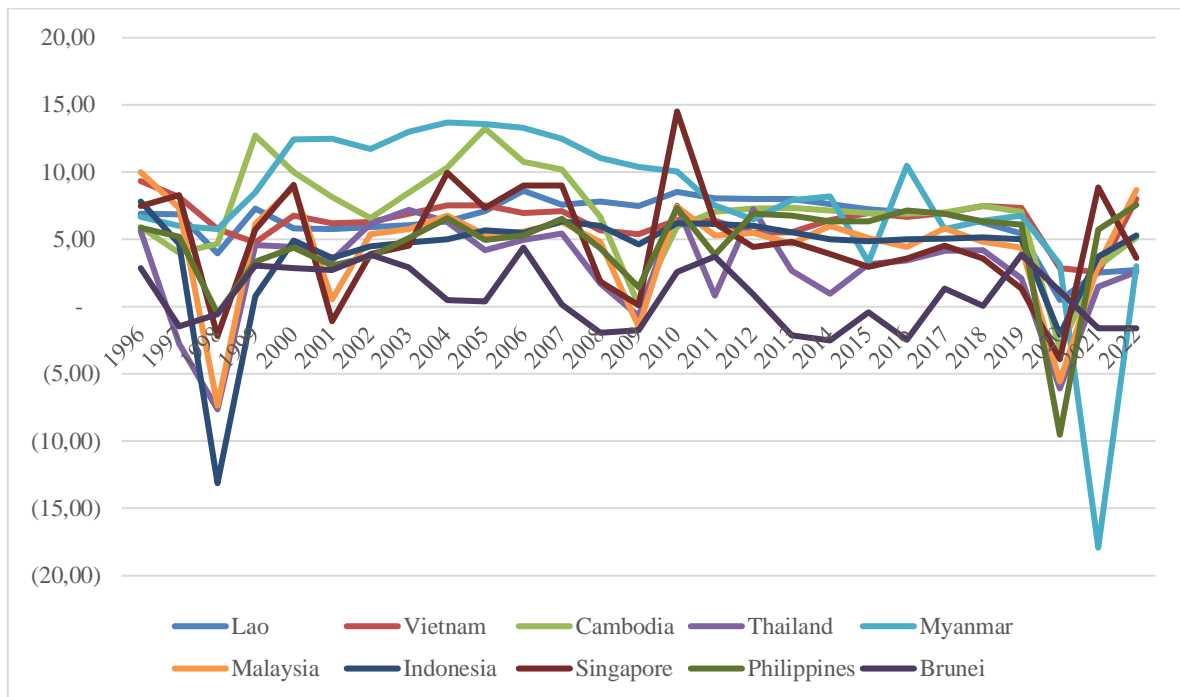
Source: World Development Indicators

Inflation trend

**Figure 2.** Inflation of ASEAN countries

Source: World Development Indicators

Broadly, inflation serves as one of the paramount macroeconomic indicators employed to assess a nation's economic vitality. Nevertheless, across multiple ASEAN countries, this metric has, over the years, tended to escalate to undesirable magnitudes in numerous instances. Between 1997 and 2003, the inflation rate experienced a significant surge, reaching high levels. However, from 2010 to 2020, many countries sustained elevated inflation levels.

Unemployment trend

The unemployment rates in ASEAN countries have shown a rising trend, although the pace of increase has been slowing down. From 1996 to 2010, the average unemployment rate in nearly all countries decreased. However, in the subsequent period from 2010 to 2022, there was an upward trend in the average unemployment rate.

Figure 3. Unemployment of ASEAN countries
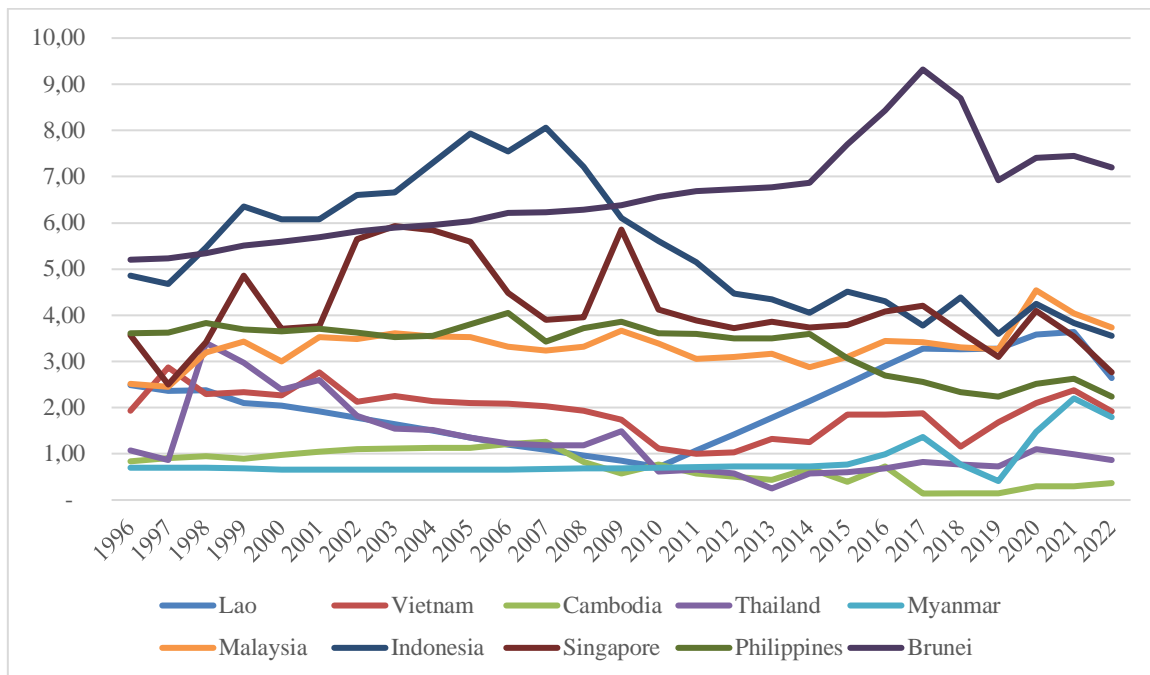
Source: World Development Indicators

