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The Study of Factors Influencing the Movement of Inflation in Thailand

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Abstract

The main cause of inflation is excessive demand for goods and services that exceeds the capacity to supply them, often due to increased production costs. This leads producers to adjust prices upward or reduce production. In the context of energy-related products, such as fossil fuels, electricity, and cooking gas, they constitute a significant portion of production costs for many goods and services. This study used quantitative research, and data were collected by the documentation method with secondary data from 1998–2022, using autoregressive distributed lag (ARDL) as a method for data analysis. Based on the results of the analysis, it was found that oil prices have a significant positive influence on inflation, both in the short run and the long run. Government expenditures have a significant negative influence on inflation, both in the short run and the long run. The money supply has a significant positive influence on inflation, both in the short run and the long run. Average monthly wages have a significant positive influence on inflation in Thailand, but only in the short run. The unemployment rate has a significant negative influence on inflation, but only in the short run.

Keywords: Inflation, Oil price, Government expenditure, Average monthly wages, Unemployment rate

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INTRODUCTION

Inflation is an economic problem for each country because inflation is a priority for economic stability, which affects both micro and macroeconomic economies. This is a negative impact on households in terms of income, including those with high incomes. Low incomes and fixed incomes have led to lower living standards. Inflation affects macro levels. This will result in higher production costs and long-

term financial costs. As a result, exports are reduced. There are obstacles to long-term stability and economic expansion, which increases production costs. As a result, producers have to increase the price of goods such as labor wages, raw material prices, production costs, and uncontrollable factors such as global oil prices.

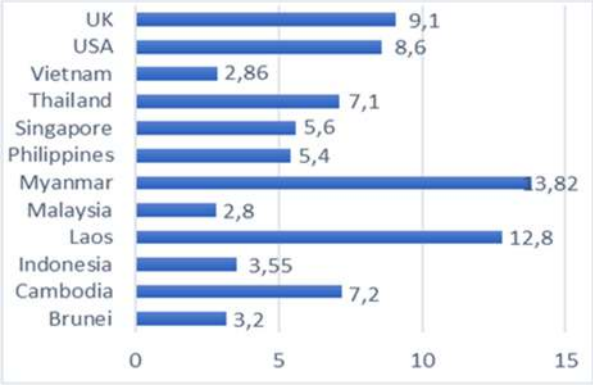

Figure 1. ASEAN Inflation Statistics for May 2022
Source: Bureau of Trade and Economic Indices

Stabilizing the economy is a factor of paramount importance. In order for a country to develop properly and steadily, any country with a good and stable economy will result in rapid progress. However, at the same time, the rapid rate of economic growth often causes inflation, which is a situation where the level of goods and services, in general, continues to rise.

In the economy, it is believed that if inflation increases but only slightly, it will create incentives for entrepreneurs, but if inflation increases and fluctuates, it will create uncertainty and cause problems for the economy. At present, social conditions, economic conditions.

Variable domestic and external factors can affect inflation. A very important thing to prevent inflation is to stabilize the price level in the right direction. However, if a country's economy does not stabilize its price levels, it can cause the country to experience more severe inflation. It affects the internal and external stability of the economy. Especially the cost of living of the people. This is due to the higher price of Thai exports compared to countries with low inflation rates.

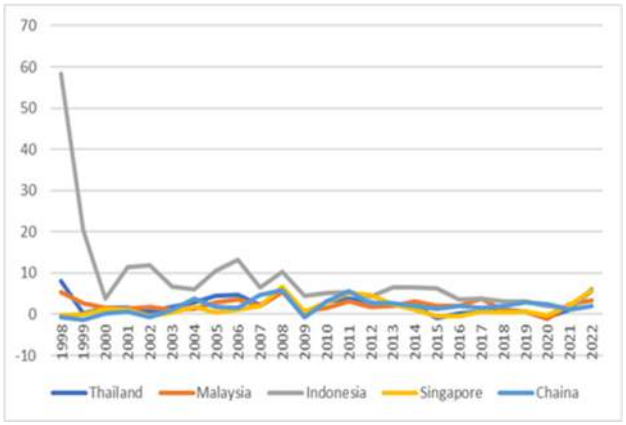

Figure 2. Inflation, consumer prices (annual %)
Source: World bank, 2022

There are two causes of inflation, the first being demand-pull inflation, and cost-push inflation. Increased consumption of goods and services as a result, goods, and services are insufficient to meet the demand in the economy, resulting in a shortage of goods and services, causing the price of goods to rise. This could be due to several reasons, such as changes in the money supply, and the implementation of government policies. Secondly, cost-limiting inflation is caused by rising production costs, forcing manufacturers to increase the prices of goods and services (Namphueng, 2006)

The KKP (2022) research institute estimates that the conflict between Russia and Ukraine is likely to be more intense and protracted than market expectations. and although the direct impact on the ASEAN

economy is minimal the indirect effect of energy prices Inflation and monetary policy trends in developed economies could put the ASEAN economy into its worst case in 2022 and have a significant impact on recovery.

