

ANALYSIS BETWEEN INFLATION, EXPORTS, IMPORTS, AND INTEREST RATE ON EXCHANGE RATE IN INDONESIA 2010-2019

ANALYSIS BETWEEN INFLATION, EXPORTS, IMPORTS, AND INTEREST RATE ON EXCHANGE RATE IN INDONESIA 2010-2019

Nurasita Indah Lingga Suri*, Banatul Hayati

Economics and Development Studies, Faculty of Economics and Business, Diponegoro University, Semarang, Indonesia

Abstract

This study aims to analyze the effect of the inflation rate, import-export activities, interest rates simultaneously on fluctuations in the rupiah exchange rate against the US dollar from 2010 to 2019. The method used in this study is the VAR/VECM with the Eviews analysis tool. to see whether there is a long-term or short-term effect between variables. The results of this study all have a positive influence on the rupiah exchange rate against the US dollar and are in accordance with the hypothesis and theory used, but the export activity variable is not in accordance with the hypothesis and theory because of the influence of imports on raw materials to produce export goods. This study also provides an update where the interest rate variable uses the theory of interest rate parity, which states that there is a balance of international interest with domestic interest so that the relationship between interest can affect fluctuations in the rupiah exchange rate against the US dollar and increase incoming capital flows.

Keywords: Exchange Rate, Inflation, Export, Import, Interest

1. INTRODUCTION

The economic system in Indonesia is an open economy. The activities of the international trade is one of the activities of the system of open economy. In the era of globalization such as this, the movement of the MEA (Masyarakat Ekonomi Asean) strongly encourage the Indonesian economy to trade with countries other so that the development of Indonesia's economy expanded through international trade. "International trade is increasingly less resistance and easy to do in international trade can increase the volume and value in the international trade". To perform international trade activities required a medium of exchange agreed upon by the two countries as a means of transaction. The exchange rate or exchange rate is an agreement known as the exchange value of the currency to make payments between the two countries. The following is the movement of exchange rate fluctuations in the rupiah against the us dollar from the years 2010-2019.

*Coressponding author. *Email address:* Nurasitaindahlinggas@students.undip.ac.id

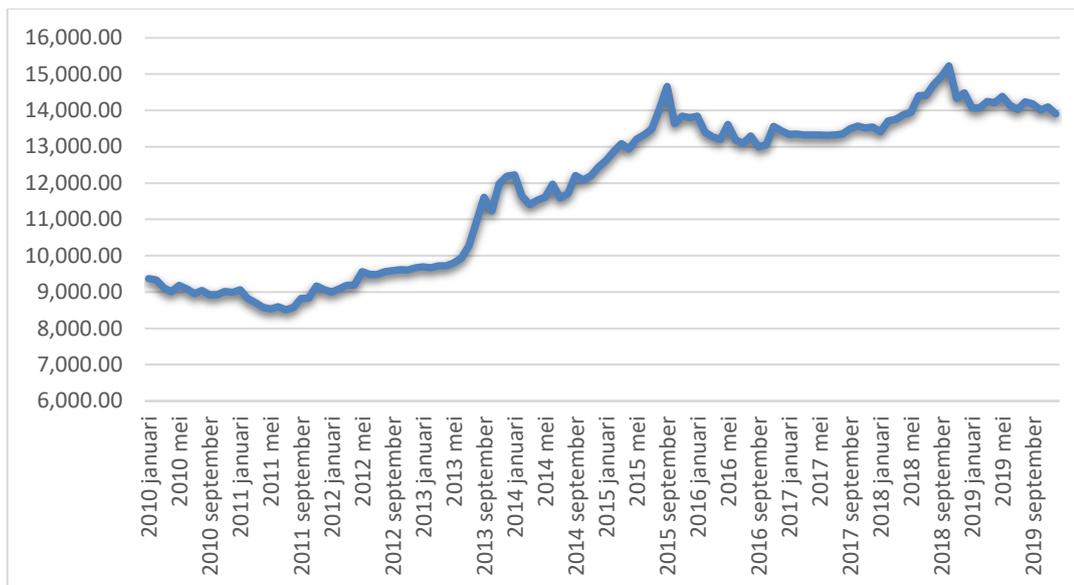


Figure 1. Fluctuations in the Value of the Rupiah Exchange rate over the American dollar the years 2010-2019

