




Macroeconomic Factors Affecting the Level of Unemployment in Malaysia

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Abstract: Reducing unemployment is one of the essential macroeconomic objectives, while many countries find it difficult to manage it. The current study examines annual time-series data from 1980 to 2022 to determine how unemployment in Malaysia is affected by key macroeconomic factors, including economic growth, inflation rate, foreign direct investment, and population growth. The Autoregressive Distributed Lag (ARDL) technique is used in the study to examine both short- and long-term dynamics among the variables. According to the empirical findings, there is a negative correlation between GDP growth and unemployment: for every 1% increase in GDP, the unemployment rate decreases by 0.099%. Although the effect's magnitude remains low due to structural limitations and labor market inefficiencies, this result confirms Okun's Law and indicates that economic expansion helps create jobs. Likewise, the results indicate that inflation has a statistically significant negative effect on unemployment, which confirms the validity of the Phillips Curve hypothesis. It is suggested that moderate inflation could boost employment and aggregate demand, as a 1% increase in inflation lowers unemployment by 0.521%. On the other hand, the findings indicate that both population growth and FDI inflows have a significant positive impact on the unemployment rate, suggesting that foreign investment in Malaysia cannot be sufficiently labor-intensive and that the labor market remains under pressure from population growth. These results underscore the importance of creating inclusive growth plans that balance labor market expansion and macroeconomic stability. Promoting labor-intensive businesses, enhancing human capital, and directing foreign direct investment (FDI) into profitable industries that create jobs should be the main priorities of policymakers.

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INTRODUCTION

Elevated unemployment signifies labor resources have not been utilized effectively. The most central problem that developing countries face is unemployment. Underutilization of human capital, or unemployment, is a significant issue that plays a crucial role in improving

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economies. Its definition is the quantity of individuals who are jobless, actively seeking work, and available to take a job (Aurangzeb et al., 2013). In recent years, researchers have focused on examining the correlations among unemployment, inflation, economic growth, and other macroeconomic factors. After the 2008 economic crisis, the issue of elevated unemployment and negative economic growth became serious not only in developing economies but also in developed ones. Hence, much research has been conducted to evaluate the impact of macroeconomic factors on unemployment (Djambaska et al., 2015). According to Aurangzeb et al. (2013), changes in technology, the participation of women in the labor force, demographic structures, economic environments, and migration from rural areas to cities are the main reasons for unemployment in developing countries.

A quick look at historical unemployment rate data for Malaysia from 1982 to 2016 shows the highest was 8.28 percent in 1986 and the lowest was 2.45 percent in 1997. The highest unemployment rate in 1986 was due to the global recession, which had a severe impact on Malaysia's manufacturing sector. Throughout this period, Malaysia experienced comparatively low internal and external demand. Conversely, the lowest unemployment rate in 1997 was due to the Malaysian economy's recovery from the recession (World Bank, 2023).

There was a decline in the rate of unemployment from 8.28 percent in 1986 to 2.45 percent in 1997, which apparently indicates a rapid increase in the economy and a shift in labor utilization. During the period of low unemployment, the manufacturing sector provided more job opportunities, largely replacing the agricultural sector. Even the influx of foreign labor was allowed due to the labor market's shortage. However, the unemployment rate rose again after 1997 due to the Asian Financial Crisis (Noor et al., 2007).

Okun's Law, a fundamental concept in macroeconomics, explains the empirical inverse relationship between unemployment and economic growth. The law, which was first proposed by Arthur Okun in the 1960s, contends that times of sluggish or negative economic development are linked to growing unemployment, whereas periods of strong economic growth tend to cause unemployment to decline. This link illustrates the notion that more output necessitates more labor, which in turn creates more job possibilities. On the other hand, when output falls, businesses cut down on production and often lay off employees, which raises unemployment rates. Okun's Law is significant because of its real-world applicability. It is used by governments and organizations such as the World Bank and the International Monetary Fund to predict patterns in unemployment based on anticipated economic growth. Additionally, it aids in the creation of macroeconomic policies that stimulate growth via monetary or fiscal measures in order to lower unemployment. The link offers important insights into how economic recovery and development policies might result in employment creation in emerging economies. Yet, structural elements like productivity levels, informality, and labor market rigidity may affect how strong this association is (Noor et al., 2007).

The Phillips Curve can explain the correlation between inflation and unemployment. It describes a stable, inverse relationship between inflation and unemployment, which can be

clarified by the basic notions of labor demand and labor supply. If labor demand exceeds labor supply, wages will rise, leading to higher prices. Hence, workers will be able to obtain jobs more easily, which will, in turn, reduce unemployment. On the contrary, if labor supply surpasses labor demand, it will cause wages and prices to go down in the country. Eventually, it might not be easy for workers to obtain jobs, and unemployment will rise. From another angle, inflation and unemployment are related: when the economy expands, firms hire more workers to boost production. During periods of economic boom, high inflation typically follows low unemployment. In contrast, during recessions, firms will cut production volumes due to low demand, leading to fewer workers. During downturns, low inflation will coexist with a high level of unemployment (Furuoka et al., 2014). A fluctuation in the unemployment rate is also dependent on population growth. If a country fails to control population growth, it may cause severe employment problems by increasing the number of workers and leading to an unequal distribution of income (Xuen et al., 2017).

Fluctuations in unemployment can also be revealed by foreign direct investment. Foreign direct investment (FDI) inflows can furnish capital for productive investment, thus enhancing economic growth and generating employment possibilities, particularly through greenfield investments. Moreover, FDIs contribute to economies by providing technology and productivity spillovers, as well as by expanding production and competitiveness (Bayar et al., 2017).

The primary aim of this research is

- To assess the influence of GDP growth, inflation rates, population growth, and FDI inflows on the unemployment rate in Malaysia.
- To recommend and suggest policies that could help to address the phenomenon of unemployment in Malaysia.

Comprehending the correlation between macroeconomic factors and unemployment is vital, as there have been no specific studies investigating the joint impact of macroeconomic factors on unemployment in Malaysia. The basic idea is to demonstrate the linkage between macroeconomic variables and the unemployment rate in Malaysia, which may provide policy recommendations for reducing the unemployment rate by managing macroeconomic factors.