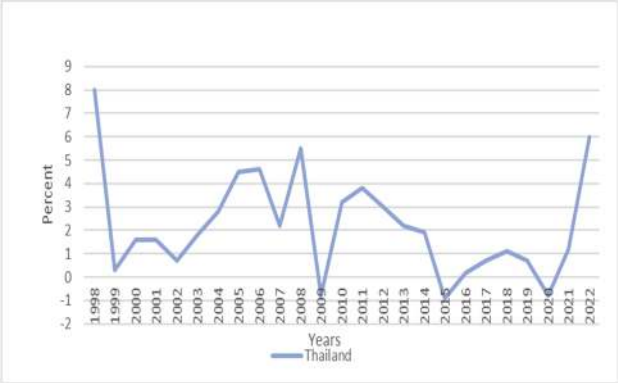

Figure 3. Inflation rate in Thailand (1998-2022)
Source: World bank, 2022

ASEAN countries There are levels and patterns. Exposure to the Russian economy varies. The impact that ASEAN will surely suffer from the Ukraine war will be higher food and energy prices and the crisis in some manufacturing supply chains will affect ASEAN in many ways. (James, 2022)

Inflation in 'ASEAN' cost of living rose during May 2022 because of the Covid-19 epidemic. which was fueled by the Russian-Ukrainian crisis's impact on the economy in the ASEAN region Inflation levels rose, with Myanmar, Laos, and Cambodia among the top three ASEAN countries with the highest inflation since the beginning of the year. Thailand's inflation rate was 7.1% in May.

Not only ASEAN has to deal with inflation. But big economies like the United States and the United Kingdom faces the highest inflation rate in the past 40 years. Inflation is a general increase in the price of goods that can reduce the purchasing power of people. Inflation can cause economic instability to allow the country's governments to implement monetary policy to stabilize prices and inflation. Low inflation is fundamental to sustainable economic stability (Aydin et al., 2016).

Therefore, if inflation is above inflation expectations, which are set by the central bank, then the central bank will raise interest rates to reduce inflation. An increase in interest rates will lead to reduced investment and economic growth (Saidi et al., 2019). The negative effect of inflation on economic growth is in controversial with the Keynesian view that states that inflation can positively affect economic growth (Karahan and Çolak, 2020).

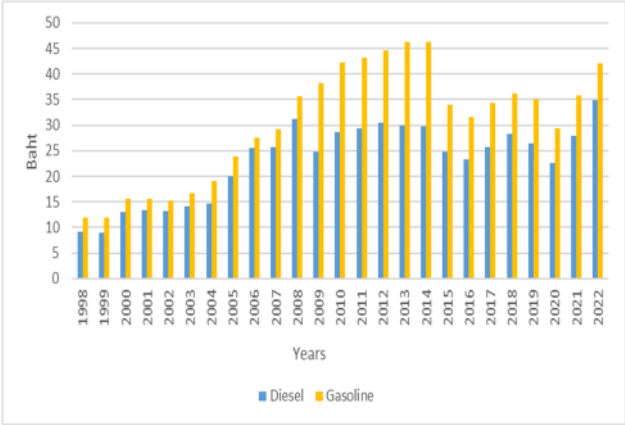

Figure 4. Diesel and gasoline price rates during 1998-2022 (Thai Baht)
Source: bangchak, 2022

Fischer (1993), and López Villavicencio and Mignon (2011) state that the positive or negative effect of inflation on economic growth will depend on a certain level of inflation called the inflation threshold. If inflation is above the inflation threshold, the effect of inflation on economic growth is negative. Conversely, if inflation falls below the inflation threshold, then the effect is positive. (Tajuddin, Adam and Yuwanda, 2021).

When demand increases and there is no access to an equally increased supply. It automatically generates general price levels and can cause inflation to occur in a particular country. Cost-driven inflation is a type of inflation, whose main impact comes from the supply side. Factors such as an increase in raw material prices, an increase in wage rates, etc., may result in an increase in the cost of production in the industrial sector.

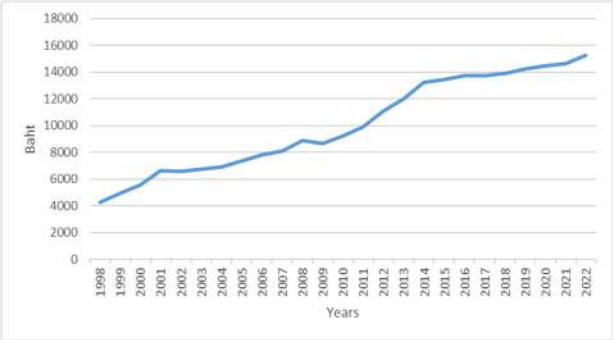

Figure 5. Minimum Wage 1998-2022 in Thailand (Thai Baht)
Source: Bank of Thailand, 2022

Therefore, the price level of goods and services generally rises sustainably since this situation causes inflation to occur when the general price level rises. Therefore, we can say that there are many factors that determine inflation. Figure 2 shows regional inflation comparisons between upper-middle-income countries. But each country must face the different effects of Inflation trends. Compared to Singapore, Thailand, China, and Malaysia faced low inflation during this period.

Overall, between 1998 and 2022, Indonesia faced high inflation from 1998 to 2008. As a developing country, Thailand had to overcome inflation. by Focusing on factors that affect inflation rates Thailand's average inflation rate was 2.2% per year in the past, although Thailand has gone through low inflation. Rates compared to Global Wise overall about 51 years ago, but it may face high inflation in three periods. The three periods of high inflation in Thailand were the 1998s, the early 2008s, and the late 2022s.

For Thailand in recent times, inflation has risen, and there is a risk of further rise in energy prices, whether it is energy prices that continue to rise due to geopolitical conflicts in Russia and Ukraine, or pressures from pig prices that have already skyrocketed by more than 40% due to the prolonged ASF epidemic and affecting supply. KKP Research (2022) estimates that average inflation in the first quarter of the year may rise by 3.5% Compared to the same period last year, it may exceed 4% in some months, mainly due to three main reasons: First, global energy prices continued to rise due to both recovering demand-side factors; Reducing energy investments due to global warming concerns and global geopolitical conflicts, KKP Research estimates that oil prices are likely to skyrocket in excess of $100 per barrel.

