PAPER – OPEN ACCESS

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DOI : 10.32734/lwsa.v9i1.2740
Electronic ISSN : 2654-7066
Print ISSN : 2654-7058

Volume 9 Issue 1 – 2026 TALENTA Conference Series: Local Wisdom, Social, and Arts (LWSA)

LWSA Conference Series 09 (2026)
TALENTA Conference Series
Available online at https://talentaconfseries.usu.ac.id

Determinant of GDP in Developing Countries in the G-20 Group

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Abstract

This study aims to determine how much influence the variables Trade Openness, Foreign Direct Investment, External debt, and Inflation both partially and simultaneously have on GDP in 8 developing countries in the G-20 group. The type of research used is descriptive quantitative. The analytical method used in this study is to use panel data regression. The data used in this study is secondary data for the period from 2005 to 2023 GDP in 8 developing countries in the G-20 group. The data comes from world data bank. The result show that partially Trade Openness had a negative and significant effect on GDP. Foreign Direct Investment had a positive and significant effect on GDP. External debt had a positive and significant effect on GDP. Inflation had a positive and significant effect on GDP. Simultaneously the independent variables Trade Openness, Foreign Direct Investment, External debt, and Inflation have a positive and significant effect on GDP

Keywords: Trade Openness; Foreign Direct Investment; External Debt; Inflation; GDP.

1. Introduction

Economic growth in a country can be reflected by the Gross Domestic Product (GDP) which is the total value added (productivity) of goods and services of a country within one year. So that to be able to increase economic growth, it can be done by increasing Gross Domestic Product. One of the efforts that can be made by a country to improve its economy is to carry out economic and trade cooperation with other countries. Every country has a relationship and even cooperates with other countries. The cooperation between the two countries is called international cooperation. According to the World Bank, openness to trade expressed as trade (% of GDP) is the ratio of the sum of exports and imports of goods and services measured as a share of GDP. It is also often interpreted as a measure of trade restrictions. Trade openness can encourage GDP growth because with the increase in a country's export activities, the country's income will also increase. However, developing countries tend to import more than export despite having large natural resources.

Foreign Direct Investment (FDI) is also a factor that can affect GDP. Foreign direct investment refers to the investment of domestic companies and other countries' assets by foreign investors [1]. Large multinational companies will seek new opportunities for economic growth by opening branches and expanding their investments in other countries. Foreign Direct Investment will continue to have an important role in China's economy if the right factors are in place. Foreign investment inflows especially in developing countries are influenced by several factors, dominated by macroeconomic variables such as interest rates, inflation, human development index, infrastructure quality as well as other variables such as labor productivity, exchange rate policy, political conditions and corruption.

Researchers named moh. Daud and Jilengga revealed that foreign debt can have a positive effect on GDP if used and invested properly. Foreign debt should have a positive influence on a country, which can help a country's economic growth by increasing production (GDP), expanding employment opportunities and improving the balance of payments [2]. Not only foreign debt, the inflation rate also affects the economy of a country. Inflation is one of the indicators of economic stability. Inflation is a large increase in the price of goods and services that occurs continuously within a certain period. Inflation can be caused by the increasing amount of money in circulation, the increasing prices of goods and services, and the increasing demand for goods or services but not balanced by adequate supply [3]. Inflation and economic growth have a closely interrelated relationship. Inflation, which is a tendency for the prices of goods and services to rise continuously (thus causing a decline in the value of the currency), can have a positive or negative impact on economic growth.

Selection and peer-review under responsibility of Event of Young Researcher and Economics Students (EVEREST) IX
p-ISSN: 2654-7058, e-ISSN: 2654-7066, DOI: 10.32734/lwsa.v9i1.2740

2. Literature Review

2.1. Gross Domestic Product

Gross Domestic Product (GDP) is the sum of the production value of final goods and services produced by each productive sector in a country during a certain period. GDP is used as an indicator to determine the economic condition of a country in a certain period both at current prices and at constant prices. GDP on the basis of current prices explains the value added of goods and services calculated based on prices prevailing each year, while GDP on the basis of constant prices shows the value added of these goods and services calculated using prices prevailing in a particular year. GDP at current prices can be used to see the structure of the economy and its shifts, while GDP at constant prices is used to determine economic growth from year to year [4].