The graph shows the movement of the fluctuations in the value of borne in the rupiah against the us dollar less stable. In 2010 the value of the rupiah exchange rate over the u.s. dollar experienced an appreciation of 4% with an average of Rp. 9.081/US dollar. Then in 2011 to depreciate by 1,3% due to getting in your way the impact of the economic instability in the countries of Europe. From year 2010-2013 fluctuations around Rp. 8000-Rp.9000. In September 2013 experience the depreciation amounted to 6.3% and then re-experiencing the appreciation of 3.3% in October 2013. The rupiah is Rp. 12.226 in January 2014 due to the influence of the investors. In 2015 BI lowering the exchange rate to keep the volatility of the exchange rate itself. Year 2018 exchange rate reached Rp. 14.292 then experienced an appreciation in the year 2019.

Changes in the value of the rupiah stable greatly affect the macro economy of Indonesia. Depreciation is the value of the rupiah exchange rate reflects the demand of the community will rupiah currency because the national economy or rising dollar as a means of international payment. The impact that occurs on the addition of the cost of imported materials raw materials which caused the price of imported goods become expensive. Depreciation can also reduce the competitiveness of export products, which means that goods and services in Indonesia, will be expensive if seen from the value of the dollar. In general, the relationship in the form of purchasing power parity prevails in developing countries, which stated that the currency classified as soft (*soft currency*). In Indonesia itself using a system of free floating exchange rate, where in this system does not involve the intervention of the government and the fluctuations of the exchange rate is influenced by the money market.

By using a system of free floating exchange rate, economists distinguish exchange rate into two, namely the nominal exchange rate and the real exchange rate. The nominal exchange rate is the degree to which people can trade in a country's currency to buy another country's currency. While the real exchange rate is the level where people can trade goods produced by the two countries. The hypothesis that famous in the science of economics is the law of one price (*the law of one price*) or commonly referred to as purchasing power parities (*purchasing power parity*) states that the goods be not be sold at different prices in different locations at the same time. The percentage change in the nominal exchange rate between the currencies of two

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countries is equal to the percentage change in the real exchange rate is added with the difference in the rate of inflation in both countries. This analysis shows how monetary policy affects the nominal exchange rate. The growth of the money supply that led to high inflation. The consequences of high inflation is a currency will depreciate (Mankiw, 2007).

To overcome the instability of the economy because the rate of inflation increased. The Central Bank sets policy by raising interest rates so that the circulation of money in the community is reduced. When the central bank increases the interest rate then the flow of capital into the country it will be increasing foreign exchange in the country. This causes the value of the rupiah exchange rate over the u.s. dollar experienced an appreciation. However, the situation is opposite if the central bank lowers the interest rate in the country. Investors are likely to be pulling their capital out of the country and invest funds to countries that have more certainty in the economy. The relationship between the interest rate to Fluctuations in the value of the rupiah exchange rate over the American dollar can be explained through the theory of *Interest Rate Parity* or parity of interest rates, where this theory states that the exchange rate can be determined if the level of interest rates between two countries is the same. This theory also states that the interaction between market participants and the state will affect the flow of capital between countries.

The above explanation is in accordance with research conducted by Kadek Arya Diana and Ni Putu Martini Dewi (2017) with the title "Analysis of the Factors That Affect the Value of the Rupiah Exchange rate Over the United States Dollar In Indonesia" the results of the research says that interest rates have a positive influence and significant impact on the value of the rupiah exchange rate over the American dollar. That is, the increase or decrease in the interest rate is not necessarily influence on exchange rate fluctuations. The results of these studies are also supported by research conducted by Hazizah, Viphindrartin, and Zalnuri (2017) with the title "the Influence of JUB, Interest Rates, Inflation, Exports and Imports to the Value of the Rupiah Exchange rate over the Dollar of the United States". Next on the variable inflation does not give effect to the exchange rates for the us dollar, it is because the economic conditions in each country is different. Based on the theory of PPP, said that the inflation rate will weaken the currency exchange rate. In general, rising prices of goods in the country, the price of goods in the country will rise, so will lose currency exchange rate. The results of this study are supported by research conducted by Silitonga, Isaac, and Mukhlis with the title "the Influence of Exports, Imports, And Inflation To Exchange rate of the Rupiah in Indonesia," stated that inflation does not have a significant influence on the exchange rate.

