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# *Analysis of the Determinants of Foreign Direct Investment in IMS-GT (Indonesia, Malaysia, Singapore Growth Triangle)*

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**Abstract:**
This study is to examine the factors that influence FDI inflows in the Indonesia-Malaysia-Singapore Growth Triangle (IMS-GT) region between 2014 and 2023. FDI is the dependent variable in this study, which also uses GDP, inflation, interest rates, and trade openness as independent factors. The results of a panel data regression employing the Common Effect Model (CEM) as the best specification based on the Chow, Hausman, and Lagrange Multiplier tests demonstrate that trade openness, GDP, and inflation all significantly boost foreign direct investment. Interest rates, on the other hand, have a detrimental but statistically inconsequential effect. The findings imply that in order to draw in more foreign investment, the IMS-GT countries must improve macroeconomic metrics, especially economic growth and openness to international commerce. These insights can guiede policymakers in improving investment invironments to boost FDI inflows in the region.

JEL: F21; F23; C33; E22

**Keywords**:
foreign direct investment; GDP, inflation; interest rate; trade openness; ims-gt; panel data; ASEAN

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## 1. Introduction

Foreign Direct Investment (FDI) constitutes a significant element of external finance and capital movements in developing nations. It is generally more advantageous and less onerous for the national economy in comparison to loan flows, development financing, and export credits, which are classified as national debt (Arawomo, 2018). This is due to the recognition of FDI as a crucial element that can introduce supplementary foreign capital essential for fostering economic growth and transformation in developing nations (Arogundade et al., 2022). Consequently, it is imperative for developing nations to enhance their capacity to draw in greater capital inflows through foreign direct investment (Asiamah et al., 2019). Investments by investors encompass not merely financial resources, but also extend to the realms of technology and the transfer of knowledge.

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Strong foreign investment performance is projected to help the economy of developing countries, especially in the ASEAN region. ASEAN has gotten a lot of attention from around the world in the last 20 years because of its steady and dynamic expansion. This situation has arisen because nations in the ASEAN region are perceived as desirable for foreign direct investment (FDI) due to their comparative advantages, including low labor costs, favorable preferential policies, extensive natural resources, and a substantial supply of raw materials (Aslam et al., 2022). The United Nations Conference on Trade and Development (UNCTAD) says that foreign direct investment (FDI) into ASEAN countries has grown every year, albeit at different rates in each country. A UNCTAD analysis of FDI inflow trends into ASEAN indicated that ASEAN nations have made modifications to their policy schemes to make it easier for foreign investors to put money into them (Jaiblai et al., 2019). In addition, the following shows the amount of Foreign Direct Investment (FDI) that came into the three nations that make up the IMS-GT (Indonesia-Malaysia-Singapore Growth Triangle):

**Figure 1.** Foreign Direct Investment (FDI) Inflows in IMS-GT (billion USD)

*Source: World Bank, 2024*

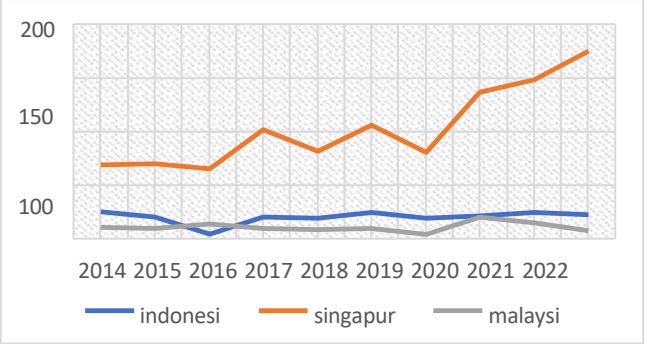


**Figure 1** illustrates that three ASEAN nations under the IMS-GT (Indonesia-Malaysia-Singapore Growth Triangle) received foreign investment inflows from 2014 to 2023. Singapore possesses the highest level of foreign direct investment (FDI), whilst Indonesia and Malaysia are two ASEAN nations exhibiting rather stable economic trajectories. Foreign Direct Investment (FDI) is affected by numerous aspects that investor governments must evaluate prior to directing capital flows to recipient nations (Nguyen, 2020).

This predicament occurs because foreign direct investment (FDI) is intricately associated with economic growth, a vital indication observed by investor nations, as it signifies a country's economic dynamics. Foreign Direct Investment is pivotal to GDP expansion in ASEAN nations. Inflation significantly impacts FDI inflows indirectly, as nations with low inflation rates generally attract foreign investors. Besides inflation, interest rates are recognized as significant factors affecting FDI (Septiantoro, 2020).

Interest rates are crucial for FDI since they are a factor that investors or borrowers use to set the price of a loan. People or businesses invest to make money, hence interest rates are important to think about while making investment choices. If the return on capital is less than the interest rate, the investment is not profitable (Sumiyati, 2021).

