Original Article

Inflationdeterminants in Asean-5 Countries

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Abstract - *This study aimed to analyze the determinants of inflation in ASEAN-5 countries in 2011-2019. The analysis method used in this study is panel data with a Fixed Random Effect (FEM) approach. The results of this study indicate that the Gross Domestic Product and interest rate partially have a positive and significant effect on inflation in ASEAN-5 countries. However, the export value has a negative and insignificant effect on inflation in ASEAN-5 countries.*

Keywords - *Inflation, Gross Domestic Product, Exports, Interest Rates, Fixed Random Effect.*

I. INTRODUCTION

Inflation is a monetary phenomenon in which there is a decrease in the value of the monetary unit of calculation for a commodity. Conversely, if what happens is a decrease in the value of the monetary unit for goods or commodities and services, it is defined as deflation (deflation). Referring the book entitled Macroeconomic Theory by (Mankiw 2013) states that the CPI or the Consumer Price Index is an indicator of inflation that describes various sources of price increases for several types of goods and services consumed by the public within a certain time limit. The CPI is defined as the price of a group of goods and services relative to the price of the same group of goods in the base year.

Asean-5 is the five countries, according to IMF, that share the same economic goals, namely inclusive and sustainable economic growth. One of the goals of establishing ASEAN is the realization of economic integration and enhancement of regional competitiveness between the largest countries in the region or what is more commonly referred to as the ASEAN-5 (Indonesia, Malaysia, the Philippines, Thailand, and Vietnam). In this study, the inflation rate from 2015-2019 will be taken to find out how much the inflation rate increases in ASEAN countries:
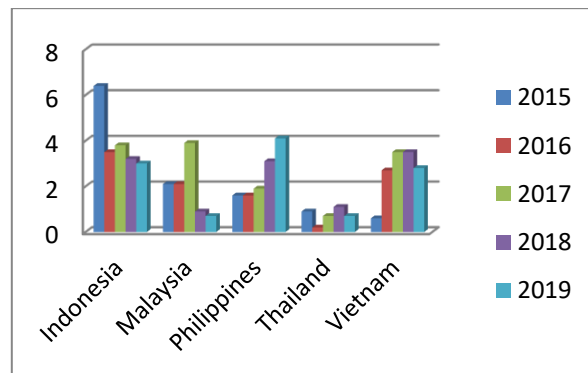

Fig. 1 Inflation in ASEAN Countries 2015-2019

It can be seen in Figure 1 that the inflation rate of each country in ASEAN generally fluctuates from year to year, but if calculated on average, Indonesia has the highest inflation rate relative to the other 4 countries, which is calculated on average, which is equal to 3.98%, while the highest inflation rate after Indonesia was Vietnam, which was 2.62%. After that, the next country that was calculated on average was the Philippines at 2.46%, which occupied the next position, namely Malaysia at 1.94%, and The stable inflation from year to year, which is calculated on average is Thailand, which is 0.72%.

Based on the theory of Keynes put forward by (John Maynard Keynes, 1936), where inflation occurs because society wants to live outside the limits of its economic capacity. The process of inflation, according to this view, is nothing but a process of seizing a share of the fortune between social groups who want a larger share than what the community can provide. This seizure process is finally translated into a situation where the public's demand for goods always exceeds the number of goods available (called an inflationary gap).

Factor Gross Domestic Product (GDP) is an indicator of inflation. According to the Keynesian theory, an increase in the expenditure side of GDP will increase the effective demand of society. If the amount of effective demand for commodities increases, at the current price level, exceeds the maximum number of goods that can be produced by society,

then an inflationary gap will arise and cause inflation problems. It can also be negatively related.