2. LITERATURE REVIEW

While the theoretical correlation between inflation and economic growth continues to pose challenges for consensus, the nexus between economic growth and unemployment is notably ascribed to Okun's Law. This fundamental principle suggests that economic growth typically corresponds to a decline in unemployment rates and an increase in employment opportunities. Its enduring significance lies in its practical utility for guiding monetary policies, providing a framework to forecast or estimate a nation's growth rate based on prevailing unemployment rates.

Extensive empirical research has explored the dynamics among inflation, unemployment, and economic growth. While numerous studies have individually investigated the impact of inflation on economic growth and the influence of unemployment on economic growth, only a limited subset has explicitly delved into the combined effects of inflation and unemployment on economic growth. Additionally, this research primarily hinges on time series data and various estimation techniques. Despite the wealth of studies, consensus remains elusive, suggesting that the relationships between these variables manifest diversely across different countries. Subsequent discussions within the empirical literature will venture deeper into these intricacies and complexities.

Further elaboration on this topic will involve a comprehensive exploration of how these relationships vary in distinct economic contexts. Such exploration will shed light on the implications for devising effective economic policies tailored to specific national or regional circumstances. This in-depth analysis will provide insights into the multifaceted nature of these connections and their implications for policymakers seeking to foster sustainable economic growth while addressing inflation and unemployment concerns.

The Effect of Inflation and Unemployment on Economic Growth

The nexus between inflation, unemployment, and economic growth is a complex and enduring topic in economics, attracting extensive research from scholars worldwide. Phelps' groundbreaking paper, "Inflation, Unemployment, and Economic Growth" (1967), significantly contributed to this discourse by introducing the concept of the "natural rate of unemployment." Phelps highlighted the trade-off between inflation and unemployment, emphasizing their intricate impacts on long-term economic growth. This concept challenged prevailing Keynesian views and laid the groundwork for understanding the dynamic interactions between inflation, unemployment, and their implications for sustainable economic development.

Lucas' seminal work in "The Costs of Inflation" (1972) furthered this discourse by emphasizing the detrimental effects of unexpected inflation on economic growth. Lucas highlighted the importance of comprehending how inflation influences people's behavior and economic decisions. His work underscored the adverse consequences of inflationary surprises, suggesting that they can distort economic behavior, impair investment decisions, and hinder long-term growth prospects.

A pivotal relationship explored in economic theory is Okun's Law, which connects unemployment and economic growth. Ball and Moffitt's study, "Okun's Law: Fit at Fifty?" (2001), revisited this relationship, evaluating its validity over time and its implications for policy. Okun's Law suggests an inverse relationship between changes in unemployment and changes in economic growth, indicating that as unemployment decreases, economic growth increases, and vice versa. The study reexamined the applicability of this law, offering insights into its reliability and implications for policymakers striving to address unemployment concerns while promoting sustained economic growth.

Moreover, studies such as "Inflation and Economic Growth" by Bruno and Easterly (1998) have provided empirical evidence supporting the negative impact of high inflation on long-term growth across diverse countries. Their research underscored the importance of

maintaining stable price levels to foster sustained economic development. Similarly, Mortensen and Pissarides' study, "Unemployment and the Structure of Labor Markets: A Case for Specific Training" (1994), introduced the "matching function," revealing insights into the relationship between unemployment, job vacancies, and the efficiency of labor markets. This work highlighted the significance of skill matching and training programs in reducing structural unemployment and enhancing labor market efficiency.

The conduct of monetary policy in the context of inflation and unemployment has been a subject of extensive research. Mishkin and Posen's study, "Inflation, Unemployment, and Monetary Policy" (1997), explored the intricate relationship between inflation, unemployment, and the challenges faced by policymakers in steering monetary policy. Understanding these relationships is crucial for central banks and policymakers seeking to achieve price stability while simultaneously addressing unemployment concerns.