Trade openness is another thing that can affect FDI inflows (Ukhtiyani et al., 2020). Openness means lowering trade barriers like tariffs and non-tariff barriers, as well as making it easier for capital to move between countries. When a country becomes more open to international trade, it can grow its economy faster, which makes it more likely that foreign investors will want to invest in it.

The researcher is interested in investigating the factors that influence Foreign Direct Investment in the three ASEAN countries included in the IMS-GT, namely Indonesia, Malaysia, and Singapore, in light of this statement. The influence of economic factors on FDI in the three ASEAN countries is determined by examining factors such as inflation, interest rates, trade openness, and GDP. The direction and magnitude of the influence will be determined by the results of the calculations for these economic factors.

## 2. Data and Methodology

This study is a quantitative descriptive research. This research utilizes secondary data and use panel data regression as the analytical technique. The Foreign Direct Investment data from the three IMS-GT countries for the period 2014-2023 was sourced from the World Bank. The dependent variable in this study is foreign direct investment (FDI), whilst gross domestic product (GDP), inflation, interest rates, and trade openness serve as the independent factors. Foreign Direct Investment (FDI) denotes capital investment by foreign investors aimed at conducting business activities within or outside the host country.

The variable is based on FDI inflows, quantified in millions of US dollars, obtained from the World Bank. Gross Domestic Product (GDP) is utilized to ascertain the overall national income of any nation. The utilized data pertains to the current GDP, quantified in millions of US dollars, and is likewise obtained from the World Bank.

Inflation denotes the overall rise in prices within a nation. The data utilized is inflation derived from consumer prices, expressed as a percentage, and sourced from the World Bank. The interest rate denotes the expense of borrowing capital, taking into account the duration of the loan, and pertains to the real interest rate, also articulated as a percentage. The trade openness of the three IMS-GT countries denotes the ratio of total exports and imports of goods and services to GDP. This information is derived from trade as a percentage of GDP, sourced from the World Bank.

The panel data regression model is articulated as follows:

$$LOG\ FDI_{it} = \beta_0+\beta_1 LOG\_GDP_{it}+\beta_2 INF_{it} +\beta_3 SB_{it}+\beta_4 TO_{it}+ \varepsilon it\ 1)$$

Where:

- FDI: stands for Foreign Direct Investment
- GDP: Gross Domestic Product
- INF: Inflation
- IR: Interest Rate
- TO:Trade Openness
- LOG: refers to the logarithmic transformation
- $\beta_0$: the constant term
- $\beta_1$: represents the regression coefficient
- ε: the error term
- i: denotes the three ASEAN countries, and
- t: represents the time period (2014-2023).

The analytical method applied in this research is a quantitative model using panel data regression with STATA software. Panel data methods consist of three main models:

1. Common Effect Model (CEM)
   This estimation model combines all cross-section and time-series data, assuming homogeneity across units and time. It often requires a Spatial Autoregressive (SAR) approach to estimate its parameters.
2. Fixed Effect Model (FEM)
   In this model, the intercept varies over time due to different characteristics across objects and periods, which are accommodated in the model. It uses dummy variables to estimate unknown parameters. This approach is also known as the Least Square Dummy Variable (LSDV) method.

3. Random Effect Model (REM)
   This model assumes variability across entities and time, with the unobserved individual effects treated as random. It involves decomposing the error term into individual-specific and time-specific components, since the error structure consists of both cross-sectional and time-series elements.
   This technique is crucial to consider due to the correlation of errors across cross-sectional units and over time.

## 3. Result and Discussion

The selection of the best estimation model was conducted using the Chow test to determine whether the Fixed Effect Model or the Common Effect Model was more appropriate, where the decision rule states that if the p-value is less than the significance level (α), the Fixed Effect Model is chosen; otherwise, the Common Effect Model is preferred, as shown in:

**Table 1.** Result of Chow Test
*Source: Based on STATA 17, 2024*

| Effects Test | Prob. |
|---|---|
| F (4,23) | 14.26 |
| Prob > F | 0.0003 |

The Chow test yielded a probability value (Prob > F) of 0.0003, resulting in the rejection of $H_0$ and the acceptance of $H_1$. This indicates that the Fixed Effect Model (FEM) is the most suitable estimation model for this study. Subsequently, the Hausman test was performed to ascertain whether the Fixed Effect Model or the Random Effect Model is more appropriate. The procedure dictates that if the probability of the test statistic is less than the significance level (α), the Fixed Effect Model is chosen; if it is greater, the Random Effect Model is selected, as illustrated in the following table:

**Table 2.** Result of Hausman Test
*Source: Based onSTATA 17, 2024*

| Effects Test | Prob. |
|---|---|
| Chi Square (4) | 0.00 |
| Prob > Chi2 | 0.0000 |

*Sumber: Hasil olah data STATA 17, 2024*

The probability from the Hausman Test (Prob > Chi2) is 0.0000, which is less than the significance level (α = 0.05). This means that $H_0$ should be thrown out and $H_1$ should be accepted, which confirms that the Fixed Effect Model is the right one. At the same time, the Lagrange Multiplier test was done to choose between the Common Effect Model and the Random Effect Model. If the probability of the test statistic is less than α, the Random Effect Model is chosen, but if it is greater, the Common Effect Model is chosen.