2.2. Trade Openness

Every country is certainly interdependent on other countries to meet their domestic needs because not all commodities are owned by each country, so international trade occurs. [5] International trade occurs due to demand factors in the form of demand for goods and services determined by tastes and income and supply factors in the form of differences in the number, type, quality, how to combine factors of production in the production process or differences in production costs that can lead to price differences in production. This, the definition of international trade is the trade of goods and services between countries in the world market. According to [6], economic openness provides an opportunity for all economies to specialize in what they know best, thus making citizens around the world more prosperous. According to the Word Bank, Trade Openness (TO) expressed in trade data (% of GDP) is the ratio of the sum of exports and imports of goods and services with other countries measured as a share of Gross Domestic Product.

2.3. Foreign Direct Investment

According to [7], foreign investment is the transfer of capital from one country to another or the transfer of capital. The purpose of this capital transfer is to be used in the country in order to generate profits under the supervision of the capital owner, either totally or partially. Foreign investment can help developing countries overcome the problem of savings shortage and shortage of foreign exchange reserves. This, foreign investment will not only provide the capital funds and foreign currency needed for the planned investment but also increase management personnel, entrepreneurial skills, technical expertise and knowledge of the market and marketing of the goods produced. In the long run, foreign investment can train a country's people to gain expertise in the fields in which the foreign capital is engaged. Apart from that foreign companies can accelerate the process of new technology (Transfer Of Technology) to developing countries because in building a company in developing countries, the technology used is much better technology than the technology used in developing countries.

2.4. Inflation

Inflation is the increase in general prices prevailing in an economy from one period to another. The inflation rate is the percentage increase in prices in a particular year compared to the previous year. Inflation is one of the indicators that is important to maintain stability so that economic conditions can also run stably. There are several factors that can affect the inflation rate, one of which is the interest rate and the amount of money in circulation (Manliw, 2006).

3. Research Method

The type of data used in this study is secondary data in the form of published the world data bank website. The object of this research is 8 developing countries in the G-20 group, namely South Africa, Argentina, Brazil, China, India, Indonesia, Mexico, Turkey.

This study uses one variable dependent variable and four independent variables. The dependent variable in this study is Gross Domestic Product (GDP), while the independent variables in this study are Trade Openness (TO), Foreign Direct Investment (FDI), External Debt (ED) and Inflation (I). The analysis uses panel data regression and the data is processed using Eviews 10. The regression model is formulated as follows:

$$\mathbf{GDPit} = \boldsymbol{\alpha} + \boldsymbol{\beta}\mathbf{1TOit} + \boldsymbol{\beta}\mathbf{2FDIit} + \boldsymbol{\beta}\mathbf{3EDit} + \boldsymbol{\beta}\mathbf{4INFit} + \mathbf{eit}$$

In the above equation i,t describes the combination of cross section and time series data with the following information :

GDP = Gross Domestic Product (GDP)

TO = Trade Openness (TO)

FDI = Foreign Direct Investment (FDI)

ED = External Debt (ED)

INF = Inflation (INF)

i = Cross section

t = Time series

$\beta\beta_{1\ldots}\ \beta_2$ = Regression Coefficient

3.1. Model Selection Test

The panel regression model consists of three approaches: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The selection of the appropriate model follows a series of statistical tests [4]:

1. Chow Test: This test determines whether CEM or FEM is more suitable. If the cross-section chi-square value is> 0.05, then CEM is selected. If the value is < 0.05, then FEM is chosen.
2. Hausman Test: If FEM is selected in the previous step, the Hausman test is conducted to compare FEM and REM. If the chi-square value is < 0.05, then FEM is used. Otherwise, if the value is > 0.05, then REM is selected.
3. Lagrange Multiplier (LM) Test: If CEM was chosen in the Chow test, or REM in the Hausman test, the LM test is used to confirm whether REM or CEM is more appropriate. If the chi-square value is < 0.05, then REM is selected; otherwise, CEM is used [8].