Furthermore, examining the impact of inflation on economic growth within specific country contexts has yielded invaluable insights. Mtui's study, "The Impact of Inflation on Economic Growth: A Case Study of Tanzania" (2015), provided a nuanced understanding of how inflation affects economic growth in a developing economy like Tanzania. Similarly, Cuestas and Staehr's investigation in "Inflation and Economic Growth in Transition Economies: Some Panel Evidence" (2005) shed light on the relationship between inflation and economic growth in transition economies, offering insights into the unique dynamics of these countries undergoing economic transformation.

Recent research has delved deeper into analyzing the nonlinear relationships between inflation, unemployment, and economic growth in developing countries. Chaudhry and Roubaud's study, "Inflation, Unemployment, and Economic Growth: A Dynamic Panel Threshold Analysis for Developing Countries" (2019), employed dynamic panel threshold analysis to uncover the intricate and nonlinear nature of these relationships in developing nations. Such studies contribute significantly to understanding the diverse economic landscapes and offer valuable implications for economic policies tailored to specific country dynamics.

The empirical evidence and theoretical underpinnings derived from these studies underscore the complexity of interactions among inflation, unemployment, and economic growth. This complexity emphasizes the need for nuanced and context-specific policy interventions to address inflationary pressures, unemployment challenges, and promote sustainable economic growth. Understanding these relationships remains pivotal for policymakers striving to craft effective strategies that mitigate the adverse effects of inflation and unemployment while fostering long-term economic development.

Moreover, the economic landscape varies across different regions and timeframes, influencing the outcomes and implications of these relationships. For instance, Mohseni and Jouzaryan's (2016) investigation of Iran's economic scenario between 1996 and 2012 revealed a significantly adverse impact of both inflation and unemployment on the country's long-term economic growth trajectory. Similarly, Shahid's (2014) comprehensive analysis focusing on Pakistan unveiled negative effects of inflation and unemployment on economic growth, emphasizing the statistical significance observed solely in unemployment's influence. These studies underscore the nuanced dynamics within individual countries and the importance of tailored policy responses that account for these intricacies.

Contrastingly, Ademola and Badiru's (2016) empirical investigation in Nigeria unearthed a surprising positive correlation between inflation, unemployment, and economic growth, diverging from conventional expectations. Their utilization of Ordinary Least Squares (OLS) and diagnostic tests showcased an unusual association in Nigeria's economic dynamics, highlighting the complexity and variability of these relationships across different economic contexts.

Similarly, Jaradat's (2013) comprehensive study in Jordan illuminated a significantly negative relationship between unemployment and economic growth, while the interaction between inflation and economic growth exhibited an unexpected positive trend. This observation emphasizes the unique economic dynamics within specific countries, suggesting that the relationships between inflation, unemployment, and economic growth might manifest differently across diverse economic landscapes.

These diverse findings underscore the complexity of interactions between inflation, unemployment, and economic growth, emphasizing the need for tailored policy approaches that account for the nuanced economic dynamics within individual countries. Additionally, research on this subject spans a wide array of methodologies and economic contexts, encompassing longitudinal studies, comparative analyses, and interdisciplinary research efforts.

Longitudinal studies have been instrumental in tracking the dynamics of these economic variables over extended periods, providing insights into their long-term relationships. Comparative analyses across countries and regions allow for a comprehensive understanding of how different economic systems and policy regimes influence the relationships between inflation, unemployment, and economic growth.

Interdisciplinary research efforts that incorporate insights from sociology, political science, and other social sciences have contributed to a broader understanding of the societal implications of inflation and unemployment on economic growth. These efforts delve into the

socio-political aspects and human behavior influenced by economic factors, offering holistic perspectives for policymakers aiming to address social welfare concerns while ensuring economic stability.

Additionally, the implications drawn from these studies have significant relevance for economic policymakers globally. The insights gleaned from the interplay between inflation, unemployment, and economic growth aid in formulating effective policies aimed at promoting sustained economic growth, maintaining price stability, and minimizing unemployment rates.

Moreover, the complexities arising from globalization, technological advancements, and structural changes in economies necessitate continuous research in this domain. Studies that adapt to evolving economic landscapes by employing sophisticated econometric techniques, big data analysis, and scenario-based modeling contribute substantially to understanding the evolving relationships between inflation, unemployment, and economic growth.

The extensive body of research exploring the interrelationships between inflation, unemployment, and economic growth has provided invaluable insights into the complexities of economic systems globally. These studies, spanning decades and diverse methodologies, have significantly contributed to economic theory and policy formulation. However, the dynamic nature of economies necessitates continuous inquiry to adapt policies to changing economic landscapes and ensure sustainable economic development worldwide. The pursuit of deeper understanding and effective policies in managing inflation, unemployment, and fostering economic growth remains an ongoing imperative for economists, policymakers, and researchers alike.