Unemployment, however, is a complex and multi-dimensional concept that extends beyond purely economic considerations to include educational, socio-cultural, and political dimensions, making it difficult to define (Msigwa et al., 2013). Some scholars adopt a simpler perspective; for example, Booth et al. (1985) explain unemployment as a situation in which people are without a job. Similarly, Arslan et al. (2014) describe it as a condition where individuals are able and actively seeking work but are unable to secure employment. Other studies Adebayo (2013), Ahmed (2014) and Tsani et al. (2013) offer similar definitions with slight variations. According to the International Labor Organization (ILO), unemployed individuals are members of the economically active population who do not have a job, are available for work, and are actively seeking employment.

The problem of unemployment is not just a question for one particular country; rather, it is a global phenomenon of varying magnitudes. Particularly, this problem is more widespread among youths in several countries (Görlich et al., 2013). Given the long-lasting effects of unemployment, specific approaches are needed to address it. Usually, the main cause of unemployment is the imbalance between job demand and labor supply. If the supply of labor exceeds the demand for labor, the surplus of labor in the economy will leave many workers unemployed (Furuoka et al., 2014). Several significant factors increase the supply of labor in the market. According to Rayan et al. (2001), the most significant factor contributing to unemployment is macroeconomic performance. Low economic growth affects every worker in the economy. However, it has an even more severe impact on certain groups, such as youths, who are more likely to experience super-cyclical unemployment compared to unemployed adults.

An additional key factor explaining higher unemployment is the changing demographics worldwide. This phenomenon is occurring in certain parts of the world, such as Europe, where the aging population is increasing, while in other parts of the world, such as Asia, Africa, and the Middle East, the youth population (youth bulge) grows at a rapid pace (Engin, 2019). The high demographic growth is due to the high fertility rate and the increase in the prime-aged working population relative to those who are just dependent (Achy, 2011). When there is a youth bulge in a country, and they reach their working age, the dependency ratio, which is the proportion of the non-working-age population to the working-age population, will decrease only if the rise in the number of working-age individuals can be effectively absorbed in productive jobs; all other factors being equal, the amount of average per capita income would rise as a result. Thus, the youth population would become a demographic dividend.

On the other hand, if a large cohort of young individuals cannot find jobs or earn sufficient wages, the youth bulge could become a population explosion, as a significant number of unemployed young individuals are likely to become a potential source of social and political instability. Therefore, a high rate of youth employment is a prerequisite for a country's progress in creating a youth bulge and achieving a demographic dividend (World Bank, 2023). Also, countries with a large growing population have sluggish economic growth, which reduces demand for labor and prevents them from finding adequate employment (Biavaschi et al., 2017).

Furthermore, the issue of unemployment is not solely confined to educational background or population growth; it also involves the role of related institutions, such as labor market organizations, in improving the situation. Muhammad et al. (2012) indicate that, in Pakistan, despite possessing the essential educational qualifications, youths seeking employment are still not hired by either governmental or non-governmental institutions. On the contrary, Granleese (2009) states that the cause of unemployment among educated groups is due to gender bias in the labor market. For instance, some occupations have been considered suitable for women, such as receptionist jobs, because they rely on physical appearance, whereas other positions are deemed more appropriate only for men. A major

change in labor participation rates across developed and developing countries would significantly reduce unemployment (Richardson et al., 2021). For example, the participation of women laborers in developed countries like Australia leads them to take over jobs considered men's work. Despite increased labor participation rates among women in emerging countries compared to less developed nations, they continue to face challenges in securing appropriate employment. (Achy, 2011).

There are relatively few macroeconomic models that link the unemployment rate to economic growth. It was Okun (1962) who highlighted the empirical correlation between variations in the unemployment rate and shifts in GDP (Noor et al., 2007). In the economic field, Okun's law is a well-known empirical relationship between unemployment and real GDP growth, sometimes called real output. Real output growth implies that more goods and services are produced in the economy (Higgins, 2011). The objective of the study done by Okun (1962) on the relationship was to provide policymakers in the United States with a method to predict the effect of labor policies on output growth. Based on U.S. quarterly data from 1947 to 1960 in his original study, Okun adopted two models to examine the relationship between unemployment and GNP. He found that the relationship between the two variables was negative and indicated that a rise in unemployment of about 1% would decrease output growth by about 3% (Örn et al., 2017). Thus, the economy should continue to expand to avoid the losses caused by unemployment (Sadiku et al., 2015).

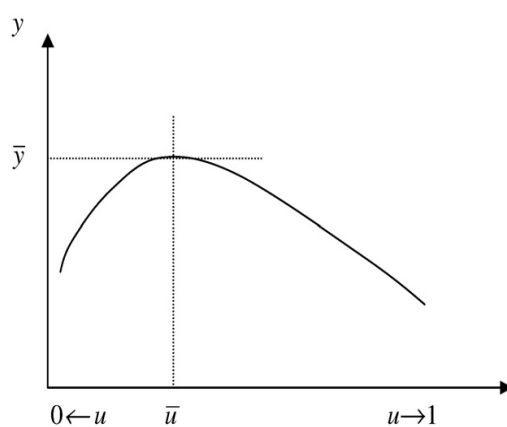


Figure 1. The relationship between output and unemployment

Note: The figure shows the relationship between unemployment and output proposed by Arthur Okun, as presented in Malley et al. (2008). Output, unemployment, and Okun's law: Some evidence from the G7. *Economics Letters*, 101(2), 113–115.

Malley et al. (2008) indicate that a one percent decrease in the real output, shown by “y” below a certain threshold level for the “y” bar, is linked with the indispensable yet small rise in unemployment rate, illustrated by “u” in the figure. They also stated that labor productivity depends on changes in the unemployment rate and on the macroeconomic policies implemented by a country. Accordingly, the G7 countries provided evidence of Okun's law, but in Germany, it was stronger. Nevertheless, since the concept was first suggested, there has been considerable debate and contention over how consistent the part of Okun's law is.

Most of these studies reported that a 1% reduction in unemployment raises GDP by 2-3% (Martin et al., 2014), and therefore the law remains applicable (Higgins, 2011).

Malthus's theory of population growth. A rise in the birth rate would exponentially accelerate population growth, while the production of food products increases arithmetically. Therefore, populations may exceed the resources if left uncontrolled. According to Malthus (1798), preventive checks are willful acts individuals can take to prevent population growth. For instance, family planning, late marriages, and celibacy may reduce the average lifespan. For instance, disease, warfare, famine, and poor living and working conditions help reduce a country's population growth. Hence, he predicted that unchecked population growth would lead to increased unemployment.