The following is an illustration of GDP growth data in ASEAN countries from 2015 to 2019, which can be seen in the following table:
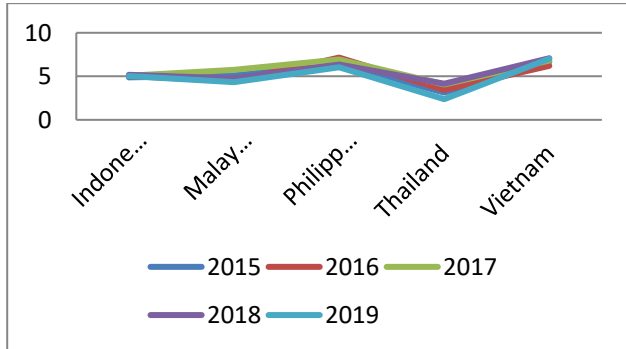

Fig. 2 GDP Growth in ASEAN Countries 2015-2019 (in percentage%)

Based on the data above, it can be seen that the GDP per capita inequality in ASEAN is very high. This can be seen from the level of GDP per capita between countries in ASEAN, which is very far, like Vietnam in 2019 at 7.01%, the Philippines has a high GDP per capita of 6.04%, then Indonesia has a GDP per capita of 5.02%, then Malaysia has a GDP per capita of 4.33 % and the smallest GDP per capita in Thailand, namely 2.37%. Thailand became the country with the lowest GDP due to the trade war that occurred in the United States, which resulted in the baht exchange rate strengthening higher than other Asian currencies, thereby reducing the competitiveness of export products. The increasing GDP per capita of a country will be in line with domestic consumption so as to be able to provide relatively high economic growth.

Uyi and Guptan (2019) and Bhat and Laskar (2016) state that GDP has a positive effect on inflation. This also shows that the pattern of GDP behavior has an influence on the rate of inflation. And research by Raju, Manjunath, and Rehaman (2018), GDP and inflation have a positive effect by being influenced by low inflation conditions.

Another factor that affects inflation is the export value factor. A country can export its manufactured goods to another country if these goods are needed by other countries, and they cannot produce these goods, or their production cannot fulfill domestic needs. The thing that must be considered in exporting is the ability of the country to issue goods that can compete in foreign markets. That is, the quality and price of the exported goods must be at least as good as those traded in foreign markets. The taste of the people abroad towards goods that can be exported abroad has a very important role in determining the export of a country. In general, it can be said that the more types of goods that

have such features produced by a country, the more exports can be made (Sukirno, 2008).

Based on the 2020 report from (World Bank), the export value of each country in ASEAN is calculated on average to fluctuate from year to year, and the first in Vietnam, which has the highest export value compared to the 4 countries (Indonesia, Malaysia). , Thailand, and the Philippines) which was 13.3%, while the lowest level of export value was Malaysia, namely 2.7%. Based on World Bank data, it can also be seen that the level of export value from each country tends to be different and fluctuates. Therefore, this study wants to prove whether the value of exports has a negative effect on inflation.

Purusa and Istiqomah's (2018) results show that exports and crude oil prices have a positive and significant effect on inflation. However, FDI has a negative and significant effect on inflation. Indonesia, Malaysia, the Philippines, Thailand, and Vietnam will face the AEC, therefore increasing the competitiveness of the production of goods and services must be done to compete and develop the economies of each country and create prosperity in each country. While the research conducted by R. R. Ahmed et al. (2018) this study shows that exports are a contributing factor to inflation, and ironically, Pakistan's exports have continued to decline over the last few years, so the results of this study are true to picture of the Pakistani economic situation. The government should also reduce unnecessary taxes and tariffs on exports and provide favorable incentives for foreign investors to invest locally. Furthermore (Nurul and Tarmizi 2018) explained that this study using time series data for the period 1990-2016 obtained from BPS Indonesia and Bank Indonesia. The data were analyzed using multiple linear regression. The results showed that exports did not affect inflation. In addition, the average export value of Indonesia during this period was higher than the value of imports. The results of this study support previous research by Silvia, Wardi, and Aimon (2013), which states that Indonesian exports do not have a significant effect on inflation.

Inflation is often associated with other economic elements in macroeconomics. One of them is the interest rate. According to Keynes's theory, the interest rate is determined by the demand and supply of money. Many factors determine the level of interest rates. Not only the debtor's credit score or rating but also depending on supply or demand. When the level of demand for loans is high, and the level of supply is low, the interest rate will be high as well. Conversely, if the level of demand is low and the level of supply of loans is high, the interest rate will be low as well.