2. LITERATURE STUDY

The rate is used as a medium of exchange to conduct international trade with many countries. The exchange rate is divided into two, namely the fixed exchange rate and the real exchange rate, while in Indonesia, this time using a free floating exchange rate system where the sistemn only rely on the activities of money market and does not involve the intervention of the government. The us Dollar is used as a means of exchange to perform activities of international trade can be explained in the model mundell-flemming where on this model explains the relationship between the money market and the goods market in an open economy, thus giving rise to exchange rate of the country's other then make an agreement with the value of the domestic exchange rate to be used as a medium of exchange. The price level in each country is different so it takes the value of the exchange rate as a means of exchange for trade.

Supply and demand occurs on the money can also affect the depreciation or appreciation of a country's currency.

Purchasing Power Parity Theory

For maintain the stability of exchange rate fluctuations top dollar by testing the theory of Purchasing Power Parities (Purchasing Power Parity Theory). This theory connects between the fluctuations of the exchange rate with the rate of inflation. Conceptually, this theory linking the price of an item in an open economy will be equal to the price of goods in another country after converted through a unit of exchange rates. According to Cassel (1918) one of the theories that explain the relationship between the inflation rate and the exchange rate is the theory of Purchasing Power Parity with the arguments of one price (*the law of one price*), that is if the trade is completely free and there are no barriers of any kind then one item definitely sold anywhere in the world with the same price. If the price of goods in two different countries would be the same if judged by the same currency.

International Trade

This approach is seen that the exchange rate between the two currencies of both countries can be determined by the size of the trade in goods and services of the two countries. Seen from international trade, the equilibrium exchange rate is the exchange rate which can balance the activities of export and import that are performed by the two countries. If imports of a country larger than exports then it will happen a trade deficit that causes the exchange rate to depreciate. The depreciation of the exchange rates of this currency also will lead to a reduction in imports and increase exports, it is done to restore the state of the trade balance. There are several theories that explain the emergence of international trade in the fundamental that is expressed by some experts of classical economics, Adam Smith declared adakanya the benefit of absolute (*absolute advantage*), J. S. Mill declared a country will export goods that have *comparative advantage* the largest and import goods that have a *comparative disadvantage* and David Ricardo also argued that the theory of the cost of the relative (*comparative cost*).

Interest Rate Parity

This theory also states that the interaction between market participants and the state will affect the flow of capital between countries. Monetary policy will affect the exchange rate through the comparison of domestic interest rates to international interest rates and *capital inflow*. Monetary policy are taken by the Bank of Indonesia will push nominal interest rates increased domestic where international interest rates are considered constant, so that the parity of interest rates will rise and give impact to the investors so that capital can flow entered into in the country so as to make the rupiah appreciated.

The hypothesis in this study, among others:

H1: the inflation Rate has a positive influence on the value of the rupiah exchange rate over the American dollar.

H2: the export Activities have a negative effect on the value of the rupiah exchange rate over the American dollar.

H3: import Activities have a positive influence on the value of the rupiah exchange rate over the American dollar.

H4: the Level of rates has a positive influence on the value of the rupiah exchange rate over the American dollar.

3. RESEARCH METHODOLOGY

The variables used in this study is the dependent variable and the independent variables. The dependent variable is a variable that is very important in a study, on varabel bound can not stand alone as the independent variable and the dependent variable is very easy to get to the influence of other variables as independent variables. The dependent variable used is the value of the rupiah exchange rate over the American dollar (Usd). While the independent variable is the variable that is able to stand on its own without the help of the other variables, the independent variable between alain rate of inflation (%), export activities (Rp), imports (Rp), and the level of interest rates (%). The type of data used in this research is time series data from the years 2010 until 2019 with data. The Data obtained from multiple official website such as *statistik.kemendag.go.id*, *trade.go.id/exchange-rates*, *bps.go.id*, *kemendag.go.id*, *seki.bi.go.id* and fred.stlouisfed.org/. Then the data was processed using the analysis tools *evIEWS* by the method of VAR/VECM to look at the relationship of short-term and long-term between the variables.