In brief, an economy's high unemployment rate rises with its population size. Bloom et al. (2009) state that the most serious problem in its history will confront the economies of less-developed countries: generating enough job opportunities at appropriate salaries to accommodate their fast-growing populations and productive employment. In terms of absolute significance, this challenge has no precedents in human history. In several instances, this challenge is fundamentally unparalleled in its nature, given, on the one hand, the scarcity of natural resources in many countries and, on the other hand, the widespread availability of advanced technologies. They made three observations about the interrelationship of population growth and labor supply. Firstly, population growth positively affects labor supply, particularly when demographic growth is accelerated by a decrease in mortality rates or an increase in net in-migration. Secondly, fertility and mortality rates, irrespective of their relationship to each other, are essential determinants of labor supply. Lastly, enhanced fertility and decreased mortality are likely to have an immediate impact on labor supply via their "behavioral" influence on workforce participation. Thus, population growth positively affects the labor supply and causes it to exceed labor demand, leaving many workers unemployed.

Foreign direct investment has been a topic of discussion and growing significance for analysts and decision-makers, affecting the economy. Moreover, it is a core element of an open and effective international economic system as compared to the regulated economies (Johnny et al., 2018). FDI inflows can become a driving force of economic growth and significantly affect countries' unemployment levels, as higher unemployment is associated with higher FDI inflows (Strat et al., 2015). FDI is a direct investment in a sector or business activity by a person or corporation in another country, either by the establishment of a specific business, expanding the business of an existing company, or purchasing a business in the target country. Merger and acquisition, the development of new facilities, and the reinvestment of profits from foreign business activities are the different forms of FDI (M. et al., 2014). Indeed, FDI can positively or negatively affect unemployment in the economy, and its impact can be direct or indirect, in terms of magnitude, quality, and location.

FDI can be deemed the reinvestment of incomes or additional capital in a company. You may alternatively call this investment a "greenfield investment" or a "brownfield investment."

(Goerg et al., 2003). Greenfield investment is the renovation of a current factory, while brownfield investment is the acquisition and rental of an existing plant that is not productive or fully utilized. New production is developed through these investments. A rise in FDI will also raise an economy's GDP while reducing unemployment (Eldeeb et al., 2023).

The potential rewards for the domestic economy from foreign direct investment may be substantial, including technological transfer of expertise, support for capital formation, strengthening of the competitive business climate, and improved international trade integration. Such advantages could support the host country's most important parts of the economy. For instance, mining, farming, transportation, communication, and construction are the components that contribute to high employment, economic growth, and development (Johnny et al., 2018).

The Phillips curve explains the relationship between unemployment and inflation and is named after New Zealand economist Alban William Phillips. In his 1958 study "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957," Phillips investigated the relationship between unemployment and wage rates in the United Kingdom from 1861 to 1957. His findings indicated that there is an inverse, stable relationship between wages and unemployment levels, with periods of low wage growth associated with high unemployment and vice versa.

Other economists, Lipsey (1960), Paul Samuelson, and Solow (1960), coined the term "Phillips Curve" after plotting price inflation against unemployment in US data and discovering a trade-off between the two variables. Although Phillips was not looking for his research to be applied as a policy guide, Samuelson and Solow believed that the Phillips curve could serve as a "menu of choices among various levels of unemployment and price stability," leading policymakers to consider that the Phillips curve offered a set of socially optimal points from which they could attain their macroeconomic goals in the short term (Maseide, 2018; Waheed, 2020).

Numerous scholars have empirically examined the influence of macroeconomic variables on unemployment. Some studies examine the correlation between macroeconomic conditions and unemployment within a particular country or economy, whereas others perform cross-country analyses utilizing panel regressions across multiple nations.

Saini et al. (2023) use secondary annual statistics from the World Bank, the Reserve Bank, and the Economic Survey of India from 1990 to 2013 to look into how the inflation rate, GDP growth rate, and exchange rate affect unemployment in India. The research employed ordinary least squares (OLS) to ascertain the association among these factors. The author concludes that the inflation rate and the exchange rate adversely impact the unemployment rate, aligning with theoretical perspectives and suggesting a trade-off between unemployment and inflation. The GDP growth rate is negligible, indicating that Okun's Law does not apply in India.

For example, in single-economy settings, Doğan (2012) examines the effects of macroeconomic shocks on real GDP growth, exports, the exchange rate, the rate of inflation, the interbank interest rate, and the supply of money on unemployment in Turkey, using a VAR model. Quarterly data have been used from 2000: Q1 to 2010: Q1. Dogan distinguishes his study from previous studies exploring the factors of unemployment in Turkey by including structural breaks in the analysis of the effect of macroeconomic factors on unemployment. The author found that all variables used in that paper do not exhibit unit roots, indicating that the variables are stationary with structural breaks. Consequently, the VAR model was employed to analyze the dynamic interconnections among the variables. The author asserts that favorable shocks to real GDP growth, inflation, and export growth adversely impact unemployment, but favorable shocks to the money supply, the interbank interest rate, and the exchange rate positively influence unemployment. His results showed that the Phillips Curve and Okun's Law are real. The Phillips Curve shows that unemployment and inflation are related in the opposite way, while Okun's Law shows that output and unemployment are related in the other way.

Djambaska et al. (2015) utilizing annual time-series data from 1999 to 2013, examine the correlation between unemployment and FDI in the Republic of Macedonia. To investigate the impact of inflation, corruption, population size, and foreign direct investment on unemployment, the author employs multiple linear regression. This study's results suggest that corruption, inflation, and unemployment are statistically significantly associated in the Republic of Macedonia. To be more specific, the research indicates that a 5% increase in inflation results in a 0.4 percentage point decrease in unemployment, whereas a 5% decrease in corruption results in a 1.4 percentage point decrease in unemployment. In contrast, the authors discovered that the unemployment rate was not statistically substantially correlated with population size or foreign direct investment. The research implies that, despite this, unemployment is significantly reduced by economic growth; FDI has not been the key factor in enhancing employment levels in the Republic of Macedonia. It can be inferred that FDI has failed to create enough new jobs. The authors strongly suggest that macroeconomic policies should be directed toward increasing FDI in high-value-added sectors and promoting domestic investment, which are crucial for economic growth and reducing unemployment.

Likewise, Bayar et al. (2017) analyzed the impact of exports, foreign direct investment inflows, and GDP on Turkey's unemployment rate. He reviewed quarterly data from the Turkish Statistical Institute and the Central Bank of the Republic of Turkey, covering the period from 2000: Q1 to 2013: Q3. He employed the bound testing procedure, which is predicated on the autoregressive distributed lag (ARDL) model, to investigate the long-term correlation between these variables. The cointegration test suggested that these variables were linked over the long term. Additionally, the empirical results suggested a negative correlation between unemployment, economic growth, and exports, suggesting that the unemployment rate decreases as economic growth and exports increase. Conversely, the unemployment rate and foreign direct investment inflows exhibit a positive correlation: the unemployment rate

increases as FDI inflows increase. This is due to the fact that foreign direct investment inflows into Turkey are in the form of brownfield investments, such as privatizations and acquisitions.