The Relationship between Inflation and Economic Growth

In the realm of economic literature, the connection between inflation and economic growth is far from straightforward, with findings exhibiting variability in terms of impact and significance.

The Positive Impacts of Inflation on Economic Growth

Initially, inflation can stimulate economic growth by influencing saving and investment. Sidrauski (1967) highlights how moderate inflation makes investment more appealing than holding cash, as cash devalues faster compared to investment. In times of inflation, there's often

a delay between output price hikes and increased input costs, particularly in wage increments. Tobin (1972) argues that moderate inflation acts as an economic lubricant (referred to as the grease effect), enabling producers to reduce real labor costs, encouraging savings, investment, and the expansion of production.

Secondly, inflation has a direct link to growth through its impact on demand. Inflation often creates the perception of escalating prices, encouraging increased consumption or stockpiling of goods, which, in turn, raises aggregate demand. Additionally, inflation frequently leads to currency depreciation, thereby enhancing a country's competitive edge and bolstering net exports. The uptick in export demand stimulates both domestic goods and services demand - contributing sources to exports. As per Keynes's aggregate demand theory, while an economy is influenced by both aggregate supply and demand factors, it's the aggregate demand that directly influences output and employment. However, aggregate demand usually falls short of aggregate supply due to tendencies toward income savings, leading to economic crises. To bolster growth, governmental intervention via policies such as expansive fiscal and monetary measures becomes essential to boost aggregate demand. Reducing interest rates, for instance, can generate inflation, prompting people to use cash for consumption and business investment.

Thirdly, the government can bolster education, science, technology, and infrastructure development by increasing the money supply. Investing in additional schools, educational facilities, research institutes, raising staff salaries, constructing factories, and industries contributes significantly to enhancing human resource quality, scientific and technological proficiency, and meeting infrastructure demands to serve economic progress.

Negative Impacts of Inflation on Economic Growth

Inflation exerts multifaceted adverse effects on economic dynamics. Firstly, Fischer (1993) delineates how inflation disrupts relative prices, leading to a misallocation of resources. In an inflationary environment, the prices of goods fluctuate disparately, causing shifts in their relative values. This distorts consumer preferences, influencing market inefficiencies in resource allocation.

Secondly, the uncertainty surrounding inflation volatility hampers investment and economic input activities. Prolonged uncertainty in inflation often deters substantial investments due to challenges in accurately calculating the real interest rate derived from investment endeavors. Fischer's (1993) analysis illustrates a 'transmission channel' from macroeconomic policy to growth, indicating that increased inflation leads to reduced investment, consequently diminishing productivity growth and overall economic progress. Choi et al. (1996) and Azariadas & Smith (1996) further expound that surges in inflation may result

in a reduced real interest rate for borrowers, potentially turning it negative. This circumstance can prompt a preference for borrowing over saving, disrupting the balance in capital and credit markets. Additionally, high inflation distorts tax mechanisms (Romer, 2001), reducing incentives for saving among depositors, which are a primary source of investment. Furthermore, elevated inflation incurs 'shoe leather costs,' 'menu costs,' and instigates 'confusion and inconvenience.'

Lastly, inflation's negative impact on economic growth extends to alterations in exchange rate policies. High inflation often triggers currency appreciation, increasing the foreign currency-denominated debt obligations of enterprises and governments. In certain open economies, particularly those with partially fixed exchange rates, high inflation may result in trade deficits. The adherence to a nominal fixed exchange rate by nations grappling with high inflation could lead to erosion in their competitiveness (Hossain & Chowhury, 1996). These cascading effects elucidate how inflation, beyond disrupting relative prices and investment, intricately intertwines with exchange rate dynamics, impacting a nation's overall economic growth trajectory.

The Relationship between Unemployment and Economic Growth

The Unemployment-Growth nexus, often referred to as Okun's Law, has been the subject of extensive investigation. Some studies support the expected inverse relationship between unemployment and economic growth in line with Okun's Law predictions (Ziberi and Avdiu, 2019; Hussain et al., 2006), while others present contradictory findings (Moosa, 2008; Banda et al., 2016; Mahadea, 2003).

In the mid-20th century, Harrod and Domar (1940) conducted pioneering studies exploring the connection between unemployment rates and economic growth (GDP) (Nguyen, 2016). These investigations emphasized the potential disruptive aspects of economic growth, such as the ways in which economic expansion might coincide with a rising unemployment rate. Solow (1956), in his examination of economic growth theory, highlighted the significant aspects of equilibrium conditions that earlier studies by Harrod and Domar (1940) relied upon, which included evaluating the relationship between nominal growth rates—tied to labor force increases—and economic growth rates, which were contingent on household savings and investment behavior.