VAR is used to project a system with a variable using the sequence of time and analyze the impact of the factor of disorders which are of such a system. Analysis of VAR has similarities with the equations simultaneously because in the analysis of VAR consider the variable-endogenous variables simultaneously in a single equation. While the VECM or restrited VAR busted up one of the VAR models used if there is data that is not terkointegrasi, VECM introduced by Cristoper A. Sims (1980). The following equation of the VAR/VECM:

$$\begin{aligned} ER_t &= \alpha_{01} + \sum_{i=1}^k \alpha y_{t-i} + \sum_{i=1}^k \beta iINF_{t-i} + \sum_{i=1}^k \gamma iEX_{t-i} + \sum_{i=1}^k \delta iIMP_{t-i} + \sum_{i=1}^k \theta iSB_{t-i} + \varepsilon_{1t} \\ INF_t &= \alpha_{02} + \sum_{i=1}^k \alpha y_{t-i} + \sum_{i=1}^k \beta iINF_{t-i} + \sum_{i=1}^k \gamma iEX_{t-i} + \sum_{i=1}^k \delta iIMP_{t-i} + \sum_{i=1}^k \theta iSB_{t-i} + \varepsilon_{2t} \\ EX_t &= \alpha_{03} + \sum_{i=1}^k \alpha y_{t-i} + \sum_{i=1}^k \beta iINF_{t-i} + \sum_{i=1}^k \gamma iEX_{t-i} + \sum_{i=1}^k \delta iIMP_{t-i} + \sum_{i=1}^k \theta iSB_{t-i} + \varepsilon_{3t} \\ IMP_t &= \alpha_{04} + \sum_{i=1}^k \alpha y_{t-i} + \sum_{i=1}^k \beta iINF_{t-i} + \sum_{i=1}^k \gamma iEX_{t-i} + \sum_{i=1}^k \delta iIMP_{t-i} + \sum_{i=1}^k \theta iSB_{t-i} + \varepsilon_{4t} \\ SB_t &= \alpha_{05} + \sum_{i=1}^k \alpha y_{t-i} + \sum_{i=1}^k \beta iINF_{t-i} + \sum_{i=1}^k \gamma iEX_{t-i} + \sum_{i=1}^k \delta iIMP_{t-i} + \sum_{i=1}^k \theta iSB_{t-i} + \varepsilon_{5t} \end{aligned}$$

Description:

- ER : Exchange rate
- INF : Inflation
- EX : Export
- IMP : Imports
- SB : Interest Rates
- α : constant
- i : the length of the lag
- ε : shock/ shocks

4. RESULT AND DISCUSSION

On the method of analysis of VAR/VECM there are several tests that need to be done, namely test stationary, the determination of the lag, stability test, test koeintegrasi, test causality, the estimated VECM, the analysis of *Impulse Response Function*, the analysis of *Variance decomposition*. The Data that has passed the test of stationary and test koeintegrasi can then estimate the VECM to see the relationship of short-term and long-term between the variables.

Table 1. Stationarity Test

The Research variables	<i>Augmented Dickey Fuller Test</i>			
	Levels Level	Description	Level First Difference	Specification
ER	0.8094	Not Stationary	0.0000	Stationary
INF	0.0000	Stationary	0.0000	Stationary
EX	0.0750	Not Stationary	0.0000	Stationary
IMP	0.1448	Not Stationary	0.0000	Stationary
SB	0.6155	Not Stationary	0.0000	Stationary

From the table it can be seen that all the variables are stationary at level *and first difference* with a level of 5% or the probability is less than 0.05. While at the level of the level of only the variable of inflation that pass the test of stationary, but in a variable exchange rate, exports, imports, and interest rates are not stationary. it can be seen from the test results stationernya by 0.8094 for the exchange rate, 0.0750 for export, 0.1448 to import, and 0.6155 to interest rates.