In the second quarter of this year, in which case, the price of domestic retail fuel, both petrol, and diesel could rise significantly. Second, pork prices have risen considerably and may pass on to other types of food prices. Pork retail prices have now risen by more than 40% and will have a major impact on inflation in the first quarter of this year. Rising food prices will challenge inflation to rise by an average of about 1% a month, with inflation potentially rising to 4% in the February and March spurs from previous forecasts.

However, the main risk is that pig prices are likely to be high until the end of the year, which is mainly due to the protracted epidemic and the fact that raising new pigs for sale takes up to 8 - 9 months while importing pigs that are

difficult to achieve due to different trade standards. And the full-year average inflation could rise to 3% Third, the state's measures to help with the 2021 electricity bills during February-March and May-August have kept the base of prices in the past year low.

Utility bills dropped by about 20% in the month of the rescue. When utility aid measures are exhausted this year, prices will rise considerably, returning to normal levels. Figure 1.3 shows the trend of inflation in Thailand from 1998 to 2022. Thailand is known as an upper middle-income country such as Indonesia, China, Singapore, and Malaysia.

Compared to his country, thailand has low inflation. Figure 3 shows the annual inflation (consumer price) from 1998 to 2022. In 1998, Thailand experienced the Bubble Crisis or Tom Yum Kung Crisis, which began on July 2, 1997, and the Thai government was forced to float the baht due to Thailand's lack of other currencies, especially the dollar, to support the baht, which caused an immediate economic impact.

Most affected countries Thailand and Indonesia Malaysia, meanwhile, were injured quite a bit. ASEAN countries have increased their debt-to-GDP ratio from 100% to 167% and increased to 180% at the peak of the crisis. In 2008, the hamburger crisis in the U.S. resulted in the bankruptcy of Lehman Brothers, causing the collapse of several major financial institutions and businesses. As a result, global GDP growth fell from 5% in 2007 to 2%, and in 2022, the crisis of conflict between Russia and Ukraine resulted in higher global energy prices.

Oil price shocks affect the economy through various channels: supply side, demand side, and trade conditions Supply is affected due to rising production costs due to falling oil prices due to substitution between inputs. Changes in relative prices result in the allocation of new inputs. This, in turn, reduces the negative impact. The long-term impact on capacity is therefore less pronounced than the short-term impact, which is dominated by conflicts arising as a result of the allocation of new resources and from uncertainty about the subsequent development of oil prices.

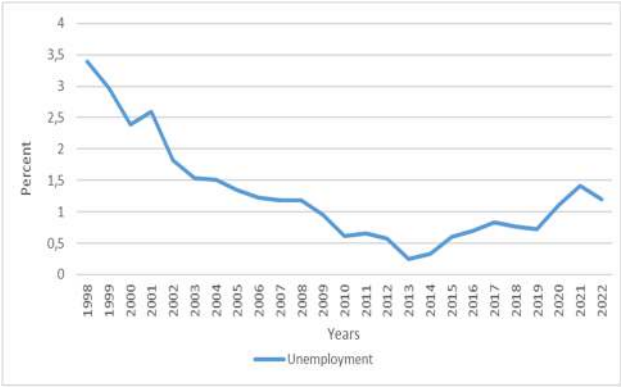

Figure 6. Unemployment rate in Thailand 1998-2022

Source: Bank of Thailand, 2022

However, the allocation of space between these branches also entails costs (training costs, immutable investments, etc.), and the actual impact on investments is primarily based on expectations about the stability of oil price changes. This often varies over time. The shock of oil prices has caused the general price level to rise. This has resulted in a decrease in disposable real income and a decrease in demand. In addition to the direct impact on the general price level. Oil prices also have a second round of impact, as strict minimum wages and price indexing and wages increase inflation.

Higher wage pressures and lower demand have led to a decline in employment. In addition, recessionary sentiment and stock market reactions can amplify the impact of shock. In addition, the economy has been

affected by changes in the international environment caused by falling oil prices. The rise in prices of imported goods contributes to the deterioration of trade conditions and causes welfare losses. In addition to the channels already described. Monetary policy response also plays an important role. The above findings apply to oil importing countries. Oil-exporting countries benefited from increased export revenues, which declined in line with declining global demand.

Oil is considered a contributing factor to inflation. If that oil has a higher price. Inflation will follow. From the picture 4, each year, the rate of diesel and benzene consumption in Thailand tends to fluctuate according to various global crises. Every time we see oil prices increase; it affects the inflation rate quite a lot. Since Thailand is a relatively large net oil importer, in 2008, oil prices were quite high due to the fact that Venezuela did not sell oil to Exxon Mobil, resulting in higher crude oil prices, and in 2020, oil prices became cheaper due to the COVID-19 epidemic crisis. And in 2022, the war between Ukraine and Russia makes oil prices rise again.

The relationship between inflation and government expenditure has a variety of concepts presented, such as Keynes' concept explaining the causes of inflation coming from the demand side. Keynes emphasized the level of total spending, particularly government expenditures, as a cause for inflation or a concept from the classical fiscal theory that believes that if a country has a budget deficit, it will cause the country to go bankrupt because of higher expenditures.