Solow's model introduced fresh insights into economic growth discussions by removing the link between economic advancement and the unemployment rate as a secondary factor (Nguyen, 2016). Solow (1956) acknowledged all other assumptions from the Harrod and Domar (1940) model, except the fixed rate, which, according to Schiliro (2017), could potentially lead to long-term economic growth dysfunction. Consequently, the Solow model assumed that the Gross Domestic Product (GDP) was produced based on diminishing returns technology.

Seth et al. (2018) utilized the Autoregressive Distributed Lagged (ARDL) method to scrutinize data on unemployment and economic growth in Nigeria between 1986 and 2015. Their findings didn't reveal a long-term relationship but indicated a short-term positive correlation between unemployment and economic growth in Nigeria. Specifically, a 1% rise in unemployment corresponded to a 20.6% upsurge in economic growth (actual Gross Domestic Product).

Gyang, Anzaku, and Iyakwari (2018) employed Johansen's cointegration and Granger causality tests to evaluate the connections between unemployment, inflation rates, and economic growth in Nigeria from 1986 to 2015. The study uncovered both short-term and long-term relationships among unemployment, inflation, and economic growth. However, the Granger causality test suggested that unemployment and inflation did not significantly explain economic growth in Nigeria.

Kreishan (2011), focusing on Jordan from 1970 to 2008, used cointegration and simple regression to analyze the unemployment-economic growth relationship, finding no impact of economic growth on unemployment. The study disputed Okun's Law, stating that there was no link between economic growth and unemployment in Jordan.

Levine (2013) argued that the short-term relationship between the economic growth rate and the unemployment rate might be loose because unemployment rates sometimes showed sustained decreases after economic policy measures, which, despite initially positive outcomes for unemployment, led to economic decline. Empirically, the study discovered a negative long-term relationship between unemployment and economic growth, attributing this to situations where actual GDP growth surpassed labor productivity growth, leading to service sector expansion, job creation, and ultimately long-term unemployment reduction.

Özel, Sezgin, and Topkaya (2013) evaluated the unemployment-economic growth link using G7 data from 2000 to 2011. They found a negative relationship between economic growth and unemployment during the pre-crisis period (2000-2007) and an insignificant negative relationship during the post-crisis period (2008-2011).

These studies collectively contribute to the ongoing discourse on the complex relationship between unemployment and economic growth, exploring both short-term correlations and long-term dynamics across various countries and time periods.

In conclusion, the empirical literature demonstrates a lack of consensus in findings despite numerous related studies. Additionally, research on the relationship between inflation, unemployment, and economic growth in ASEAN countries is notably scarce. In light of this, our study seeks to contribute fresh insights to this discourse by investigating the impact of inflation and unemployment on economic growth in ASEAN countries.

3. METHODOLOGY

3.1. Model specification

To explore the impact of inflation and unemployment on economic growth within ASEAN countries, the empirical model employed in this study is defined as follows:

$$\text{Growth}_{it} = \gamma_0 + \gamma_1 \text{Inflation}_{it} + \gamma_2 \text{Unemployment}_{it} + \gamma_3 \text{Trade}_{it} + \varepsilon_{it} \ (1)$$

The variable "Growth" serves as the dependent variable, signifying the growth of Real Gross Domestic Product (GDP). The independent variables, or regressors, encompass "Inflation", "Unemployment" and "Trade" representing the variables of the inflation rate, unemployment rate, and the degree of trade openness, respectively. These regressors are crucial factors considered in assessing their collective impact on the economic growth of the studied ASEAN countries. The subscript i and t denotes the country and time dimension, whereas, γ_0, γ_1, γ_2, γ_3 represent the intercept and parameters to be estimated; ε_t is the random error term, assumed to be independent and identically distributed with zero mean and constant variance.

The research centers on the real Gross Domestic Product (GDP) as the dependent variable, representing the annual average growth rates of GDP, measured as a percentage. This metric stands as a fundamental indicator for gauging economic growth, corroborated by discussions in studies like Sahid (2014), Banda et al. (2016), and Mohseni and Jouzaryah (2016). Inflation is quantified by the annual growth rate of the consumer price index, expected to wield a negative impact on economic growth due to heightened uncertainty and reduced investment, as asserted by prior research. Unemployment, delineated as the percentage of the labor force actively seeking employment but without work, aligns with Okun's law, positing that economic growth leads to a reduction in unemployment. Trade openness, computed as the sum of exports and imports as a percentage of GDP, mirrors the level of economic openness. Elevated trade openness is anticipated to correlate with increased growth and investment, forming a pivotal aspect of the study's regression model to discern the interplay between these variables in the context of the ASEAN countries' economies.

The study utilized panel data spanning from 1996 to 2022 from 10 countries in ASEAN, which were sourced from World Development Indicators.