Table 2. Cointegration Test

The level of Cointegration	Value Trace Statistic	Value of the Critical Value
None *	199.9711	60.06141
At most 1 *	100.9223	40.17493
At most 2 *	50.91195	24.27596
At most 3 *	23.52487	12.32090
At most 4 *	11.36207	4.129906

On the cointegration test also indicates that the data passed from the cointegration test marked than is the magnitude of the value *trace statistic* than the *critical value* , namely the value of *trace statistics* by 199.9711 greater than the value of the *critical value* of 60.06141. Because the data has passed the test koeintegrasi and test stationary, then it can be done the estimated VECM. The following is the estimated VECM.

Table 3. The estimated VECM Short-Term

Variable	Coefficient	T-Statistics
INF	141.223	-2.28518
EX	0.03546	0.12495
IMP	0.02722	-0.56529
SB	156.728	1.95696

It can be seen that the estimation of VECM only variable inflation has a short-term relationship, it is seen from the more the value of t-statistics than t-table value (1.98). The value of t-statistics on the variable inflation of 2.28518, while on the variables of export, import, and interest has a value of t-statistics below the value of t-table is 0.12495, 0.56529, and 1.95696 sequentially.

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Table 4. The estimated VECM Long-Term

Variable	Coefficient	T-Statistics
INF	1815.35	8.50062
EX	0.38671	2.22399
IMP	0.37309	0.15879
SB	340.928	0.33908

On the relationship of long-term panjang there are two variables that have a long-term relationship to the value of the rupiah exchange rate over the American dollar is the variables of inflation and exports. Where the variable inflation and export has the value of t-statistic is greater than t-table that is equal to 8.50062 and 2.22399 in a row. Whereas in a variable import and flowers do not have long-term relationships because the value of t-statistic is smaller than t-table that is equal to 0.15879 and 0.33908 in a row.

The relationship between the rate of inflation to exchange rate of the rupiah over the American dollar

Based on the results of the estimation using the VECM, short-term relationship between inflation and exchange rate fluctuations in the short term to obtain the value of the coefficient of 141.223. By using the value of t-table is of 1.98 at alpha 0.05% can be interpreted that the presence of a short-term relationship a positive and significant correlation between the rate of inflation to fluctuations in the value of the exchange rate for the Indonesian rupiah is the top u.s. dollar. A positive sign that there are on the coefficient indicates that when inflation increases then it will effect on the increase in the value of the rupiah exchange rate top dollar or can be said if inflation increases, then the rate weaken or depreciate. It is the same as the effect on the long-term is the value of the coefficient of 1815.35. The value of the coefficient is more than the value of t-table 1,98 at alpha 0.05%, indicating the presence of positive and significant influence between the rate of inflation and the fluctuations of the exchange rate for the Indonesian rupiah against the us dollar.

These results are in accordance with the theory of *purchasing power parity*, because when inflation recalled the value of the rupiah exchange rate over the American dollar will depreciate. research is also in line with research conducted by Zumrotudz Dzakiyah, Zarah Puspitaningtyas, Yeni Puspita (2018) with a paper entitled “the Influence of the Amount of the Value of Exports and the Rate of Inflation To exchange Rate of the Rupiah Years 2009-2016” with the results of the relationship between the inflation rate and exchange rate fluctuations provide a positive and significant influence

The relationship between export activity with the value of the rupiah exchange rate over the American dollar

Based on the results of the estimation of test VECM, shows the relationship of short-term and long-term between export activities and the fluctuations in the exchange rate. The relationship between exports and exchange rate in the short term can be seen in the value of the coefficient of 0.03546, the value is less than the value that is on a t-table that is equal to 1.98 use alpha 0.05%. from the comparison of these values can be interpreted that the activities of export does not have a significant influence on exchange rate fluctuations. A positive sign that exist on the value of the coefficient of states if the export activities have increased the

value of the rupiah exchange rate over the dollar also increased or exchange rate depreciates. Different with the relationship between exports and exchange rate fluctuations in the long term, seen from the value of the coefficient of 0.38671. By using the t-table value of 1.98 with alpha 0.005% can be interpreted that the relationship between export activity and fluctuations in the value of exchange rate is positive and significant. The same as in the short term, a positive sign that exist on the value of the coefficient means that if the export activities have increased the value of the exchange rate for the Indonesian rupiah is the top u.s. dollar also be increased or it can be said that the exchange rate depreciates.