It will tie the government to borrow money to spend, resulting in higher expenditures in the coming years. Or, if it is the case that the government increases revenue by printing banknotes, it will cause inflation, the value of the currency will fall, and the price of goods will rise sharply from the above-mentioned concepts.

It was found that when government spending increases, it is possible to cause inflation, and if we look at Wagner's view, it will be found that the trend of rising price levels will also have an impact on the trend of government spending, coupled with Aghevli and Khan's assumption that the government deficit will cause inflation through the expansion of the money supply as a result of offsetting the deficit and the resulting inflation will affect the size of government expenditures, which are adjusted more rapidly than government revenues and form a cycle. (Two-Way Causality)

In the monetary policy of various central banks around the world. Wages are an important factor that monetary policymakers use to assess a country's inflationary pressures, as wages are one of the major costs of producing goods and services. The increase in wages of workers cannot affect the decision to adjust the prices of goods and services of entrepreneurs.

If entrepreneurs decide to raise the price of goods, it will put pressure on inflation, which reflects the rise in prices of various goods in the country (Jirayu, 2018). The period 1998-2012 was a period of foreign and domestic investment, so it expanded rapidly. Raising the minimum wage does not have much effect on the cost of entrepreneurship. But labor productivity is increasing rapidly, away from the minimum wage and the average wage quite substantially.

Representatives of the labor and academic sectors called for wage increases, which the Wages Committee later announced to all provinces to equalize the minimum wage. 300

baht nationwide On January 1, 2013, when calculated on average, it would increase the wage rate by another 25.5 percent, and no minimum wage increase was considered for "first-time workers to work, to improve their skilled workers."

Inflation and the unemployment rate are two important variables used to measure a country's economic potential. Inflation is the general increase in the level of prices for goods and services. Inflation is a constant increase in the level of the price of a country. As inflation increases, it indicates that the level of prices for goods and services generally increases, affecting the well-being and livelihoods of citizens.

When the price level increases the money held can be used to buy fewer goods and services or less purchasing power. This makes planning for future spending more difficult. Whereas the unemployment rate is the percentage of the unemployed per total labor force. The labor force refers to people who are 15 years of age or older and ready to work.

A low unemployment rate means a high number of employed people. Production will increase. As a result, the country's productivity and income also increased. Therefore, low inflation or low inflation and low unemployment have a positive effect on economic expansion. Economic policymakers, therefore, want low inflation and low unemployment. But often these two goals are contradictory.

It can be observed that when there is more productivity or when unemployment decreases, but the price goes up. Prices rise when the same price levels come to a head, and inflation rises. So, when policymakers direct the economy, the economy expands. More is being produced. Employment is increasing. Unemployment is falling, but inflation is higher.

On the contrary, when policymakers direct the economy by adopting pegged monetary policy or reducing government spending, demand is reduced. Unemployment rose, but inflation fell. It seems that there is compensation for two important economic variables, which are inflation and the unemployment rate. This offset is a distinctive feature of the Phillips curve, discovered by New Zealand economist William Phillips. Phillips used U.K. data from 1861 to 1957, later Paul Samuelson and Robert Solow used U.S. data from the 1900s to 1960s, giving the same effect: offsetting inflation and unemployment.

From the figure 6 in 1998, we can see that the unemployment rate was very high due to the economic crisis. Affecting the employment of people in Thailand. And unemployment in Thailand has gradually decreased due to the government's policy to help the unemployed. From 1999 until 2019, the average unemployment rate was quite good and in 2020, the situation of the outbreak of the Covid-19 virus.

This caused volatility and the Thai economy deviated even more from its natural level. This is a temporary or short-term phenomenon, causing the Thai economy to contract in 2021 by 6.1%, headline inflation was negative by 0.8%, and the number of unemployed increased to 6.5 hundred thousand people, representing an unemployment rate of 1.42%.

Inflation decreases but the unemployment rate increases or there is some compensation between inflation and unemployment in the Thai economy. Explain that Thailand's unemployment rate is higher than the natural unemployment rate or Thailand's production is lower than the natural level.

RESEARCH METHODS

This research uses a quantitative method, The study aims to determine the study of factors influencing the movement of inflation in Thailand by using econometric techniques to estimate various parameters and draw various conclusions about the causes of inflation. And descriptive methods are the study of the causes of inflation based on relevant economic theories based on various concepts.

The method used in this study is Autoregressive Distributed Lag (ARDL) analysis. The type of data used in this study is time series data obtained from the observation process, which comes from the Bank of Thailand and the Office of the Budgetary Commission of Thailand. The data used in this study is a time series data for Thailand.

The researcher utilized Autoregressive Distributed Lag (ARDL) as a data analysis method because the ARDL method has the advantage of not requiring the variables used to be stationary at the same level. The descriptive and time series analysis approaches are used in this research. The descriptive analysis provides an overview or description of the data but does not generalize or make conclusions from the data. Descriptive analysis is used in this study to characterize the development of each variable from 1998 to 2022.

Furthermore, this descriptive analysis is utilized to determine the time period during which the variables used in this research reach their lowest, highest, and fluctuation. Since the data used in this study is time series data, which typically exhibits non-stationarity, it is necessary to assess whether the data being studied is stationary. Non-stationary data can lead to spurious regression and inaccuracies in the analysis. To test stationarity, the Augmented Dickey-Fuller (ADF) test is commonly used. The ADF test examines the time series data and assesses its stationarity properties with the following equation.

$$\Delta yt = \alpha + \beta y(t\text{-}1) + et$$

In the AR (1) model, y_t represents the time series at time t, where t represents the time period. α is the intercept or constant term, and e represents the error or residuals. The unit root test is conducted to examine the stationarity of the time series included in the model at that level. If the time series is not stationary at that level, the unit root test proceeds to the first difference.

