

Research Paper

The Effect of GDP, FDI, and Inflation to Trade Balance in 12 APEC Countries

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Abstract.


This research analyzes the factors that affect the trade balance in 12 APEC countries because trade balance is one of the important factors for economic growth. The level of prosperity and economy of a country can be measured by its active trading activities. This activity can be a source of income for countries. So, it can be said that the strength of a country's economy is its trade. Through trade, a country can establish diplomatic relations with other countries. This research uses panel data model with trade balance as a dependent variable, and gross domestic product (GDP), foreign direct investment (FDI), and inflation as independent variables. This research uses data from 2011-2020. The result is that GDP does not have significance with the trade balance, FDI has a positive significance for trade balance, and inflation has a negative significance with trade balance.

Keywords: APEC, data panel, trade balance

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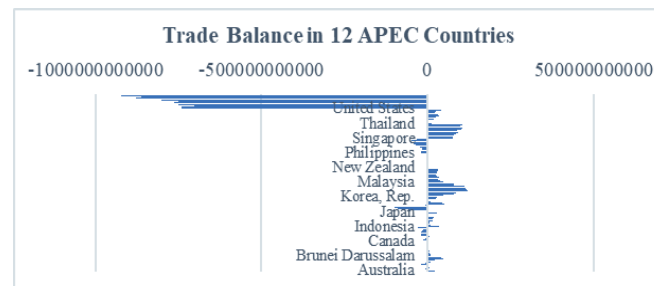
1. Introduction

In recent decades, world trade has undergone massive changes. The development of transportation and communication technology has pushed the world trade system towards a more open direction and encourage an increase in the income of countries in the world (Puri & Ima Amaliah, 2021). Furthermore, according to Todaro and Smith (2006), the international trade economy's openness and the infusion of foreign direct investment were two hallmarks of the economic globalization. With the existence of international trade, every country that conducts trade will be mutually beneficial. The form of this advantage is the availability of goods and services at relatively cheaper prices than if all of them were produced by the country concerned (Suparmoko, 1991). The cooperation between countries usually occurs because of economic integration and creates cooperation in the economic, social and political fields. At the APEC Summit 18-19 November 2015 in the Philippines, APEC countries agreed on a service

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trade cooperation agreement as a form of increasing the trade balance between APEC countries.

International trade activities between these countries can be recorded in the trade balance. Every economic activity of a country against other countries is recorded in its trade balance (Puri & Ima Amaliah, 2021). Because it provides information about a country's economic health, the trade balance plays a crucial function in that economy. Exports and imports are the main factors in the trade balance indicator. When exports exceed imports in value, the trade balance is said to be in surplus, and when exports fall short of covering imports, it is said to be in deficit. A trade balance deficit can lead to a crisis for a country's economy. The trade balance is not only affected by exports and imports, but is also affected by several variables.



Source: World Development Indicators

Figure 1: Trade Balance in 12 APEC Countries 2011-2020.

If seen from Figure 1, the trade balances in the 12 APEC countries fluctuated on average. This fluctuation condition can be caused by the inflation rate. An increase in inflation in the short term can indicate economic growth, but if an increase in inflation occurs in the long term it will have a bad impact (Azizah et al., 2019). The inflation rate causes the price of domestic goods to be more expensive than imported goods. This could weaken the trade balance due to the minimal volume of exports to imports.

If we take the current example, the United States will have a deficit of up to \$97.8 billion in 2021. This deficit is caused by weak export supplies that are not offset by large imports. This trade balance is enough to hamper economic growth. Of course, this is not only the case in the United States, but also in various countries. In the midst of rising inflation in some countries, the economy has changed quite a lot in various countries, especially APEC countries.

In addition to inflation, economic growth is also an effect on the trade balance (Weerasinghe & Perera, 2019). Economic growth in this study is based on Gross Domestic Product (GDP). GDP can reflect the welfare of society in a country. With a stable state condition and safe, GDP will also increase. The degree to which a country can balance

its exports and imports supports the size of its national income. The ability to export will contribute to the trade balance continuing to be in surplus.

One of the most crucial elements in determining a country's economic situation at any given time is its GDP. A nation's capacity to import is strongly correlated with its level of national GDP. The ability of the nation to import increases with national prosperity. However, the trade balance will go worse due to the rising consumption of imported commodities. Rahmawati (2014) research states that consumption of imported goods increases, but the supply of imported goods remains, it will cause a trade balance deficit.