Li et al. (2012) conducted an additional investigation into the correlations between the unemployment rate, inflation rate, and economic growth in China. They utilized annual data from 1978 to 2010 obtained from the China Statistics Bureau website. In order to establish a long-term relationship between these variables, they have implemented an error-correction model (ECM) and cointegrating vectors. Additionally, the Granger Causality test and variance decomposition are implemented. The Granger causality test results indicate that the unemployment rate is Granger-caused by inflation and economic growth. In addition, the impulse response and variance decomposition of the variables suggest that disturbances to the unemployment rate and economic growth are the result of their own variation, and that economic growth has a greater influence on the inflation rate than the unemployment rate. Finally, the findings indicated that these variables maintained a stable equilibrium over the long term. Nevertheless, the unemployment rate and economic growth exhibited a positive correlation, suggesting that an increase in economic growth would result in a rise in the unemployment rate, which contradicts Okun's law. Conversely, the Phillips curve is substantiated by the existence of a negative correlation between inflation and the unemployment rate, which posits that an increase in inflation will result in a decrease in the unemployment rate.

Similarly, using annual data from the World Bank, the IMF, and Mundi, Aqil et al. (2014) examined the factors that influenced the unemployment rate in Pakistan from 1983 to 2010. The unemployment rate was the dependent variable, while GDP growth, population growth, inflation rate, and foreign direct investment were the independent variables employed in the study. We conducted correlation and multiple regression analyses. Their results indicated that the unemployment rate was not significantly influenced by the growth rate of GDP and inflation. Conversely, the unemployment rate was found to be significantly inversely correlated with population growth and foreign direct investment. This implies that the unemployment rate decreases as population growth and FDI increase.

In contrast to the results of Aqil et al. (2014), a separate study conducted by Arslan & Zaman (2014) on the determinants of unemployment rates in the context of the Pakistani economy produced distinct findings. They utilized secondary annual time-series data from 1999-2010 from a variety of economic surveys in Pakistan, implementing the Ordinary Least Squares (OLS) model in their investigation. The unemployment rate was the response variable, with FDI, a consumer price index (CPI) proxy based on the rate of inflation, the rate of GDP growth, and the population growth rate serving as the explanatory variables in the study. The unemployment rate was considerably and adversely affected by the GDP growth rate and FDI, according to the study. Furthermore, unemployment experienced a substantial increase in response to population growth, which is in accordance with the theory. However, the unemployment rate was negatively impacted by the CPI proxy for inflation, albeit in a negligible manner.

A cross-country study by Aurangzeb et al. (2013) examines the determinants of the macroeconomy affecting the rate of unemployment for three countries, namely, India, China, and Pakistan, adopting secondary annual data from the years 1980 to 2009 with regression analysis, cointegration analysis, and Granger causality. The study used GDP, the inflation rate, the population growth rate, and the exchange rate as autonomous variables, with the unemployment rate as the dependent variable. The author concludes that, in the regression analysis, all series for all three countries were found to be significant; there wasn't bidirectional causation among any of these variables. Based on the results of Granger causality and cointegration, there is a long-run relationship between these variables across all models. Specifically, regarding the effect of GDP on unemployment, the author concludes that in India and China, the relationship is significantly negative, consistent with the theory. In contrast, in Pakistan, GDP positively affected the rate of unemployment, contradicting the theory. The stated reasons for this relationship in Pakistan are poverty, underutilization of foreign investment, and an unequal distribution of income. The result also implies that resource utilization in India and China is better than in Pakistan. Regarding the effect of inflation on unemployment, the author concludes that, in China, the relationship is negative, consistent with the Phillips Curve. In contrast, in Pakistan and India, it is positively related to unemployment. It is positive because the rise in prices reduces purchasing power, leading to a reduction in aggregate demand. It finally caps production and increases the unemployment rate. The result also implies that Pakistan and India have maintained inflation levels, which hinder employment levels. Lastly, the positive influence of population growth on the unemployment rate has been observed across all three countries, which aligns with the theory.

Understanding labor market dynamics in a rapid rising economy such as Malaysia implies investigating how macroeconomic factors affect unemployment. Employment chances are significantly shaped by factors including population, inflation, GDP growth, and foreign direct investment (FDI). Okun's Law states that economic expansion should lower unemployment; nevertheless, this link may differ based on the structural circumstances of the economy. Similar to how population growth may put pressure on the labor market by increasing the supply of workers, foreign direct investment (FDI) may promote job creation via greater investment and industry development. The Phillips Curve trade-off is often used to describe the complicated link between unemployment and inflation. Policymakers seeking to attain stable employment and sustained economic development might benefit greatly from an understanding of these factors' interactions (World Bank, 2023).

For instance, Noor et al. (2007) studied the correlation between Malaysia's GDP growth and jobless rates. Yearly time series data set spanning 1970–2004 is utilized in the study. To analyze how the unemployment rate affects economic growth, an ARDL model was employed. Results demonstrated a negative correlation between GDP growth and the unemployment rate, lending credence to Okun's law within the Malaysian context. In addition, Furuoka (2007) investigated the Phillips curve's applicability to Malaysia by looking at inflation and

unemployment rates in tandem. In order to estimate the VECM, he has used yearly data from 1973 to 2004. Validating the Phillips curve hypothesis in the context of Malaysia, his paper's findings proved the existence of causal links in addition to long-run and trade-off interactions.

An additional study conducted by Furuoka et al. (2014) examined the relationship between the unemployment rate and inflation rate in Malaysia. The results corroborate those of Furuoka (2007), who found that the two variables are positively correlated. This finding lends credence to the Phillips curve hypothesis for Malaysia. Also, using ordinary least squares (OLS), Shaari et al. (2024) looked at how FDI affected Malaysia's unemployment rate and GDP growth. Using yearly data from 1982–2010, the research was conducted. Conclusions from the study showed that FDI significantly affected GDP and the unemployment rate. The unemployment rate will decrease by 0.009% for every 1% increase in foreign direct investment. Similarly, a 1% increase in FDI will lead to a 1.219% rise in GDP. After all that, Irpan et al. (2016) looked at how FDI affected Malaysia's unemployment rate. Time series data from 1980–2012 is utilized. The unemployment rate served as the response variable, with inbound and outbound FDI, the exchange rate, GDP, and foreign labor serving as the independent factors. To analyze the correlation between these variables, the autoregressive distributed lag (ARDL) was employed. Foreign direct investment (FDI) and foreign labor have a substantial impact on lowering unemployment in Malaysia, according to the study.