3.2. Hypothesis Test

There are three hypothesis carried in this study. namely the Simultaneous Test (F-test). The F-tes is use to determine whether the independent variables simultaneously affect the dependent variable. If the probability value (F-Statistic) is < 0.05, then the independent variables simultaneously have a significant effect on the dependent variable. Conversely, if the probability value is > 0.05, then the independent variables do not significantly affect the dependent variable. The T-test is conducted to measure the individual effect of each independent variable on the dependent variable. If the probability value is < 0.05, then the independent variable significantly affects the dependent variable. However, if the probability value is > 0.05, then the independent variable does not significantly affect the dependent variable. The Coefficient of determination test (R^2) is used to assess the the extent to which the model explains variations in the dependent variable. The results depend on the coefficient of determination (R^2) value. A small R^2 value indicates that the independent variables have a limited ability to explain the dependent variable. Conversely, an R^2 value close to 1 suggests that the independent variables provide almost all the necessary information to predict variations in the dependent variable.

4. Results and Discussion

4.1. Model Selection Test

To determine which regression model is chosen between fixed effect or common effect in this study, the Chow Test is required. Chow Test. The following are the results of the Chow Test:

Table 1. Chow Test

Effect Test	Statistic	d.f	Prob.
Cross Section F	90.5574	(7.140)	0.0000
Cross Section Chi Square	259.8900	7	0.0000

Source: E-views 10 Processed Data

The results of the Chouw test show that the probability value in the results is 0.0000 <0.05, so H0 is rejected and the better model in this test is the Fixed Effect Model (FEM) and the test can proceed to the Hausman test.

Table 2. Hausman Test

Effect Test	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross Section random	44.0018	4	0.0000

Source: E-views 10 Processed Data

The Hausman Test results show a probability value of 0.0000 <0.05, indicating that H0 is rejected and a good model in this research is the Fixed Effect (FEM) model in accordance with the test results from the Chouw Test and the Hausman Test.

4.2. Panel Data Regression Analysis

Table 3. Regression Analysis

Variable	Coefficient	T-statistic	Prob.
Costant (C)	10.7596	11.5280	0.0000
TO (Trade Openness)	-0.0148	-7.8942	0.0000
FDI (Foreign Direct Investment)	0.1263	4.4611	0.0000
ED (External Debt)	0.5608	16.7419	0.0000
INF (Inflation)	0.0032	2.9465	0.0038

Source: E-views 10 Processed Data

Based on the regression results in the table, it can be seen that the results of the regression equation in this study:

GDP = 10.7596 - 0.0148TO + 0.1263FDI + 0.5608ED + 0.0032INF

This equation shows that:

1. The coefficient C of 10.7596 indicates that if all independent variables (Trade Openness, Foreign Investment, Foreign Debt, and Inflation) are fixed, then Gross Domestic Product continues to grow by 10.7 M USD.

2. The coefficient value of Trade openness is -0.0148, meaning that if Trade Openness increases by 1%, the Gross Domestic Product will decrease by 0.01 M USD, and the regression results show the results of the Trade Openness variable are negative which indicates that an increase in Trade Openness will reduce Gross Domestic Product.

3. The coefficient value of Foreign Direct Investment (FDI) is 0.1263, meaning that if Foreign Direct Investment increases by 10 M USD, the Gross Domestic Product will increase by 1.2 M USD. This shows that Foreign Direct Investment can increase Gross Domestic Product.

4. The coefficient value of External Debt is 0.5608, meaning that if External Debt increases by 10 M USD, Gross Domestic Product will increase by 5.6 M USD. This shows that External Debt can increase Gross Domestic Product.