If all variables become stationary after differencing, further analysis can be conducted. If the variables exhibit stationarity after the first difference, it indicates that the series possesses a stable long-run relationship and can be analyzed accordingly. The unit root test, typically performed using tests such as the Augmented Dickey-Fuller (ADF) test, helps determine whether a time series is stationary or exhibits a unit root (non-stationarity).

By assessing the stationarity of the time series, researchers can ensure the validity of the analysis and derive meaningful insights from the data. The estimation of the ARDL (Autoregressive Distributed Lag) model, as proposed by Narayan and Smyth (2005), is considered superior in estimating the long-run coefficient of cointegration relationships. The ARDL model, based on the work of Pesaran and Shin (1995), is generally represented by the following equation:

$$Y = \beta_0 Xt + \beta_1 Xt\text{-}1 + \beta_2 Xt\text{-}2 + \ldots + \mu t$$

While in this study, the ARDL model is transformed into a logarithmic form, and the lag is as follows:

$$LnINFLATIONt = \beta_1 OILP(t-i) + \beta_2 G(t-i) + \beta_3 M1(t-i) + \beta_4 MONTHLYWAGE(t-i) + \beta_5 UNEM(t-i) + \mu t$$

Where inflation is inflation, OILP is the oil price, G is government expenditure, M1 is Money supply, MONTHLY is the Average monthly wage, UNEM is the unemployment rate, and μt represents the residual/error. The selection of the appropriate lag length in the ARDL model is crucial for determining the optimal model fit.

Various criteria can be used to determine the suitable lag length, such as Sequential Modified LR Test Statistics (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ). These criteria help identify the optimal lag length and can be used to summarize the lag length in the model.

The number of asterisks (*) in the test results of each criterion can be used to determine the lag length in the model. The higher the number of asterisks, the greater the lag length selected as the most suitable for the ARDL model. Once the appropriate lag length is determined, it is necessary to specify the suitable ARDL model.

The criterion for selecting the suitable model depends on the AIC graph, which is one of the output results of data processing. The graph indicates that the best ARDL model is the one with the lowest AIC value compared to other alternative ARDL models. Bound Test is a method used to test whether there is a long-run relationship or cointegration between the variables used in a study (Hunter, 2019). The test is conducted using an F-test and the conclusion is based on comparing the F-test value with the critical value at the I(1) threshold.

If the generated F-test value is greater than the critical value at the I(1) threshold, it indicates that there is a cointegrating relationship among the variables. Conversely, if the generated F-test value is lower than the critical value at the I(1) threshold, we can infer that the variables are not integrated or integrated of the same order.

In other words, the Bound Test helps us determine whether there is a long-run equilibrium relationship between the variables or whether they are spurious. It provides a statistical basis for evaluating the presence of cointegration in the context of the study. The short-term model estimation using ECM after specifying the long-term relationships among the variables can be represented by the following equation:

$$ECt = \varepsilon t = yt - \sum_{i=1}^{k} 0_i \, x_{it} - N' w_t$$

The elasticity of short-term impacts of independent variables on dependent variables can be observed in the ECM by examining the coefficient cointEq1 (in EViews 9 output) or the coefficient of the error correction term (ECT) in the ECM model. These specifications describe the level of adjustment or speed of the variables in the previous period to correct the dependent variable towards equilibrium in the future period.

From the t-test results, the ECM model is considered valid if the ECT coefficient is negative and statistically significant. The stability test of the Autoregressive Distributed Lag (ARDL) model is conducted to assess

whether the coefficients of the model remain stable over time. It helps to ensure that the estimated relationships between variables are reliable and do not change significantly over the sample period.

The CUSUM test examines the cumulative sum of the estimated coefficients to detect any significant changes or shifts over time. If the CUSUM test statistic remains within the critical bounds, it suggests stability in the coefficients, If the CUSUM plot (blue line) falls within the critical bounds (red lines), it indicates that the model is stable.

CUSUM Squares is a statistical method used for detecting structural breaks or changes in the parameters of a time series model. It is an extension of the CUSUM test, which focuses on the cumulative sum of the estimated coefficients. In the CUSUM Squares test, instead of considering the cumulative sum of the coefficients, the squared residuals or errors from the estimated model are accumulated over time.

This helps in detecting any significant changes in the variance or the underlying structure of the time series. The CUSUM Squares plot is constructed by plotting the cumulative sum of squared residuals against time. If the plot exhibits a clear upward or downward trend, it suggests a structural break or change in the data-generating process. On the other hand, a flat and stable CUSUM Squares plot indicates the absence of structural breaks.

The normality test is a statistical test used to assess whether a dataset or a variable follows a normal distribution. The assumption of normality is often required for Autoregressive Distributed Lag (ARDL). In this study, the researcher used the Jarque-Bera test. This test assesses the skewness and kurtosis of the data to determine if it deviates significantly from a normal distribution. In these tests, the null hypothesis assumes that the data follows a normal distribution. If the p-value associated with the test statistic is below the chosen significance level (0.05), we reject the null hypothesis and conclude that the data does not follow a normal distribution.

This test is used to identify the Breusch-Godfrey for the test autocorrelation in the economic model that formed. The value of Breusch-Godfrey obtained from the EViews result will be checked after referring to the lower limit and upper limit of the p-value based on the p statistic that obtains. Heteroscedasticity refers to a situation in which the variability or dispersion of errors or residuals in a regression model is not constant across the range of independent variables.