RESEARCH METHOD

This is a quantitative explanatory study that investigates how GDP, inflation, foreign direct investment, and population growth influence the unemployment rate in Malaysia. Annual time series data were utilized for the present study. Data for all variables were obtained from the World Bank, spanning 1980 to 2022.

Model Specification

The model employed to examine the relationship between the selected variable of this study is as follows:

$$UNEMP = f(GDP, Inflation, FDI, Population) \dots\dots\dots (1)$$

The econometric form of the above equation can be rewritten as follows:

$$Ln_UNEMP_t = \beta_0 + \beta_1 Ln_GDP_t + \beta_2 Ln_Infl_t + \beta_3 Ln_FDI_t + \beta_4 Ln_POP_t + e_t \dots\dots\dots (2)$$

Where Ln_UNEMP_t is the unemployment rate at time t, Ln_GDP_t is the real GDP growth in time t, Ln_Infl_t is the inflation rate at time t, Ln_FDI_t is the foreign direct investment inflows in time t, Ln_POP_t is the population growth in time t, β_0 is the regression constant, β_1 , β_2 , β_3 , and β_4 are the parameter coefficients, and e_t is the stochastic error term in time t. Ln stands for the natural logarithms and is used to linearize the relationships and allows the coefficients' interpretation in elasticity terms.

Definition of Variables and Source of Data

Unemployment Rate: The unemployment rate indicates the proportion of the population that is not employed but are actively seeking employment.

Gross Domestic Product (GDP): GDP is the total market or monetary worth of all the products and services that are produced and sold in a certain nation., adjusted for production costs and the consumption of fixed capital.

Inflation Rate: The rate of inflation is the percentage by which the general level of prices in an economy has increased over a specific time frame, usually a year.

Foreign Direct Investment (FDI): Foreign direct investment is the cross-border investment in an economy that has the power or major impact on the management of a business in a particular country. FDI refers to net inflows, which can take the form of equity capital or the reinvestment of earnings, as well as other types of capital into a country.

Population: The key employment indicator is the proportion of the working-age population aged 15-64 who are either employed or actively seeking work.

Table 1. Description of the variables

<i>Variable</i>	<i>Symbol</i>	<i>Measurement</i>	<i>Time period</i>	<i>Source of Data</i>
Unemployment Rate	UNEMP	Percent (%)	1980- 2022	World Bank
Real Gross Domestic Product	GDP	Percent (%)	1980- 2022	World Bank
Inflation Rate-GDP Deflator	Infl	Percent (%)	1980- 2022	World Bank
FDI-Inflow (Net)	FDI	Billion Dollar (US)	1980- 2022	World Bank
Population Growth	POP	Percent (%)	1980- 2022	World Bank

Source: All data obtained from the World Bank open-source data (2025)

Unit Root Tests

Stationarity is a key characteristic of time series data. If the mean and variance of a series remain unchanged throughout time, we say that it is stationary. To rephrase, a series is said to be stationary if and only if its probability distribution remains constant across time. Verifying that the variables do not include a unit root is an essential first step in estimating time series data. The Augmented Dickey-Fuller (ADF) and the Phillips-Perron tests are used to check if the variables are stationary (Mushtaq, 2011; Phillips & Perron, 1988). Between 1976 and 1979, Dicky and Fuller's exam underwent revisions. Time series data can be examined for the presence of a unit root using this technique. The ADF test is usually applied using the error-term approach. While Phillips Perron (PP) is conducted to the distribution of errors, it is also more robust towards serial correlation through scrutinizing the heteroscedasticity-autocorrelation estimator, the Newey-West (1987) test.

Autoregressive Distributed Lag Model (ARDL)

To examine the long- and short-term associations between the dependent and explanatory variables in Malaysia, this research uses the Autoregressive Distributed Lag (ARDL) bounds testing technique that was suggested by Pesaran, Shin, & Smith (1999; 2001). In the ARDL statistical method, the Wald-F statistic is a special feature that predicts the generalized Dickey-Fuller regression, which in turn examines the significance of variables using the conditional and unrestricted equilibrium correction model (ECM). According to Pesaran et al. (2001), the ECM examines the existence of a long-run relationship given the upper and lower bound decisions.

In this study, the ARDL approach was selected above other methods and processes. For example, Johansen et al. (1990) suggested the Johansen maximum likelihood approach due to its many benefits over traditional methods, while Engle et al. (1987) created the residual-based test for Error Correction methods (ECM). According to Duasa (2007) and Newman (1993), after the ARDL lag order is defined, the ARDL methodology makes it easier to estimate the cointegration relationship using the OLS method. In contrast, the ARDL method is adaptable to any integration order— $I(0)$, $I(1)$, or both—and does not need a unit root pre-test of variables (Budha, 2013). Contrarily, according to Narayan et al. (2004), the method may not work at all or provide inconsistent results if the variables are determined to have an integration order of $I(2)$.

FINDINGS

This section presents the findings of the research examining how unemployment in Malaysia is affected by GDP, inflation, foreign direct investment, and population growth. Before proceeding with the regression analysis, the stationarity of all series has been checked to determine their integration orders. For this purpose, the unit root test was conducted using the Augmented Dickey-Fuller (ADF) technique.

Table 2. Unit root tests results

<i>Variable</i>	<i>ADF Test Statistic Level</i>		<i>ADF Test Statistic 1st Difference</i>		<i>Integration Order</i>
	<i>Intercept</i>	<i>Trend & Intercept</i>	<i>Intercept</i>	<i>Trend & Intercept</i>	
Ln_UNEM_t	-2.719463	-3.073622	-6.5768**	-6.490548**	$I(1)$
Ln_GDP_t	-5.1177**	-5.2937**	-	-	$I(0)$
Ln_INF_t	-7.5596**	-7.448**	-	-	$I(0)$
Ln_FDI_t	-2.3030	-2.2813	-8.1307**	-8.0608**	$I(1)$
Ln_POP_t	-0.4720	-3.0819	-3.17313**	-3.16213**	$I(1)$

Note: (*), (**) denote 5% and 1% levels of significance, respectively.