Based on the development of the interest rate of each country in ASEAN on average fluctuated from 2015-2019, but if calculated on average, Indonesia has relatively the highest interest rate compared to 4 other countries, namely

6.3%, while the average rate of Consecutively, the highest interest rate after Indonesia in Vietnam, which is 4.3%. After that, the next country that is calculated on average is the Philippines at 3.8%, which occupies the next position, namely Malaysia at 3.16%, and a stable interest rate from year to year. The average calculated year in Thailand, which is 3.00%. In 2015, Indonesia's interest rate was very high because the focus of Bank Indonesia policy in the short term was directed at steps to maintain the stability of the Rupiah exchange rate, amidst continuing global economic uncertainty, by optimizing monetary operations both on the Rupiah money market and the foreign exchange market.

According to research by Ahmed and Abdelsalam (2017), in Egypt, there is a positive relationship between interest rates and expected inflation because inflation volatility positively affects the interest rate in the first regime, which supports Markowitz's portfolio theory (1952). Dritsaki (2017) also explains that the results of Toda and Yamamoto's causality research seem to show that nominal interest rates have a positive relationship and significantly influence inflation in the three countries studied, whereas inflation only affects interest rates in Germany. On the other hand, Yolanda's research (2017) shows that the BI Rate and Gold Price variables to inflation are negative. These findings indicate that inflation is a disease in the economy of a country that has an impact on all economic activities. A number of other research results state that not all of the variables studied have a significant effect on the inflation rate, meaning that the research cannot be used by the government in determining fiscal and monetary policy.

Several studies that are in line with the topic of this study have been conducted by several researchers such as Chaundhary and Xiumin (2018), Bhat and Laskar (2016), Bala et al. (2017), Purusa and Istiqomah (2018), Nurul and Tarmizi (2018), Hamza Dahiru and ZunaidahSulong (2017), Ahmed and Abdelsalam (2017). Several previous studies have found that GDP, export value, and interest rate have a positive effect on increasing inflation. However, no one has specifically discussed the effect of GDP, exchange rates, and interest rates on inflation in ASEAN-5.

This study tries to analyze the pattern and direction of the causal relationship between exogenous variables that affect inflation in ASEAN countries. The variables used in this study consist of inflation, consumer price index, GDP, export value, and interest rates. This study, using secondary data from the time series 2011-2019 time period. The inflation variable using the consumer price index (CPI) recorded by the World Bank (WB), GDP using growth data (annual%), and the export value using World Bank (WB) data in% units, and interest rates. So this research will discuss the determinants of inflation in ASEAN-5 countries.

II. RESEARCH METHODOLOGY

This research is quantitative and qualitative research that explains the relationship between secondary data, which has a time series characteristic. The data used in this study is a discussion only within the scope of the determinant of inflation in ASEAN countries. The data used in this study is secondary data obtained from several sources, including the World Bank (WB). Data on all variables to be studied starts from the first quarter of 2011 to the fourth quarter of 2019.

The model used in this research is the Keynesian Inflation Model, which has been modified to answer the research with the following model:

$$INF_{it}= \beta_0+\beta_1 GDP_{it}+\beta_2 EXPORT_{it}+\beta_3 INT_{it}+\varepsilon_t$$

INF_{it} = Inflation (%)
GDP_{it} = Gross Domestic Product (%)
$InXM_{it}$ = Export(%)
INT_{it} = Interest Rates (%)
β_0 = constant
$\beta 1, \beta_2, \beta_3$ = Independent variable regression coefficient
ε_{it} = error term
i   = sectorunit
t   = sector time

A. Selection of Best Method for Panel Data Regression

Panel data model analysis is known as three approaches which consist of Common Effect, Fixed Effect, and Random Effects. Furthermore, three stages of testing will be carried out, namely the Chow Test, Hausman Test, and the LM test, to determine the method used.