5. The coefficient value of External Debt is 0.5608, meaning that if External Debt increases by 10 M USD, Gross Domestic Product will increase by 5.6 M USD. This shows that External Debt can increase Gross Domestic Product.

4.3. Hypothesis Test

4.3.1 Partial Test (T-test)

Table 4. Partial Test Result

Variable	Coefficient	T-statistic	Prob.
Costant (C)	10.7596	11.5280	0.0000
TO (Trade Openness)	-0.0148	-7.8942	0.0000
FDI (Foreign Direct Investment)	0.1263	4.4611	0.0000
ED (External Debt)	0.5608	16.7419	0.0000
INF (Inflation)	0.0032	2.9465	0.0038

Source: E-views 10 Processed Data

The T test results can be interpreted as follows:

1. The t test results on the Trade Openness variable (X1) obtained a t value of 7.8942> t table, namely 1.975905331 and a probability value of 0.0000 <0.05, then H0 is rejected and H1 is accepted, meaning that Trade Openness has a significant effect on Gross Domestic Product.

2. The t test results on the Foreign Investment variable (X2) obtained a t value of 4.4611> t table, namely 1.975905331 and a probability value of 0.0000 <0.05, then H0 is rejected and H1 is accepted, meaning that Foreign Investment has a significant effect on Gross Domestic Product.

3. The T test results on the External Debt variable (X3) obtained a t value of 16.7419> t table, namely 1.975905331 and a probability value of 0.0000 <0.05, then H0 is rejected and H1 is accepted, meaning that External Debt has a significant effect on Gross Domestic Product.

4. The results of the t test on the Inflation variable (X4) obtained a t value of 2.9465> t table, namely 1.975905331 and a probability value of 0.0003 <0.05, then H0 is rejected and H1 is accepted, meaning that Inflation has a significant effect on Gross Domestic Product.

4.3.2 Simultaneous Test (F-Test)

Table 5. Simultaneous Test

F-Statistic	F-Table	Prob.	Description
464.4063	2,433207717	0.0000	Significant

Source: E-views 10 Processed Data

Based on the results of the regression test using the Fixed Effect model, the results of the simultaneous test (F test) were obtained with a prob (F-Statistic) value of 0.000000 <0.05, in the test results obtained the F count value of 464.4063> F table of 2.433207717, thus it can be concluded that H0 is rejected and H1 is accepted, meaning that Trade Openness, Foreign Investment, External Debt, and Inflation together have a significant effect on Gross Domestic product.

4.3.3 The Coefficient of Determination Test (R2)

Table 6. The Coefficient of Determination Test

Regression Model	R^2
R-squared	0.9733
Adjusted R-squared	0.9712

Source:

E-views 10 Processed Data

Based on the results of the regression analysis, the Adjusted R-squared value is 0.9712. This shows that the percentage of the influence of the independent variable on the dependent variable is 97.12%. This means that the independent variables used in the model are able to explain 97.12% of the dependent variable. The remaining 2.88% is influenced by other variables that are not in the model or that are not included in the variables of this study.

5. Conclusions

Based on the stages of the research as a whole, it can be concluded that:

1. Trade Openness has a negative and significant effect on Gross Domestic Product in developing countries in the G- 20 group for the period 2005-2023.
2. Foreign Direct Investment has a positive and significant effect on Gross Domestic Product in developing countries that are members of the G-20 group for the period 2005-2023.
3. External Debt has a positive and significant effect on Gross Domestic Product in developing countries of the G-20 group members for the period 2005-2023.
4. Inflation has a positive and significant effect on Gross Domestic Product in developing countries of the G-20 group members for the period 2005-2023.
5. Trade Openness, Foreign Direct Investment, External Debt, and Inflation simultaneously have a positive and significant effect on Gross Domestic Product in developing countries of the G-20 group members for the period

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