Source: Authors' calculations

Table 2 shows the results of the ADF test conducted for the stationarity of the series. The series are unemployment rate (Ln_UNEM_t), annual GDP growth (Ln_GDP_t), inflation rate (INF_t), inflows of FDI (FDI_t), and population growth (Ln_POP_t). According to the ADF test

results, GDP_t and inflation (IN_{Ft}) are stationary at the level. While unemployment (Ln_UNEM_t), foreign direct investment (FDI_t), and population (Ln_POP_t) are not stationary in level. They become stationary at first difference.

According to Pesaran et al. (2001) and Asteriou et al. (2007), if the series is a mixture of I(1) and I(0), it is recommended to proceed with the Bounds Cointegration approach in the ARDL model framework for capturing the long-run relationship because, in this case, standard time series methods or classical regression analysis cannot be applied. Hence, the autoregressive distributed lag model (ARDL) is applied in this study to investigate the long-run relationship between the series.

In the ARDL framework, before estimating long-run coefficients, it is necessary to determine whether there is a long-run relationship among the selected variables. To examine the long-run relationship among the selected variables, the Bound cointegration test is performed. The optimal lag length for the variables is (4, 1, 4, 0, 2). It means four lags for dependent variables and one lag, four lags, zero lag, and two lags for Ln_UNEMP_t, Ln_GDP_t, Ln_Infl_t, Ln_FDI_t, and Ln_POP_t, respectively, using the AIC criterion.

Bounds testing for cointegration

The findings of the Bound test are presented in Table 3. As can be seen, the calculated F-statistic is 7.3990, which is obviously significant at the 1% level and exceeds the upper bound critical value of 4.37. Thus, the null hypothesis of no cointegration (no long-run relationship) is rejected, and it can be concluded that a long-run relationship exists among the variables in the study. Put differently, there is a long-term relationship among unemployment (Ln_UNEMP_t), gross domestic product (Ln_GDP_t), inflation (Ln_Infl_t), foreign direct investment (Ln_FDI_t), and population (Ln_POP_t) in Malaysia.

Table 3. Bounds testing for cointegration (Case 2: Restricted constant and no trend)

	Critical Value	Lower Bound	Upper Bound
	1%	3.29	4.37
	5%	2.56	3.49
	10%	2.2	3.09
Variables: Fc (Ln_UNEMP _t , Ln_GDP _t , Ln_Infl _t , Ln_FDI _t , Ln_POP _t)		F-statistics 7.3990	Cointegration Yes

Source: Authors' calculations using EViews 10

Once the long-run relationship between the variables is confirmed, the next step is to estimate their long-run coefficients.

Table 4. Estimated long-run coefficients

Variable	Coefficient	Standard Error	T-statistic	Prob.
Ln_GDP _t	-0.099774	0.046913	-2.126791	0.0444
Ln_Infl _t	-0.521991	0.078849	-6.620136	0.0000
Ln_FDI _t	0.101427	0.031125	3.258724	0.0035
Ln_POP _t	1.820947	0.200679	9.073943	0.0000
C	1.683235	0.498005	3.379954	0.0026

Source: Authors' calculations using EViews 10

The empirical long-run coefficients of the variables are shown in Table 4. The table demonstrates that there is a statistically significant negative sign for gross domestic product (Ln_GDP_t) at the 5% level. This finding indicates that GDP and unemployment have a negative connection. It indicates that, all else being equal, the predicted unemployment rate falls by 0.099774% as Ln_GDP_t in Malaysia grows by 1%. The empirical data also shows that inflation has a negative sign (Ln_Infl_t), which is statistically significant at the 1% level, suggesting that inflation has a negative effect on the unemployment rate. It indicates that, all else being equal, the unemployment rate falls by 0.52191 percent for every one percent increase in inflation.

On the other hand, foreign direct investment (Ln_FDI_t) and population (Ln_POPT) are positively signed and statistically significant. It means that a 1 billion increase in FDI would raise the unemployment rate by 0.101427. Likewise, a 1% increase in population would raise the unemployment rate by 1.820947%. The short-run relationship between the selected variables is estimated using an error correction model (ECM). The ECM findings are presented in Table 5.

Table 5. *Estimated coefficients for short-run dynamics (ECM)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.215657	0.337553	6.563875	0.0000
D(Ln_UNEMP(-1))	0.459773	0.134317	3.423034	0.0023
D(Ln_UNEMP(-2))	0.406417	0.130203	3.121417	0.0048
D(Ln_UNEMP(-3))	0.217224	0.123624	1.757132	0.0922
D(Ln_GDP _t)	-0.059832	0.024706	-2.421740	0.0237
D(Ln_INF _t)	-0.080089	0.028500	-2.810179	0.0099
D(Ln_INF(-1))	0.490970	0.085616	5.734590	0.0000
D(Ln_INF(-2))	0.316647	0.065124	4.862246	0.0001
D(Ln_INF(-3))	0.157947	0.038939	4.056266	0.0005
D(Ln_POP)	1.813191	2.325154	0.779815	0.4435
D(Ln_POP(-1))	-7.792467	2.716544	-2.868523	0.0087
ECM _{t-1}	-1.316309	0.182680	-7.205557	0.0000
R-squared		0.700472		
Adjusted R-squared		0.578442		
F-statistic		5.740163		
Prob(F-statistic)		0.000105		

Source: Authors' calculations using EViews 10

Table 5 indicates that changes in gross domestic product (Ln_GDP_t), inflation (Ln_Infl_t), foreign direct investment (FDI), and population (Ln_POP_t) all have a significant impact in the short run.

The error-correction model, denoted ECM_{t-1}, determines the speed of adjustment from disequilibrium to the equilibrium level. The ECM_{t-1} is negative and statistically significant at the 1% level, which meets the required condition for reverting to the long-run equilibrium. The coefficient is -1.316309, which implies that 131 percent of the unemployment disequilibrium due to previous years' shocks will converge back to the long-term equilibrium in the current year.

Table 6. Diagnostic tests results

A: Serial Correlation	F-Stat= 0.5426 [0.6038]
B: Normality	J-B Stat: 0.846 [0.655]
C: Heteroskedasticity	F-Stat = 0.6502 [0.734]
D: Model Specification (Functional form)	F-Stat= 1.0242 [0.3411]

A: Breusch-Godfrey Lagrange multiplier (LM) test of residual serial correlation
 B: Jaque-Bera Test based on the skewness and Kurtosis of the data
 C: Breusch-Pagan-Godfrey Test based on the regression of squared residuals
 D: Ramsey's RESET test by using the square of the fitted values

Source: Authors' calculations using EViews 10

The results of the performed diagnostic tests are illustrated in Table 6. The results indicate that there is no serial correlation among the residuals. Likewise, the findings confirm that the residuals are normally distributed. Also, the results show that the error terms are homoscedastic. Finally, the Ramsey Reset test conducted for the model specifications confirms

that the model is correctly specified. The cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) are presented in Figure 2 and Figure 3, respectively. Both CUSUM and CUSUMSQ are within the 5% critical bounds, indicating that the model is structurally stable.