In other words, the variability of the errors systematically changes as the values of the independent variables change. If the significant value is more than 0.05, then Heteroscedasticity will exist. If the significant value is lower than 0.05, then there is no Heteroscedasticity.

RESULTS AND DISCUSSION

The first step before estimating the ARDL Models analysis is to perform a unit root test. This is done with the aim of whether each variable has a stationary nature at the same level or not. To avoid spurious regression, this stationarity test is intended to ensure the order of integration and ensure that the input data is not stationary at order 1 or I (1). Because if there are variables that are stationary in the first difference, the ARDL method is not suitable for use. Testing the stationarity of the data on each variable is done using the EViews calculation with the Augmented Dickey-Fuller (ADF) Test. The calculation results can be seen in table 1.

Table 1. Unit root test result with ADF test

Variable	Critical Value	Level	1st Difference	Information
Inflation	5%	0.0006	0.0000	Stationary
OLP	5%	0.4917	0.0008	Stationary
G	5%	0.9388	0.0012	Stationary
M1	5%	1.0000	0.0148	Stationary
Monthly	5%	0.8062	0.0099	Stationary
UNEM	5%	0.0359	0.3700	Stationary

Source: Results of Data Processing Eviews, 2022

Unit root test result with ADF test in Table 1. Indicates that the Inflation (INF) variable has Stationary at level or I(0), the Oil price (OILP) variable has Stationary at the first difference, or I(1), the Government spending (G) variable has Stationary at the first difference, or I(1), the Money supply (M1) variable has the Stationary at the first difference, or I(1), the Monthly wage (MONTYWAGE) variable has the Stationary at the first difference or I(1), and the last variable, Unemployment (UNEM), has the Stationary at level or I(0).

From the unit root test results, this shows that Each variable had a different order of integration and Johansen's method could not be used to test cointegration of the variables in the model. Therefore, the appropriate method for Another cointegration test is the autoregressive distributed lag (ARDL) with bounds test proposed by Pesaran, Shin, and Smith (2001) and Narayan (2004).

In the next step, we estimate the specified ARDL model and then determine an optimal lag length. Consequently, the optimal lag length was automatically determined based on the Akaike information criteria (AIC). Thus, Figure 1 reveals an optimal lag length of ARDL (4, 0, 2, 2, 1, 2) with an AIC value of 0.54 for the top 20 models of the estimated ARDL model.

The next step is to see if the variables in this study have a long-term equilibrium relationship. The F-Bound Test is used in this study to perform variable cointegration tests. The table 2 shows the results of cointegration testing using the F-Bound test.

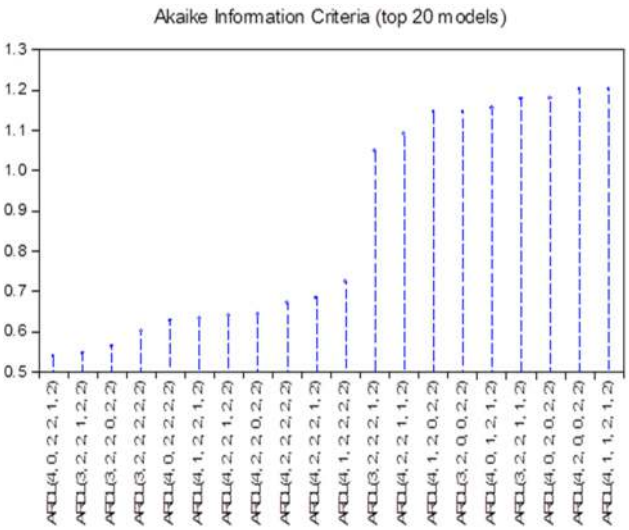

Figure 7. Optimal lag length ARDL (4, 0, 2, 2, 1, 2)

Source: Results of Data Processing Eviews, 2022

In the cointegration bound test, the F statistic, 5.554417, is greater than the 5% upper limit of I (1), which is 3.79. Additionally, the F statistic is greater than the critical upper limit of I (1), 1%, which is equal to 4.68. This indicates that all variables have a long-term equilibrium relationship. In other words, all variables move together in the long run.

The model test results using the Akaike Information Criterion (AIC) method show that the model The Autoregressive Distributed Lag (ARDL) with a lag of (4, 0, 2, 2, 1, 2) is the best model, so the long-run model estimation can be seen on table 3.

Based on the short-run estimation results of the ARDL (4, 0, 2, 2, 1, 2) model in table 3, all variables used in this study, including Inflation, Oil price, Government expenditure, Money supply, Monthly wage rate, and Unemployment

rate, explains 99.49% of factors influencing the movement of inflation in Thailand.

Table 2. Bound-Testing Cointegration Test (F-Bounds test)

Test Statistic	**Value**	**K**
F-Statistic	5.554417	5
Critical Value Bonds		
Significance	10 Bound	11 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
Significance	10 Bound	11 Bound
1%	3.41	4.68

Source: Results of Data Processing Eviews, 2022

The oil price has a significant positive short-run impact on inflation. In other words, when the oil price in Thailand increases (OILP) by 1%, it would increase inflation in Thailand by 0.27%, The money supply has a significant positive short-run impact on inflation. In other words, when the money supply (M1) increases by 1%, it would increase inflation in Thailand by 4.99, and the monthly wage rate has a significant positive short-run impact on inflation.