In supporting international trade, it is also necessary to encourage domestic production, one of which is foreign direct investment (FDI). In Heckscher and Ohlin's theory, the emergence of international trade can arise because of two conditions, namely production capacity and intensity of use. Each product will require a different amount of factors of production. The difference is caused by the comparative advantage that the country has, both in terms of technological advantages and the advantages of factors of production (Tambunan, 2004).

The ownership factor of the production component and the intensity factor, specifically the technology in the manufacturing process, whether labor intensity or capital intensity, are both included in the comparative advantage. According to this theory's premise, the countries with comparable likes and preferences employ the same technology, have comparable-quality inputs, and have consistent incremental returns to scale, but have quite different inputs in terms of their nature or accessibility. Which will result in differences in the relative prices of the factors of production between countries. This difference is the cause of international trade (Ginting, 2015).

In HO theory, trade in the modern era encourages every company to invest to increase ownership of the factors of production, including investing in other countries. This leads to increasing the comparative advantage of FDI destination countries of goods and services. With the increase in comparative advantage, it will increase exports of FDI destination countries (Ginting, 2015). As a result, the goal of this research is to ascertain how GDP, FDI, and inflation affect the trade balance. This is done to determine which variables call for specific policies to enhance the trade balance.

2. Literature Review

2.1. Theoretical Basis

International Trade

Relations between countries in economic activity are an integral part of the world economic system, in which there are no administrative boundaries that hinder it. Every country is required to be able to read and be open to economic developments that occur. Thus, international trade is the most important thing and cannot be separated from the development of the global economy. International trade is business done by a country with other countries under mutual consent. According to Salvatore (2007), one of the economic activities that cannot be separated from international trade is the activity of capital flows, both in and out of a country. When international trade activities occur in the form of export and import activities, there is a movement of factors of production from the exporting country to the importing country due to differences in costs in the international trade process. Trade in this context refers to transactions involving individuals, persons and a government, or a government with another government (Pujoalwanto, 2014).

2.1.1. Trade Balance

The Trade Balance is a record or summary that contains all transactions for exports and imports of goods from one country to another. When exports exceed imports in value, the trade balance is said to be in surplus when exports fall short of imports, it is said to be in deficit, and when a country's exports and imports are equal, the balance is said to be in balance (Pujoalwanto, 2014). Acemoglu et. al, in their 2019 research also said that a surplus in the trade balance can be seen from the high value of exports rather than the value of imports, but when the trade balance is in deficit, it means that the value of imports is higher than the value of exports.

2.1.2. Gross Domestic Product (GDP)

There is no way to separate the impact of changes in the trade balance from that of GDP (GDP). GDP is the total nominal value of the commodities and services a nation produces in a given year, expressed as national income. The trade balance is positively impacted by GDP. This means that when a country's GDP increases, the absorption of the economy increases, including consumption activities where the purchasing power of the people at that time increases or is strong which will ultimately increase the country's trade balance (Puri & Ima Amaliah, 2021). Falk (2007) also explained that government budget balance, measured as primary balance as a percentage of GDP, has a significant positive impact on trade balance. This indicates that a reduction in the budget deficit improves the trade balance.

2.1.3. Foreign Direct Investment (FDI)

The total amount of foreign direct investment made in or into a nation is known as FDI. Theoretically, foreign direct investment (FDI) has a favorable impact on a country's trade balance; the more FDI that enters a country, the more it will improve the trade balance. Therefore, increasing FDI is to increase a country's trade balance (Ginting, 2015). In line with this, research by Chaisrisawatsuk and Chaisrisawatsuk (2007) shows that FDI has a complementary effect on the trade balance, which shows the important role of harmonizing trade and investment policies to benefit from globalization. Therefore, countries can utilize incoming FDI flows to improve their trade balance.

2.1.4. Inflation (INF)

Inflation is a condition where there is an excess demand for goods and services as a whole. According to the quantity theory, if the supply of money increases, the general price level will also rise. This direct relationship between price and quantity of money can be used to explain the inflation situation in a country. It can also be said that inflation is an upward trend in the prices of goods that are included in basic needs and taken into account in the cost of living survey of each country. Rising inflation slows down the economy and hampers producer productivity, which in turn leads to higher prices of goods and a decline in purchasing power. This has a negative impact on the trade balance (Nancy & Maria, 2020). This is also because inflation will cause a weakening of competitiveness due to high domestic commodities, which will result in decreased export interest and the country will import more goods needed domestically to stabilize prices.