**Tabel 3.** Result of Lagrange Multiplier Test
*Source: Based on STATA 17, 2024*

| Effects Test | Prob. |
|---|---|
| Chibar2 (01) | 0.00 |
| Prob > Chibar2 | 1.0000 |

Based on the findings of the Chow, Hausman, and Lagrange Multiplier tests, it can be concluded that the Common Effect Model (CEM) is superior to both the Random Effect Model (REM) and the Fixed Effect Model (FEM). This conclusion is based on the fact that the probability (Prob > Chibar2) obtained from the Lagrange Multiplier Test is 1.0000, which is higher than the significance level (α = 0.05). As a result, the decision was made to accept $H_0$ and reject $H_1$. This decision led to the acceptance of the Common Effect Model (CEM) and the rejection of the $H_1$ hypothesis.

Furthermore, based on the F-statistic probability value of 0.0000 in the CEM estimation at a significance level of 5%, it is inferred that GDP, Inflation, Interest Rates, and Trade Openness all simultaneously have a substantial influence on Foreign Direct Investment in the three nations that are included in the IMS-GT. In order to ascertain the individual influence of each independent variable on the dependent variable and to evaluate the validity of the model on a partial basis, the partial significance test, also known as the t-test, was then carried out. The results of the t-test are provided in the table that follows:

**Table 4.** Result of T Test
*Source: Based on STATA 17, 2024*

| Variabel | Coefficient | t statistic | Prob |
|---|---|---|---|
| GDP | 0.0593505 | 4.34 | 0.000 |
| Inflasi | 6.5926790 | 3.34 | 0.003 |
| Trade Openess | 0.4704644 | 12.07 | 0.000 |
| Suku Bunga | -0.8535245 | -0.83 | 0.414 |
| cons | -0.8169461 | -5.65 | 0.000 |

The test with a confidence level of (α = 0.05) showed that GDP, Inflation, and Trade Openness have a partial effect on FDI in IMS-GT countries and a positive t-statistic value. Interest Rate, on the other hand, has a negative coefficient but does not have a substantial partial influence on FDI in the IMS-GT countries.

The regression analysis examining the impact of GDP on FDI in IMS-GT countries produced a coefficient value of 0.0593505 and a probability value of 0.000 (< 0.05), signifying a significantly positive GDP coefficient. If GDP goes up by 1%, FDI in the IMS-GT countries will go up by 0.0593505%. This estimate shows that GDP development in IMS-GT countries leads to better social welfare and productivity, which changes how wealth is distributed. If the GDP of IMS-GT countries grows quickly, more foreign investors will want to put their money into these countries.

It was found that inflation has a significant positive effect on foreign direct investment (FDI) in IMS-GT countries. The study's regression coefficient was 6.5926790, and the chance value was 0.003 (< 0.05). This means that inflation has a positive effect on FDI. It can be said that when inflation goes up by 1%, FDI flows into IMS-GT countries go up by 6.5926790%.

If you look at the study on how trade openness affects FDI in IMS-GT countries, you'll see that the regression coefficient is 0.4704644 and the probability value is 0.000, which is less than 0.05. In other words, this shows that trade openness has a big and good effect on FDI. If trade openness goes up by 1%, FDI comes into IMS-GT countries by 0.4704644% more.

The Influence of Interest Rates on Foreign Direct Investment (FDI): An investigation of the impact of interest rates on FDI in IMS-GT countries produced a regression coefficient of -0.8535245 and a probability value of 0.414 (> 0.05), indicating that interest rates do not significantly influence FDI. The interest rate variable has a negative correlation, which means that changes in interest rates don't have a big effect on FDI inflows. This could be because the money that overseas investors make is more than the money that banks charge them in interest. However, other research have found that interest rates have a big and bad effect on FDI inflows in IMS-GT countries, which is the opposite of what this study revealed.

## 4. Conclusion

This study was specifically conducted to identify the factors influencing Foreign Direct Investment (FDI) in IMS-GT countries. Based on the tests and discussion conducted using panel data analysis, with the best-fit model being the Common Effect Model (CEM), several conclusions can be drawn: the results of the simultaneous significance test (F-test) indicate that during the period 2014-2023, the variables GDP, inflation, interest rates, and trade openness collectively have a simultaneous effect on FDI in IMS-GT countries. The partial significance test (t-test) shows that three variables—GDP, inflation, and trade openness—significantly influence FDI in IMS-GT countries, while interest rates do not. The findings of this study are expected to serve as a reference for investors, especially those intending to invest in IMS-GT countries (Indonesia, Malaysia, and Singapore). In this regard, IMS-GT countries are encouraged to continuously enhance investment opportunities for foreign investors, accompanied by strong regulatory oversight.

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