Table 1. Variables in the model and sources of data

Variables	Definition	Data sources
Growth	Real Gross Domestic Products Growth Rate	World Development Indicator
Inflation	Annual growth rate of the price level	World Development Indicator
Unemployment	Percentage of the total labor force	World Development Indicator
Trade	Trade openness, the sum of exports and imports of goods and services measured as a share of GDP.	World Development Indicator

3.2. Estimation procedure

Unit Root Testing

To assess stationarity, various unit root tests are available, among which the Augmented Dickey-Fuller (ADF) test is widely utilized. Proposed as an extension of the Dickey-Fuller test by Dickey and Fuller in 1979, the ADF test aims to scrutinize the null hypothesis, suggesting the presence of a unit root, against the alternative hypothesis of no unit root. The determination of series stationarity relies on comparing the computed t-statistic with the critical value. Rejection of the null hypothesis implies that the series is stationary at the level. However, non-rejection suggests non-stationarity, necessitating further analysis that may involve differencing and subsequent retesting to achieve stationarity.

Scientific studies have demonstrated the significance of stationarity in time series analysis. A stationary series exhibits constant statistical properties, such as mean and variance, over time, ensuring the validity of statistical inferences and forecasting models. The Augmented Dickey-Fuller (ADF) test stands as a widely acknowledged tool for assessing stationarity, helping researchers make informed decisions regarding the integration of variables in regression analysis.

Cointegration Testing

The research incorporates the cointegration testing method developed by Westerlund (2007) as a pivotal analysis tool. The selection of cointegration testing is grounded in its capacity to account for the interdependencies among variables. Numerous scholarly works endorse the Westerlund approach due to its ability to yield unbiased test outcomes. Apergis and

Payne (2014), Herrerias et al. (2013), and Dong et al. (2017) are among the studies that have advocated for the Westerlund method's efficacy.

Moreover, the study explores long-term relationship assessments employing alternative approaches put forth by Pedroni (1999) and Kao (1999). These methods offer valuable perspectives on evaluating relationships over extended periods, contributing to a comprehensive analysis of the dataset.

Scientific literature highlights the importance of employing robust cointegration methods in econometric studies. Cointegration analysis aids in exploring the equilibrium relationships among non-stationary time series, allowing for a better understanding of long-term associations among variables. The methodologies introduced by Westerlund, Pedroni, and Kao have been acknowledged as effective tools in examining cointegration and long-term relationships, providing researchers with diverse analytical techniques to uncover meaningful insights from empirical data.

The Autoregressive Distributed Lag (ARDL) Model

The research employs the Autoregressive Distributed Lag (ARDL) estimation technique to analyze the influence of inflation and unemployment on economic growth. The ARDL method stands out as an appropriate approach for datasets characterized by mixed orders, offering pragmatic and effective estimates, a point supported by Nkoro and Uko in their work in 2016. A significant advantage of this methodology lies in its ability to handle lags for both the dependent and independent variables, thereby reducing the potential issue of endogeneity.

Scientifically, the ARDL approach is recognized for its flexibility in modeling relationships among variables in econometric studies. By allowing for mixed orders within the dataset, the ARDL model enables the examination of short-term dynamics and long-term associations, providing a comprehensive analysis of the impact of inflation and unemployment on economic growth. The incorporation of lagged variables contributes to minimizing potential biases in the estimation process, enhancing the reliability of the obtained results. Transforming and specifying equation (1) in an ARDL form becomes:

$$\Delta \text{Growth}_t = \delta_0 + \sum_{i=1}^{p} \beta_{1ti}\Delta Growth_{t-1} + \sum_{i=1}^{q} \beta_{2ti}\Delta Inflation_{t-1}$$
$$+ \sum_{i=1}^{p} \beta_{3ti}\Delta Unemployment_{t-1} + \sum_{i=1}^{p} \beta_{3ti}\Delta Trade_{t-1} + \theta Growth_{t-1} +$$
$$\alpha_1 Inflation_{t-1} + \alpha_2 Unemployment_{t-1} + \alpha_3 Trade_{t-1} + \varepsilon_t \quad (2)$$

In this equation context, the symbols 'p' and 'q' symbolize the maximum lag applied to the dependent and independent variables, respectively. The operator 'Δ' denotes the difference

function. The term 'δ_0' signifies the presence of the drift component within the equation. Within equation (2), the model's long-run coefficients are aptly symbolized by 'α,' while the short-run components, incorporating dynamics, are captured by the 'β' parameter. The model structure, delineated by these mathematical representations, captures both the enduring, long-term effects ('α') and the more immediate, dynamic influences ('β') of the specified variables, illustrating the comprehensive nature of the analytical framework utilized in this context.

4. RESULTS AND DISCUSSION

Unit Root Testing

Table 2 showcases the outcomes derived from the unit root test conducted within this study. The table encapsulates the assessment of stationarity for all series under scrutiny. The observations unveiled a mixed scenario wherein some series demonstrated stationarity at their original levels, while others necessitated undergoing a first-order difference to attain stationarity. Additionally, the significance levels varied noticeably across the series, with specific variables exhibiting significance at varying thresholds - ranging from the 1 percent, 5 percent, to the 10 percent levels. This divergence in significance underscores the heterogeneity in the behavior of the series under investigation, emphasizing the importance of accounting for varied statistical properties while interpreting the outcomes of this unit root analysis.