2.2. Previous Research

According to Ginting's (2015) study, "The Influence of Foreign Investment on the ASEAN-6 Trade Balance," which focused on developing countries, there was a positive and significant relationship between the growth of FDI flows and the growth of the trade balance based on the findings of panel data regression analysis. ASEAN-6 countries. This means that the increased growth of FDI entering these countries is able to stimulate an increase in the trade balance.

The results of Nancy and Maria's (2020) study, which employed the multiple regression method of the time series model, show that there is a negative correlation between

inflation and the trade balance. An increase in inflation will slow the economy and reduce producer productivity, which necessitates an increase in import volume, which in turn affects the trade balance deficit. This is consistent with Puri and Amaliah’s research from 2021, which used a different research methodology, the Ordinary Least Square (OLS) method using a regression model. The study found that inflation is negatively related to the trade balance. The study shows that rising inflation is caused by rising food prices, and increasing import on petroleum import which has impact on trade balance for the year.

The trade balance is positively impacted by GDP, according to research by Ginting (2014) under the alternative title “Trade Balance Development and Factors Affecting It”. This means that every increase in GDP will cause an increase in the trade balance. Rahmawati’s (2014) research also states that GDP affected Indonesia’s trade balance in 1980-2012 significantly and had a negative relationship. However, research by (Asnawi & Hasniati, 2018) found that GDP has no effect on the trade balance.

2.3. Thinking Framework

Based on the results of previous research, the following framework is obtained.

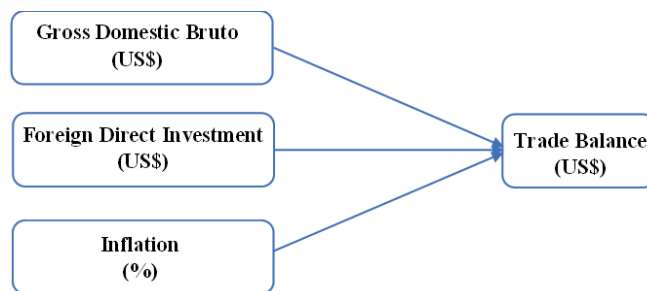


Figure 2: Thinking Framework.

2.4. Research Hypothesis

According to Darwin et. al (2021) interpret the hypothesis as a prediction of the possible results of a study. The existence of a hypothesis serves as a direction in research, it is useful to prevent the collection of data that is not relevant or related to the thing being studied. The hypothesis also serves as a framework to convince researchers (Fitrah & Luthfiyah, 2017). The hypothesis in this study is the development of the problem formulation and the underlying theory is:

H_1 : GDP has a positive and significant effect on the trade balance

H₂ : FDI has a negative and significant effect on the trade balance.

H₃ : Inflation has a positive and significant effect on the trade balance.

3. Method

The data used includes trade balance statistics (US\$), gross domestic product (US\$), foreign direct investment (US\$), and inflation (%). These secondary data were gathered from World Development Indicators utilizing 12 APEC (Asia Pacific Economic Cooperation) countries. Panel data for the years 2011 to 2020 is the data that was used. With the trade balance as the dependent variable and the gross domestic product, foreign direct investment, and inflation as the independent factors. To determine which model is best to use in panel data estimation (Zulfikar, 2018), can be seen in Figure 3.

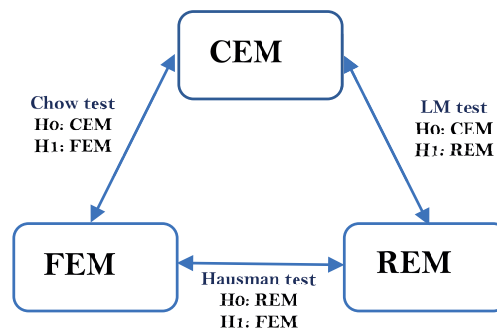


Figure 3: Panel Data Test Flow.

The Chow test, Hausman test, and LM test are the three tests mentioned above that are used to decide which model is the best. According to Silvia et al. (2021), the regression equation is as follows.

$$TRD_{it} = \beta_0 + \beta_1 LnGDP_{it} + \beta_2 FDI_{it} + \beta_3 INF_{it} + e_{it}$$

Equation -- 1 Panel Data Regression Equation

Where:

TRD is the trade balance variable, *LnGDP* is the logarithm of the GDP variable, *FDI* is the direct foreign investment variable, *INF* is the inflation variable, *0* is a constant, *1,2,3* is the regression coefficient, *e* is the error term, *i* is for object, and *t* is for time.