B. Classic Assumption Test
a) Normality test

A normality test is carried out to see whether the independent and dependent variables have a normal distribution or not in the regression model. Residuals are stated to be normally distributed if JarqueBera> chi-squares, and / or probability (p-value)> α = 5% (Gujarati, 2012).

b) Multicollinearity Test

The multicollinearity test detects whether the data in the regression model used has a relationship between independent variables. The multicollinearity test can be carried out with Auxiliary regression by comparing the partial determination coefficient (r2) with the multiple determination coefficient (R2). If R2 <r2, then the model has a multicollinearity problem, and if R2> r2, then the model is free from multicollinearity problems.

c) Heteroscedasticity Test

The heteroscedasticity test detects a problem with the unstable homoscedasticity assumption. The regression results will show misleading if the regression model has heteroscedasticity problems (Gujarati, 2012). A heteroscedasticity test is done by comparing Obs * R-Squared with χ2 (Chi-Square) table. If the value of Obs * R-

Squared is greater than χ2 table, it is concluded that there is no heteroscedasticity in the model.

d) Autocorrelation Test

The autocorrelation test can detect whether there is a relationship between residuals in the regression model by using the Breusch-Godfrey Serial correlation LM Test by comparing the Obs * R Square value with the Chi-square value. (Gujarati, 2012)

C. Statistical Hypothesis Testing
a) T-test (Partially)

T-test was conducted to detect the partial influence of the independent variable on the dependent variable at the significant level α = 5 percent cateris paribus. In this case, the value between t-count and t-table will be compared with the testing criteria if t table <t statistic, then H_0 is rejected. H_a is accepted. This means that partially the dependent variable regression coefficient has a significant effect on the dependent variable and vice versa.

b) F Test Statistics

The essence of the statistical F test is to determine the effect of all independent variables on the dependent variable together. The test criteria if F table <F statistic, then H_0 is rejected H_a accepted. This means that the regression coefficient of the independent variables together has a significant effect on the independent variable and vice versa.

c) Coefficient of Determination (R^2)

The coefficient of determination test sees how much influence the independent variable has on the dependent variable used in the study. If the value of R^2 is close to 1, then the independent variable used is able to properly explain the variation of the dependent variable.

III. RESULT
A. Classic Assumption Testing
a) Normality Test

The results of the probability test for normality of 0,939604 are greater than α = 5% (0.05). It can be concluded that the data is normally distributed.

b) Multicollinearity Test

Tabel 1. Multicollinearity Test Results

	GDP	INT	INXM
LOG(GDP)	1.000000	-0.556021	-0.344484
LOG(INXM)	-0.556021	1.000000	-0.131903
INT	-0.344484	-0.131903	1.000000

From the multicollinearity test, it was found that there were no variables that had an r^2 value greater than R^2 or 0,61. Therefore, it can be concluded that the variables used do not have multicollinearity, or in other words, there is no linear relationship between the independent variables.

c) Heteroscedasticity Test

Tabel 2. HeteroscedasticityTest Results

Variable	Prob.	Kesimpulan
LOG(GDP)	0.4731	AcceptH_0
LOG(INXM)	0.3147	AcceptH_0
INT	0.8746	AcceptH_0

Table 2 shows that all independent variables have a probability value greater than the value of α = 0,05. This means accepting H_0 and rejecting H_a; it can be concluded that in this study, there is no heteroscedasticity problem in the equation.

d) Autocorrelation Test

From the test results, the Durbin-Watson stat value is 1.127876, while for the DL = 1,3832 and DU = 1,6662 (n = 45, k = 3 with α = 5%). So that it can be written (4-DW)> DU <DW or 2.872124> 1.6739 <1.127876, it can be concluded that there is no autocorrelation problem.

B. Statistical Hypothesis Testing
a) Partial T-Test

In this study, the t-test was carried out at a 56 percent confidence level (α = 0.05) with an n-k-1 degree of freedom (n = number of observations, k = number of independent variables) or df of 42.

Tabel 3. T-Test Result

Variabel	t-Statistic	t-Tabel	Prob.	Keterangan
LOG(GDP)	2.629453	2.01954	0.0124	Reject H_0
LOG(INXM)	1.144529	2.01954	0.2598	Accept H_0
INT	2.766137	2.01954	0.0088	Reject H_0

T-test results show that the gross domestic product and interest rate partially have a positive and significant effect on inflations in ASEAN. However, exports have a negative and insignificant effect on inflation in ASEAN-5 countries.

b) F-Test Statistics

Based on the calculation results, the f-statistic value is 8.502194, and the f-table value is 3.23. It can be seen that the f-statistic value is greater than the f-table, so Ho is rejected, and Ha is accepted, which means that the gross domestic product, export, and interest rate workforce together have an effect on inflations.

c) Detemination Coefficient (R^2)

The coefficient of determination is 0.616641 or 61.66%. This shows that the gross domestic product, export, and interest rate is able to explain variations in inflations with actual data of 61.66%, and the remaining 38.34% are factors not included in the study.