Table 2. Unit Root Test

Variables	Level	First Difference
Growth	-5.8617***	
Inflation	-4.5146***	
Unemployment	-1.0865	-10.5082***
Trade	-0.4358	-7.7907***

Note: ***, ** and * indicates significance at the 1, 5 and 10 percent level of significance.
Source: Author's computation using output from Stata

The analysis revealed that the variables Growth and Inflation demonstrated stationarity at their original level, while Unemployment and Trade required differencing to attain stationarity. These outcomes, derived from the Augmented Dickey-Fuller (ADF) unit root test, underline the appropriateness of using the Autoregressive Distributed Lag (ARDL) model for estimation. The ARDL model's adaptability to handle variables with different orders of integration is crucial in accurately capturing the relationships among variables, especially when

dealing with a combination of stationary and non-stationary series. This compatibility highlights the ARDL model's efficacy in accommodating diverse integration levels among variables, ensuring a robust estimation process and accurate analysis of economic dynamics.

Optimal lag selection

Utilizing the unrestricted model alongside an information criterion facilitates the determination of lag selections for each variable across individual countries. This process enables the identification of optimal lag specifications. Subsequently, the most frequent or common lag identified for each variable is chosen to represent the lags incorporated within the model. This methodological approach aims to streamline the selection process, ensuring uniformity in lag representations across variables within the model, ultimately enhancing the model's coherence and interpretability.

Table 3. Optimal lag for each variable

Variables	Lag
Growth	1
Inflation	0
Unemployment	1
Trade	0

Source: Author's computation using output from Stata

Cointegration Test

Conduct the Pedroni (1999, 2004) cointegration test, which determines cointegration through the statistical significance of the long-run coefficients and the error correction term. Notably, cointegration is indicated by the collective significance of the levels equation. The analysis in Table 4 highlights a high degree of cointegration among the model variables, demonstrating statistical significance at the 1% level.

Table 4. Test for integration

	Statistic	p-value
Modified Phillips-Perron t	-2.4210	0.0077
Phillips-Perron t	-7.5879	0.0000
Augmented Dickey-Fuller t	-7.9579	0.0000

Source: Author's computation using output from Stata

ARDL Results and Analysis

The study, employing the Hausman test to compare two methodologies—the Pooled Mean-Group Method (PMG) and the Mean Group Method (MG) (Pesaran et al., 1999; Pesaran & Smith, 1995), determines that the MG method represents the more suitable approach. The comprehensive outcomes are delineated below:

Long-term Analysis

The long-term findings, presented in Table 5 of the investigation, reveal patterns aligning with the study's anticipated outcomes across all variables, namely Inflation, Unemployment, and Trade Openness. Notably, while Inflation and Trade Openness demonstrate statistical significance, the Unemployment variable is observed as statistically insignificant.

Table 5. Long-run ARDL Estimation Results

Variables	Coef.	Std. Err.	z	P>|z|
Inflation	-.2351421	.1305506	-1.80	0.072
Unemployment	-.4622073	1.5669	-0.29	0.768
Trade	.0301223	.0158441	1.90	0.057

Source: Author's computation using output from Stata

The analysis of the results highlights the adverse impact of inflation on the economic growth of ASEAN countries. At a 10 percent significance level, it was revealed that a one percentage point rise in inflation corresponds to a 0.235 percent reduction in long-term economic growth, assuming constant other factors. This denotes that heightened inflation, a pivotal macroeconomic gauge, is associated with a decline in economic growth. The possible rationale behind this association lies in the potential macroeconomic instability linked to elevated inflation levels, potentially undermining investor confidence and diminishing consumers' purchasing power, thereby adversely affecting economic growth. Notably, this outcome corroborates the findings of the study by Adaramola and Dada (2019).

The findings unveiled a positive inclination of trade openness towards bolstering the economic growth of ASEAN countries, aligning with the anticipated trajectory posited at the study's outset. This trend implies that nations adopting more open trade policies tend to foster economic growth through increased engagement in international trade. However, despite aligning with theoretical expectations and existing literature, this relationship didn't achieve statistical significance within the context of ASEAN countries.

Furthermore, an upsurge in unemployment rates within ASEAN nations appeared to correspond with a decline in long-term economic growth. This discovery adheres to Okun's law, indicating an inverse correlation between unemployment and economic growth within the ASEAN region. Elevated unemployment rates typically signify an underutilization of a country's human capital, potentially resulting in the erosion of skills and income among the workforce, thereby impeding economic growth. This empirical observation substantiates the research conducted by Mohseni and Jouzaryan (2016) and Shahid (2014), providing additional support for the established economic principles regarding the interconnectedness between unemployment rates and economic growth dynamics within the ASEAN economies.