4. Results and Discussion

There are three methods for analyzing the panel data model, the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The study will employ the regression model that produced the best results out of the three used to estimate the panel data. The outcomes of the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches, along with the best model, are shown below.

TABLE 1: Selection of the Best Model.

	CEM	FEM	REM
LnGDP	0.083 (2.09)	0.145 (-6.12)	0.026* (-5.75)
FDI	0.000*** (-2,307)	0.004* (0.244)	0.803 (0.026)
INF	0.844 (-1.47)	0.031* (-5.23)	0.038* (5.31)
*p<0.05, **p<0.01, ***p<0.001			

Given that the probability value is less than 0.05 and that H0 is accepted, the Chow test shows that the Fixed Effect Model is superior to the Common Effect Model. The table below illustrates this:

TABLE 2: Chow test.

Chow test	
F (3.15) = 0.04	Prob>F = 0.0027

In the meantime, the Hausman test shows that the Fixed Effect Model is better than the Random Effect Model because H0 is rejected because the prob>chi2 value is less than 0.05. The table below illustrates this:

TABLE 3: Hausman test.

Hausman test
Prob>chi2 = 0.000

The Fixed Effect Model is the most effective model in this study based on the outcomes of the Chow test and Hausman test discussed above (see tables 2 and 3).

Next, verify the multicollinearity assumption that was once common. Multicollinearity shows that a very strong direct link between the independent variables (correlation). If

the Tolerance value is less than 0.10 or the Variance Inflation Factor (VIF) value is larger than 10, multicollinearity will result.

TABLE 4: Classical Multicollinearity Assumption Test.

Variable	VIF	1/VIF
LnGDP	1.47	0.679
FDI	1.26	0.792
INF	1.20	0.832
Means VIF	1.31	

According to testing, all independent variables have a VIF value that is less than the 10 maximum limit or a tolerance value that is greater than 0.1, which means that H0 is rejected and the independent variable does not exhibit multicollinearity symptoms (there is no strong relationship between the independent variables and other independent variables).

The Fixed Effect Model is the best regression model to apply, according to the best model analysis that has been performed. The findings produced after the estimation are consistent and unbiased, as shown in table 4, because the Fixed Effect Model successfully passed the multicollinearity test in the previous test, which is a traditional assumption test.

TABLE 5: Fixed Effect Model Results.

Fixed Effect Model			
Trade Balance (TRD)	Coefficient	Standard Error	Probability
LnGDP	-6.12	4.17	0.145
FDI	0.244	0.83	0.004
Inflation	-5.23	2.39	0.031
R ²	0.7554		
F _{statistic}	0.04		
Probability	0.0027		

4.0.1. GDP to Trade Balance

Based on the processed data, GDP has a probability value of 0.145 and is not significant to the trade balance because the probability is greater than 0.05. This is in accordance with research by Asnawi & Hasniati (2018), when GDP fluctuates, the trade balance will not experience a deficit. This happens because GDP has increased on a national scale to encourage exports. When exports occur, it will be able to increase the trade balance. However, this has not been affected by the increasing demand for imports. Reflecting

on the experience of the COVID-19 pandemic yesterday, all sectors in all countries experienced shocks. The decline in GDP as a result of stalled or stalled exports led to a decrease in the level of trade balance in each country, especially APEC countries.

4.0.2. FDI to Trade Balance

Then, at the 1 percent confidence level, FDI is significant with a probability value of 0.004. The trade balance will grow by 0.244 million USD if FDI increases by 1 million USD, assuming no change in the number of independent variables, according to the regression coefficient for FDI, which is positive 0.244. This result is in accordance with Ginting's research (2015), that the increase in FDI growth entering these countries is able to stimulate an increase in the trade balance. The existence of FDI will encourage an increase in the rate of exports to widen the distance from imports and increase the trade balance towards a surplus.

4.0.3. Inflation to Trade Balance

Meanwhile, inflation has a probability value of 0.031 and is significant to the trade balance at 1 percent confidence level. Given that there is no change in the number of independent variables and the regression coefficient for inflation is negative at -5.23, a 1% increase in inflation will result in an increase in the trade balance by 5.23 million USD, and vice versa. An increase in inflation in a country will have an impact on the increase in domestic commodities which will reduce domestic net exports which in turn reduce the level of the domestic trade balance. According to research by Nancy & Maria (2020), an increase in inflation will slow down the economy and reduce producer productivity, thus requiring an increase in imports, which in turn has an impact on the trade balance deficit.