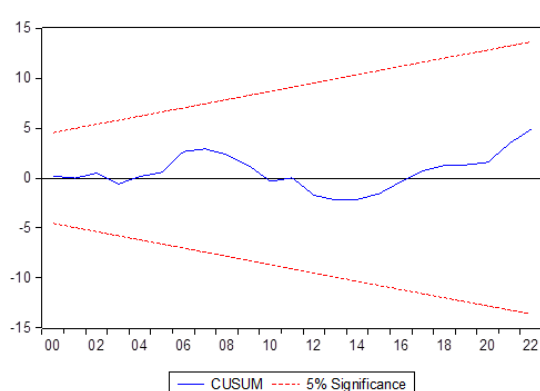


Figure 2. Plot of Cumulative Sum of Recursive Residuals

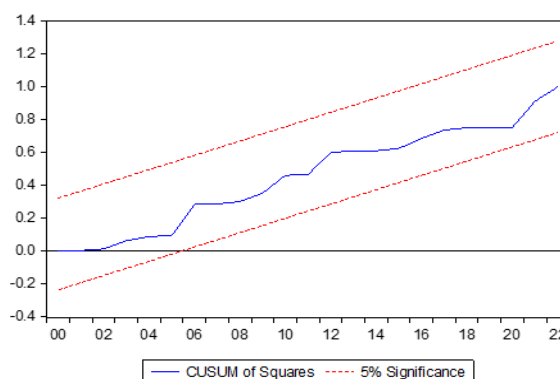


Figure 3. Plot of Cumulative Sum of Squares Recursive Residuals

DISCUSSION

The objective of this study was to examine the correlation between unemployment and macroeconomic factors, such as GDP, inflation, FDI, and population growth, by utilizing annual time-series data from 1980 to 2022. The long- and short-term relationships between the dependent and explanatory variables in Malaysia are examined through the use of the Autoregressive Distributed Lag (ARDL) bounds testing approach in this study.

According to the calculated coefficient, there was a 0.099774 percentage-point decrease in unemployment for every 1 percentage-point increase in real GDP. This is in line with Okun's Law, which states that unemployment has a negative elasticity with respect to output, albeit

less than zero. Despite being modest, the magnitude indicates that Malaysia's economic growth has the potential to lower unemployment, albeit perhaps not very strongly. This is consistent with research by Nasir et al. (2024) in Malaysia, who also find a significant inverse relationship between GDP and unemployment. However, the elasticity of this relationship varies across periods and is influenced by controls such as population, inflation, and asymmetric effects of FDI; perhaps recessions increase unemployment more than expansions decrease it. A possible structural explanation for the relatively small coefficient is that productivity advances or capital-intensive industries may be driving production growth more so than widespread hiring.

Additionally, labor market rigidities such as wage stickiness, regulatory constraints, and mismatches between the skills that educational institutions produce and those employers seek may prevent new jobs from being created during growth. Another theory is that economic fluctuations, such as those during crises, produce asymmetric impacts; for example, growth upswings may have a weaker effect on unemployment than downturns. The findings of a significant negative relationship between GDP and unemployment in this study are consistent with those of Bayar et al. (2017), Dogan (2012), Djambaska et al. (2015), Arslan et al. (2014), and Aurangzeb et al. (2013).

The study's findings exposed a statistically significant inverse link between unemployment and inflation. This indicates a trade-off between unemployment and inflation. In simple terms, unemployment falls as inflation rises and vice versa. In the context of Malaysia, the Phillips Curve theory, which postulates an inverse relationship between inflation and unemployment, is consistent with the conclusion that inflation is negatively associated with unemployment. This implies that moderate inflation could boost the country's economy and labor demand, thereby lowering unemployment. Similar results have been reported by Furuoka (2007) and Furuoka et al. (2014), as well as Djambaska et al. (2015) and Dogan (2012), all of whom observed a negative inflation-unemployment link in various economies. On the other hand, there are drawbacks to high inflation, such as uncertainty, a shrinkage of real earnings, and potentially diminished purchasing power, particularly for lower-income individuals. Therefore, even though the negative impact of inflation on unemployment is conceivable, it needs to be carefully considered because there may be constraints on the trade-off, and high inflation may eventually stop reducing unemployment further or even have the opposite effect if inflation is unstable and expectations become unreliable.

The findings additionally revealed a statistically significant positive correlation between unemployment and population growth. This positive and substantial association shows that rapid demographic expansion, without proportionate job development, results in a surplus labor supply and more competition for jobs. In simpler terms, this is because the number of jobs available dictates how many people will be employed in any given nation. The sectoral growth needs to keep up with the rise in population (labor supply); otherwise, unemployment will eventually exceed labor demand, leading to a rise in the unemployment rate. In addition,

it limits opportunities and intensifies rivalry among young people, ultimately driving down wages and raising the unemployment rate (Ilegbinosa et al., 2014). This also confirms the results of Augrangzeb et al. (2013) and Arslan et al. (2014), who reported comparable impacts in underdeveloped nations.

Lastly, the results of the research show that the unemployment rate is significantly improved by foreign direct investment (FDI). It implies that foreign direct investment (FDI) inflows are not successfully resulting in the creation of new jobs, that FDI is focused on non-labor-intensive industries where foreign companies automate and hire foreign workers, concentrating on capital goods and sub-assemblies. This is comparable to the results of Nasir et al. (2024), who found a substantial positive relationship between FDI and Malaysia's unemployment rate.

Implications arising from this study's conclusions are substantial for theoretical comprehension of the dynamics of unemployment in Malaysia and other emerging nations as well as for economic policy. The study demonstrates that a mix of demand-side and structural factors, including GDP growth, inflation, foreign direct investment, and population growth, significantly affects unemployment in Malaysia. The negative correlation between GDP and unemployment supports the validity of Okun's Law, indicating that economic growth is crucial for reducing unemployment. Nonetheless, the moderate elasticity suggests that Malaysia's expansion has not been entirely driven by job creation. This could be a result of the economy's structural bias toward industries that require substantial capital and technology, such as manufacturing and services, which typically generate less employment than their output increases. Policymakers should implement inclusive growth strategies such as diversifying into labor-intensive industries, bolstering small and medium-sized businesses, and targeted fiscal incentives for sectors with high labor-absorption priorities to improve the employment consequences of growth.