In other words, when the Monthly wage rate (MONTHWAGE) increases by 1%, it would increase inflation in Thailand by 1.62. According to the short-term estimation, several factors have been identified to cause Factors Influencing the Movement of Inflation in Thailand through its negative impact on inflation.

Inflation in the previous 2 and 4 years has had a significant negative short-run impact on inflation. In other words, when inflation in the previous 2 and 4 years increased by 1%, it would decrease inflation in Thailand by 0.27 and 0.23, respectively, Government expenditure has a significant negative short-run impact on inflation. In other words, when government expenditure (G) increases by 1%, it would decrease inflation in Thailand by 3.45, The monthly wage rate in the previous year had a significant negative short-run impact on inflation.

Table 3. ARDL Short Run Estimation Results

Selected Model: ARDL(4, 0, 2, 2, 1, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INFLATION(-1)	-0.271830	0.087451	-3.108380	0.0359
INFLATION(-2)	-0.222164	0.091926	-2.416764	0.0730
INFLATION(-3)	-0.031527	0.081236	-0.388093	0.7177
INFLATION(-4)	-0.234556	0.064039	-3.662724	0.0215
OILP	0.270270	0.036632	7.377926	0.0018
G	-3.45E-06	1.21E-06	-2.850714	0.0464
G(-1)	-2.97E-06	1.48E-06	-2.002261	0.1158
G(-2)	-3.28E-06	1.61E-06	-2.036059	0.1114
M1	4.99E-06	1.26E-06	3.947814	0.0168
M1(-1)	-3.11E-06	1.83E-06	-1.697226	0.1649
M1(-2)	4.64E-06	2.11E-06	2.195286	0.0931
MONTHWAGE	0.001619	0.000366	4.423319	0.0115
MONTHWAGE(-1)	-0.001306	0.000446	-2.929751	0.0428
UNEM	-0.108473	0.358950	-0.302196	0.7776
UNEM(-1)	1.181082	0.486639	2.427019	0.0722
UNEM(-2)	-1.466777	0.508315	-2.885566	0.0448
C	4.256245	2.370747	1.795318	0.1470

R-squared	0.994997	Mean dependent var	2.078095
Adjusted R-squared	0.974985	S.D. dependent var	2.042747
S.E. of regression	0.323086	Akaike info criterion	0.539025
Sum squared resid	0.417539	Schwarz criterion	1.384591
Log likelihood	11.34024	Hannan-Quinn criter.	0.722534
F-statistic	49.71918	Durbin-Watson stat	3.559634
Prob(F-statistic)	0.000880		

Source: Results of Data Processing EViews

In other words, when the monthly wage rate (MONTHWAGE) in the previous year increased by 1%, it would decrease the inflation rate in Thailand by 1.30, and Unemployment in the previous two years had a significant negative short-run impact on inflation. In other words, when unemployment (UNEM) in the previous 2 years increased by 1%, it would decrease inflation in Thailand by 1.46.

To test whether the coefficients of the calculated influencing the movement of inflation in Thailand are stable. We can see from the calculation results of CUSUM and CUSUM Squares in figure 8. Based on the CUSUM calculation result from figure 8, it can be seen that the CUSUM curve is in the boundary of 95%

confidence, thus showing that the coefficient of the ARDL (4, 0, 2, 2, 1, 2) is Stable.

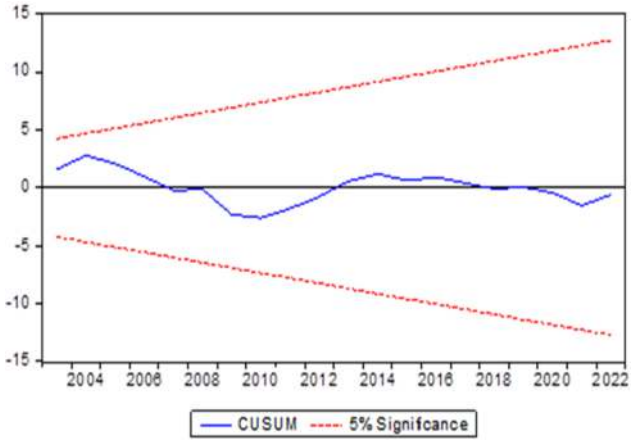

Figure 8. The Plot of Model Stability Test Results with the CUSUM Test Method
Source: Results of Data Processing EViews

Based on the figure 9 CUSUM Squares curve is in the 95% confidence boundary, thus indicating that the variance of the residuals of the ARDL (4, 0, 2, 2, 1, 2) equation is stable from Considering the effect of CUSUM Squares that is in the boundary of the 95% confidence line, it can be concluded that the equation of the Factors Influencing the Movement of Inflation in Thailand is stable and it can be used to explain long-term cointegration.

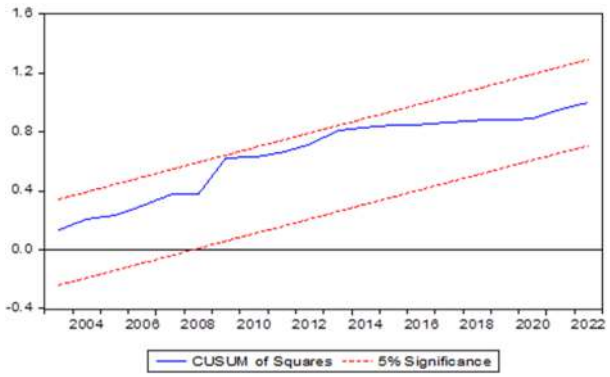

Figure 9. The Plot of Model Stability Test Results with the CUSUM Squares Test Method
Source: Results of Data Processing EViews

After determining that the model has long-term cointegration in the bound test. Long-term model estimates can be obtained. Table 4 shows the results of the long-term estimation model of ARDL in this study. Based on the ARDL model's long-term estimation findings in table 4, the CointEq coefficient value will be used to explain the speed of adjustment or the speed of adjustment in response to changes.