5. Conclusions

This research uses the latest annual data, this data is up to 2021 to adjust to the current situation. Because it uses the latest data, this research has difficulty in obtaining valid and appropriate data for the continuation of this research. In addition, the lack of studies on the balance of trade in APEC countries is a limitation as well as an update for the continuation of research and policy direction for interested parties.

The conclusion that can be drawn from this research is that the existence of FDI will stimulate an improvement in the trade balance in the destination country, hence the FDI variable has a positive impact on the trade balance in the twelve APEC countries. Meanwhile, rising inflation will impede the pace of the economy and result in a drop in the trade balance, therefore central bank policies are required to manage the inflation rate. This is because rising inflation has a negative impact on the trade balance. While GDP has no effect on the trade balance, because the fluctuations in GDP do not cause a trade balance deficit, the country must encourage exports to support the trade balance.

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References

- [1] Pujoalwanto B. Indonesian economy, historical, theoretical and empirical review. Jakarta: Graha Ilmu; 2014.
- [2] Rahmawati D. Effect of exchange rate and GDP on Indonesia's trade balance 1980-2012. *Economics Development Analysis Journal*; 2014.
- [3] Weerasinghe E, Perera R. Determinants of balance of trade in the Sri Lankan Economy. *International Journal of Trade, Economics and Finance*. 2019;10(1):17–24.
- [4] Fitrah and Luthfiyah. *Research methods: Qualitative research, classroom action and case studies*. CV Jejak; 2017.
- [5] Duasa J. Determinants of Malaysian trade balance an ARDL Bound Testing Approach. *Glob Econ Rev*. 2007;28(3):21–40.
- [6] Weiss J. Export growth and industrial policy: Lesson from the East Asian Miracle Experience. ADB Institute Discussion Paper. 2005. 26.
- [7] Azizah L, Tan S, Emilia E. Estimasi Model Neraca Perdagangan Indonesia dalam Periode 1998-2017. *E-Journal Perdagangan Industri Dan Moneter*. 2019;7(3):123–136.
- [8] Darwin M, Mamondol MR, Sormin SA, Nurhayati Y. *Research methods quantitative approach*. Bandung: Indonesian Science Media; 2021.

- [9] Ginting M. The effect of foreign investment on the ASEAN-6 Trade. Center for the Study, Data and Information Processing (P3DI). Jakarta Economic and Public Policy Sector; 2015.
- [10] Ginting M. The development of the trade balance and the factors affecting it. Center for the Study, Data and Information Processing (P3DI). Jakarta Economic and Public Policy Sector; 2014.
- [11] Silvia MA, Rahmayani. Investing in the whirlpool of the pandemic: Reading the gap in the national economic recovery in the new normal era. National Seminar of the Faculty of Economics Tidar University. 2021;25-32.
- [12] Suparmoko M. Introduction to Macroeconomics. Edition Two. First Print. BPFY Yogya. 1991.
- [13] Nancy N, Maria F. Analysis of the effect of exchange rate and inflation on the trade balance in Indonesia. *Vision of Social Sciences and Humanities*. 2020;1(1).
- [14] Todaro P, Smith C (Haris Munandar Puji A, translator). *Economic development*. 9th ed. Jakarta: Erlangga; 2006.
- [15] Puri, Amaliah. The effect of inflation, interest rates, GDP, exchange rates and economic crisis on Indonesia's trade balance for the 1995-2017 Period. 2021;1(1).
- [16] Zulfikar R. Estimation model and selection method of panel data regression: An overview of common effect, fixed effect, and random effect model. Center for Open Science; 2019.
- [17] Aminda S. Analysis of the effect of inflation and rupiah exchange rate on Indonesia's Trade Balance in 2005-2015. 2019.
- [18] Chaisrisawatsuk S, Chaisrisawatsuk W. Import, export and foreign direct investment interactions and their effects. *Asia-Pacific Research and Training Network on Trade Working*. 2007;47.
- [19] Soelistyo. *International economics volume I: International trade theory*. Edition Two. Fourth Printing. 1989.
- [20] Tambunan T. *Globalization and international trade*. Jakarta: Ghalia Indonesia; 2004.
- [21] Acemoglu D, Laibson D, List JA (Mulyana A, editor). *Makroekonomi*. Penerbit Erlangga; 2019.
- [22] Falk M. Determinants of the trade balance in industrialized countries (No. 013). *FIW-Research Reports*. 2008.
- [23] Salvatore D. *International Economics*. Prentice-Hall. 2007.