Short-run Analysis

Similar to its impact in the long-term, unemployment demonstrates a negative correlation with economic growth in ASEAN countries in the long-term. A one percent rise in unemployment within ASEAN nations corresponds to a notable 3.8 percent decrease in long-term economic growth. This trend aligns with Okun's law, which theorizes an inverse connection between unemployment rates and economic growth in the context of ASEAN countries.

In contrast, the influence of inflation in the short run displays a divergent pattern. The analysis reveals that a one percent increase in the preceding year's inflation rate contributes to a 0.112 percent uptick in short-term economic growth, assuming constancy in other variables. This suggests that the inflation rate from the prior year positively impacts the current economic growth.

Table 6. Short-run ARDL Estimation Results

Variables	Coef.	Std. Err.	z	P>|z|
Inflation	.1121912	.0531466	2.11	0.035
Unemployment	-3.800487	1.336629	-2.84	0.004
Trade	-.0032802	.0316511	-0.10	0.917

Source: Author's computation using output from Stata

Moreover, the study reveals a detected negative impact of trade openness on short-term economic growth, albeit lacking statistical significance. This outcome parallels the findings observed in the research conducted by Lawal et al. (2016), marking a deviation from the anticipated theoretical predictions. Hence, it emphasizes the necessity for policymakers to diligently analyze the dynamics within the trade sector and formulate strategies aimed at

addressing potential short-term adverse effects arising from trade openness, in alignment with the insights presented by Lawal et al. (2016).

5. CONCLUSION

This study centers on elucidating the challenges faced by ASEAN countries in their pursuit of consistent and sustainable economic growth. Its primary objectives are twofold: to explore the effects of inflation and unemployment on economic growth within ASEAN nations and to scrutinize the presence of a sustained connection between these variables. To address these objectives, the study harnesses panel data encompassing the period from the first quarter of 1996 to 2022, employing the ARDL estimation technique for rigorous analysis and inference.

The study's findings unveiled a significantly adverse long-term impact of both inflation and unemployment on economic growth across ASEAN countries. When examining the short-term dynamics, the results highlight the negative and statistically significant nature of the error correction term (ECT), affirming the existence of a lasting relationship among these variables. In the immediate context, variables such as inflation and unemployment exert noteworthy impacts on economic growth. Specifically, the unemployment and trade openness variables exhibit adverse effects, while the inflation variable demonstrates a positive influence. This elucidates the complex and nuanced nature of the interactions between inflation, unemployment, and economic growth within the ASEAN region, emphasizing both short-term impacts and the enduring implications for sustained economic progress.

Drawing from these findings, the study offers policy recommendations for ASEAN countries. In the realm of macroeconomic management, the government is tasked with delicately balancing two key aims: curbing inflation to sustain macroeconomic stability and propelling economic growth, all while maintaining inflation at a level that aligns with reasonable growth expectations. Simultaneously, policymakers need to focus on refining and updating an all-encompassing database system and conducting a specific quantitative study. Looking ahead, to effectively implement targeted inflation policy, it is vital to fortify the independence of the Central Bank, ensuring its proactive engagement in managing monetary policies to achieve the specified inflation goals, detached from governmental influences. Furthermore, the central bank ought to adopt a flexible approach in steering exchange rates and reinforcing the competitive edge of export-oriented businesses, thereby spurring exports, regulating imports, and bolstering foreign exchange reserves. The flexible management of exchange rates should harmonize with investment incentives aimed at sustaining the influx of

Foreign Direct Investment. This entails streamlining mechanisms, policies, and tax incentives related to land utilization and facilitating potential investment opportunities.

The negative correlation observed between the unemployment rate and economic growth persists both in the short and long term. Addressing unemployment demands a strategic focus on revitalizing economic growth, primarily by encouraging the active engagement of young laborers in economic activities and facilitating retirement options for individuals nearing retirement age. This strategy creates opportunities for unemployed youth entering the job market, significantly contributing to bolstering economic growth. Moreover, implementing well-devised governmental policies becomes crucial to foster economic development and curb unemployment rates.

These policy interventions encompass various facets such as relaxing financial regulations, streamlining administrative and legal procedures to attract foreign investments, fortifying the growth of small and medium-sized enterprises, reducing tax burdens, and facilitating financial aid to augment production within these enterprises. Providing incentives to businesses across diverse economic sectors to partake in substantial projects indirectly aids in generating increased employment prospects. Additionally, supporting the agricultural sector through innovative approaches in public investment and diversification of agricultural production serves to create economic avenues for farmers and disadvantaged communities.

An essential focus area involves the structural shift of the labor force toward industrial and service sectors. This necessitates the enhancement of vocational training programs for rural workers and channeling labor toward high-value-added jobs in diverse value chains. Collectively, these initiatives strive to establish a more competitive labor market, thereby mitigating the vulnerability to unemployment, particularly during periods of economic upheaval. Such comprehensive measures aim to align economic growth strategies with employment opportunities, fostering a robust and resilient economy capable of addressing unemployment challenges effectively.

Data availability: Collected from World Development Indicators (WDI), published if requested

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