IV. CONCLUSION

The results showed that the gross domestic product and interest rate partially at the α level (5%) had a positive and significant effect on inflations in ASEAN countries in 2011-2019. However, exports have a negative and insignificant effect on inflation in ASEAN-5 countries.

SUGGESTION

Macroeconomic factors of a country still must be considered even though the tariff exemption scheme for export and import goods on free trade that occurs in countries has been implemented. Not all of the coefficients of determination in this study have a big influence on the dependent variable. For further research, it is expected to be able to add other macroeconomic indicators such as GDP, interest rate, and others. Further research can add other factors, both internal and external, and increase the number of research observations and also use other methods to see their effect on the inflation rate.

REFERENCES

[1] Ahmed, DoaaAkl, and MamdouhAbdelmoula M. Abdelsalam. 2017. Inflation Instability Impact on Interest Rate in Egypt: Augmented Fisher Hypothesis Test. Applied Economics and Finance 5(1): 1.

[2] Ahmed, Rizwan Raheem, SaghirPervaizGhauri, JolitaVveinhardt, and Dalia Streimikiene. 2018. An Empirical Analysis of Export, Import, and Inflation: A Case of Pakistan. Romanian Journal of Economic Forecasting 21(3)117–30.

[3] Bala, Umar, Lee Chin, ShiveeRanjaneeKaliappan, and NormazWana Ismail. 2017. The Impacts of Oil Export and Food Production on Inflation in African OPEC Members. International Journal of Economics and Management 11(3 Special Issue): 573–90.

[4] Bhat, Shariq Ahmad, and MahboobRasulLaskar. 2016. Interest Rate, Inflation Rate and Gross Domestic Product of India. International Journal of Technical Research and Science 1(9) 284–88.

[5] Chaundhary, Sunil Kumar, and Li Xiumin. 2018. Analysis of the Determinants of Inflation in Nepal. American Journal of Economics 8(5)209–12. http://article.sapub.org/10.5923.j.economics.20180805.01.html.

[6] Dritsaki, Chaido. 2017. Toda-Yamamoto Causality Test between Inflation and Nominal Interest Rates: Evidence from Three Countries of Europe. International Journal of Economics and Financial Issues 7(6) 120–29.

[7] Gujarati, D.N. 2012. Dasar-DasarEkonometrikaTerjemahanMangunsongS.C. SalembaEmpat. Buku 2. Edisi 5. Jakarta.

[8] John M. Keynes, The General Theory of Employment, Interest and Money, New York, Harcourt Brace, 1936.

[9] Mankiw, N. G. (2013.). PengantarEkonomiMakro,. Jakarta: PenerbitSalembaEmpat.

[10] NurulUlfa, and Tarmizi Abbas. 2018. The effect of export and import on inflation in indonesia period 1990-2016. 01(02) 60–64.

[11] Purusa, Nanda Adhi, and NurulIstiqomah. 2018. Impact of FDI, COP, and Inflation to Export in Five ASEAN Countries. Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomidan Pembangunan 19(1) 94.

[12] Raju, J. K., B. R. Manjunath, and M. Rehaman. 2018. An Empirical Study on the Effect of Gross Domestic Product on Inflation: Evidence Indian Data. Academy of Accounting and Financial Studies Journal 22(6) 1–11.

[13] Sukirno, Sadono. 2015. Makroekonomi Teori Pengantar. Jakarta: PT Raja GrafindoPersada.

[14] Sulong, Zunaidah. 2017. The Determinants of Inflation in Nigeria from 1970-2014. World Applied Sciences Journal 35(10) 2202–14.

[15] Uyi, Kizito, and VinithaGuptan. 2019. Www.Econstor.Eu. : 0–25.

[16] Yolanda, Y. 2017. Analysis of Factors Affecting Inflation and Its Impact on Human Development Index and Poverty in Indonesia. European Research Studies Journal 20(4) 38–56.