Table 4. Long Run Estimation Model, Dynamic Cointegration and Speed of Adjustment

Cointegrating Form				
Variable	**Coefficient**	**t-statistic**	**Prob.**	**Explanation**
CointEq (-1)	-1.760078	-12.413795	0.0002	Significant
Cointeq = INFLATION – (0.1536*OILP – 0.0000*G + 0.0000*M1 + 0.0002*MONTHWAGE – 0.2239*UNEM + 2.4182				
Long Run Coefficient				
Variable	**Coefficient**	**t-statistic**	**Prob.**	**Explanation**
OILP	0.153556	6.846243	0.0024	Significant
G	-0.000006	-3.589276	0.0230	Significant
M1	0.000004	3.116631	0.356	Significant
MONTHWAGE	0.000178	0.905913	0.4162	Not Significant
UNEM	-0.223949	-0.670572	0.5392	Not Significant
G	2.418214	1.884884	0.1325	Not Significant

Source: Results of Data Processing EViews, 2022

In the estimation results, the CointEq value is 1.760078 with a probability value of 0.0002, which is significant at $\alpha<5\%$. This means that the ARDL model has short-term co-integration. In addition, the CointEq value of -1.760078 is a negative value indicating that the model will head toward equilibrium at a rate of 1.76% per year. From the results of the ARDL model estimation in table 4, it is known that in the long run, if all independent variables have a value of 0, the value of the inflation rate in Thailand is 2.418214.

The oil price has a significant positive long-run impact on inflation. In other words, when the oil price in Thailand increases (OILP)

by 1%, it would increase inflation in Thailand by 0.15. The money supply has a significant positive long-run impact on inflation. In other words, when the money supply (M1) increases by 1%, it would increase inflation in Thailand by 0.4. Government expenditure has a significant negative long-run impact on inflation.

Table 5. Classical Assumption Test

Classical Assumption	Type of Test	Result Score	Description
Normality	Jarque Bera Value	0.8184 > α 0.05	Data Normally Distributed
Auto correlation	Breusche-Godfrey Serial Correlation LM Test	0.7410 > α 0.05	No Autocorrelation
Heteros cedasticity	Heterosceda sticity Test Breusch-Pagan-Godfrey	0.2534 > α 0.05	No Heteroscedasticity

Source: Results of Data Processing EViews, 2022

In other words, when government expenditure increases by 1%, it would decrease inflation in Thailand by 0.16. The monthly wage rate doesn't have a significant positive long-run impact on inflation. In other words, when the monthly wage rate (MONTHWAGE) increases by 1%, it would increase inflation in Thailand by 0.17. Unemployment doesn't have a significant negative short-run impact on inflation.

In other words, if unemployment increased by 1%, it would decrease inflation in Thailand by 0.22. The standard assumption tests of normality, autocorrelation, and heteroscedasticity were used to ensure that the ARDL model used for this study was valid and the optimal model. The results of the classical assumption tests are shown in table 5.

Based on the results of the normality test that was carried out in the table 5, a significance value of 0.8184 > 0.05 was obtained, it can be concluded that the results of the normality test are normally distributed. The results of the autocorrelation test in the table 5 can be seen that the obs*R-squared probability value is 0.7410 or more than 0.05.

This means that the data in this study do not contain autocorrelation or in other words, there are no autocorrelation problems. And The results of the heteroscedasticity test in the table 5 show that the Prob. Chi-Square of Obs *R-squared= 0.2534 or more than 0.05, indicating that there is no problem of heteroscedasticity.

CONCLUSION

Oil prices have a significant positive influence on inflation in Thailand, both in the short run and the long run. In other words, In the short run, the research findings indicate that a 1% increase in oil prices leads to a 0.27 increase in inflation. In the long run, the study reveals that a 1% increase in oil prices will result in a 0.15 increase in inflation meaning that the first hypothesis in this study is accepted. Government expenditure have a significant negative influence on inflation in Thailand, both in the short run and the long run.

In other words, In the short run, the research findings indicate that a 1% increase in government expenditure leads to a 3.45 decrease in inflation. In the long run, the study reveals that a 1% increase in government expenditure will result in a 0.6 decrease in inflation meaning that the second hypothesis in this study is rejected.

Money supply have a significant positive influence on inflation in Thailand, both in the short run and the long run. In other words, In the short run, the study found that a 1% increase in money supply in Thailand would result in a

4.99% increase in inflation. In the short run, the study found that a 1% increase in money supply in Thailand would result in a 4.99% increase in inflation meaning that the third hypothesis in this study is accepted.

Average monthly wages have a significant positive influence on inflation in Thailand, but only in the short run. In other words, In the short run, the study found that a 1% increase in Average monthly wages in Thailand would result in a 1.62 increase in inflation meaning that the fourth hypothesis in this study is accepted.

The unemployment rate has a significant negative influence on inflation in Thailand, but only in the short run. In other words, In the short run, the study found that a 1% increase in the unemployment rate in Thailand would result in a 1.46 decrease in inflation meaning that the fifth hypothesis in this study is accepted.

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