The strong negative effect of inflation on unemployment confirms the Phillips Curve hypothesis and shows that moderate inflation paired with high aggregate demand might promote employment. This suggests that, as long as it stays within manageable bounds, moderate, demand-driven inflation and job growth may coexist. Malaysian policymakers must strike a cautious balance, though, since an unduly tight monetary policy intended to reduce inflation may unintentionally stifle employment and productivity. Therefore, to maintain both price stability and labor market expansion, a coordinated framework of monetary and fiscal policy is required.

A key policy concern is the significant positive impact of foreign direct investment on unemployment. Given that foreign investments are mainly located in high-tech, capital-intensive sectors or rely heavily on imported labor and intermediate inputs, this suggests that FDI inflows have not yet generated sufficient employment spillovers. It is recommended to implement targeted FDI policies that support domestic skill upgrading, enforce technology transfer, and foster connections with local businesses to optimize the employment benefits of FDI.

Lastly, the significant correlation between unemployment and population growth highlights the demographic stresses Malaysia's labor market is facing. Structural unemployment results from an increasing workforce without a corresponding rise in employment prospects, especially for young people and recent immigrants. Long-term plans centered on regional development, entrepreneurial assistance, school reform, and the establishment of labor-intensive businesses are needed to address these issues. The negative impacts of population growth on unemployment may also be mitigated by policies that support rural employment and private-sector innovation.

These findings have implications that go beyond Malaysia. The observed trends of a moderate Phillips Curve trade-off, a weak unemployment elasticity in GDP, and mixed impacts of FDI are in line with what many emerging and middle-income economies, such as the Philippines, Thailand, and Indonesia, have experienced. Additionally, the positive relationship between FDI and unemployment serves as a warning to other economies. In the absence of appropriate institutional frameworks, FDI might not always result in inclusive growth. Lastly, nations experiencing rapid labor force growth, particularly in Asia, Africa, and the Middle East, might benefit greatly from the demographic pressures highlighted by the population-unemployment nexus.

From a theoretical standpoint, this work contributes to the literature by providing updated empirical evidence on the dynamics of Okun's Law and the Phillips Curve in Malaysia. The ARDL technique provides in-depth insights into the transmission of macroeconomic shocks to the labor market by enabling the simultaneous evaluation of both short- and long-term connections. The findings contribute to the discussion of whether inflation-led and growth-led employment impacts are consistently true in developing countries characterized by labor market rigidity and structural change.

From an empirical perspective, this study adds to the growing literature challenging the generalizability of conventional macroeconomic theories in emerging markets. It highlights the significance of institutional and structural elements unique to a given setting by demonstrating that FDI and population have a positive effect on unemployment. These results demonstrate how economic growth, inflation, and foreign direct investment interact differently in economies with differing industry compositions, labor market restrictions, and demographic characteristics.

CONCLUSION

Lowering unemployment is a key macroeconomic objective for a nation; however, many struggle to control it, and it persists. While many aspects of unemployment could be investigated, this study focuses on the macroeconomic variables influencing Malaysia's unemployment rate between 1980 and 2022.

This study employed the Autoregressive Distributed Lag (ARDL) model to analyze the macroeconomic factors that contributed to unemployment in Malaysia. According to the ADF

results, the unemployment rate, foreign direct investment, and population growth are found to be stationary at first differences. In contrast, GDP growth and the inflation rate are stable at levels. Since the variables are of mixed orders, the bounds cointegration approach in the ARDL framework is applied. Diagnostic techniques, including serial correlation, heteroscedasticity, normality tests, and model specification tests, are employed, and for model stability, CUSUM and CUSUMSQ are used. The empirical findings show that whereas FDI and population growth have positive and substantial effects on unemployment, GDP growth and inflation have considerable negative effects. All of these results point to the influence of both demand-side and structural variables on Malaysia's unemployment patterns.

Okun's Law is supported by the inverse relationship between GDP and unemployment, which confirms that economic growth, albeit with limited flexibility, creates jobs. The modest scale of this effect suggests that, although Malaysia's growth is strong, it could be focused on industries that require substantial capital or technology and do not fully employ its workforce. The Phillips Curve hypothesis, which suggests that moderate inflation fueled by robust aggregate demand might temporarily boost employment, is supported by the strong negative relationship between inflation and unemployment. However, to avoid inflationary instability, preserving this trade-off requires careful policy coordination.

The positive correlation between FDI and unemployment, on the other hand, indicates that foreign investment in Malaysia has not yet been successfully converted into inclusive or labor-intensive growth. This underscores the need for policies that enhance knowledge transfer, talent development, and local ties to ensure that FDI makes a significant contribution to job creation. Similarly, population growth's notable positive effect on unemployment highlights demographic constraints on the labor market and highlights the need for investments in entrepreneurship, schooling, and career development. In general, the results show that full employment cannot be attained by macroeconomic stability alone. To convert Malaysia's economic advancement into widespread job opportunities and long-term prosperity, a comprehensive policy framework that supports inclusive growth, flexible labor markets, and human capital development is recommended.

LIMITATIONS OF THE STUDY

Despite this study offering valuable insights into the macroeconomic factors that influence unemployment in Malaysia, several limitations should be noted to put the results in context and guide future research. The analysis uses yearly time series data from 1980 to 2022. Although this allows for long-term trend analysis, it can mask short-term swings and fluctuations in unemployment caused by policy changes, external shocks, or economic cycles. Using higher-frequency data, such as quarterly or monthly observations, may allow for more dynamic interactions and enhance the precision of short-run estimations. The following other important variables, such as trade openness, labor productivity, education, technological advancement, and institutional quality, could be considered in studying unemployment. Leaving these variables out might reduce the model's explanatory ability. To gain a more

thorough knowledge of the dynamics of unemployment, future studies should expand the model to incorporate these variables.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

The primary author conducted the majority of the study, encompassing data collection, econometric analysis, and result interpretation, and spearheaded the drafting of the paper. The second author made significant contributions to the introduction and the development of the theoretical framework, and provided critical revisions to enhance the paper's overall quality and coherence. Both writers examined and verified the final iteration of the work.

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DATA AVAILABILITY STATEMENT

Upon reasonable request, the corresponding author will provide the data supporting the study's conclusions. To protect respondent confidentiality, access may require ethical approval.

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