This research is in line with research conducted by Candra Mustika, Ethics Umiyati, and Erni Achmad (2015) with the title “Analysis of the Effect of Net Exports To Exchange rate of the Rupiah Against the u.s. Dollar and Economic Growth in Indonesia”. The results of these studies say that net exports have a positive and significant influence on the exchange rate. However, the results of this study are not in accordance with the hypotheses and theories that explain. On the theory explains that when the number of exports that is done then the value of the rupiah exchange rate over the u.s. dollar experienced an appreciation but on the results of this instead of the opposite. This happens due to the presence of import activities on the material of the raw materials to produce goods that will be exported.

The relationship between the activities of the imports with the value of the rupiah exchange rate over the American dollar

Based on the results of the estimation of test VECM, the relationship between the activities of import and exchange rate fluctuations in the short term to obtain the value of the coefficient of 0.02722. With using t-tables of 1.98 at alpha 0.05% can be interpreted that in the short term the import activity has no significant effect on exchange rate fluctuations. The same as in the short term, in the long-term relationship between the activities of import and fluctuations in exchange rates also did not have a significant effect. It is seen from the value of the coefficient of 0.37309 greater than the value of t-table by 1,98 at alpha 0.05%. In the short-term and long-term together to provide a positive sign, that is when the imports increased then the fluctuations in exchange rates also increased or in other words the exchange rate to depreciate.

This is in line with research conducted by Nurul Hazizah, Zainuril, Sebastiana Viphindartin (2017). The value of imports of the higher will increase the value of the exchange rate so that the rate become weaker, the expectations of the activities of such imports followed by an increase in foreign exchange used to pay for goods imported into the country.

The relationship between the level of rate of interest with the value of the rupiah exchange rate over the American dollar

After the test VECM, produce an estimate on the value of the coefficient of 156.728. by using the t-table value of 1.98 at alpha 0.05% can be interpreted that in the short-term relationship between the level of the tribe of interest and exchange rate fluctuations did not have a significant effect. The same as in the short term, the relationship between interest rate and exchange rate fluctuations in the long-term also does not have a significant effect. It can be known from the value of the coefficient of 340.928 by using the t-table value of 1,98 at alpha 0.05%. the sign is positive given on short term and long term can give the sense that if the interest rate increases, exchange rate fluctuations over the American dollar will also increase or it can be said that the exchange rate depreciates.

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The results of such research in accordance with the theory of *interest rate parity* because when the interest rate increases, the flow of capital inflow is also increased so that the circulation of foreign exchange in the country is increased and make the value of the rupiah exchange rate over the American dollar has appreciated. This study is also in accordance with the research conducted by Nurul Hazizah, Zainuril, Sebastiana Viphindrartin (2017) with the title “the Influence of JUB, Interest Rates, Inflation, Exports, and Imports to the Value of the Rupiah Exchange rate over the Dollar of the United States” with the results of the level of interest rates does not have a significant influence on the fluctuations in the value of the exchange rate

5. CONCLUSION

Based on the research that has been done on the analysis of the relationship between the rate of inflation, the import export activities, the level of interest rates to fluctuations in the value of the rupiah exchange rate over the American dollar in Indonesia during the period of 2010 to 2019 using monthly data by the method of analysis of VAR/VECM can be concluded that the empirical findings on the growth of the economy shows the results of research in accordance with the hypothesis of the study except in the variable export activities that have the hypothesis of a negative however, the results in this study give positive results. This happens because there are import activities conducted on the material of the raw materials to manufacture goods that will be exported. So the more items that will be exported then the higher of the raw materials will be imported so the demand for u.s. dollars increases and makes the rupiah depreciated. Variables in addition to the export activity, i.e. the rate of inflation, imports, and the level of interest rates give results that are in line with theory and hypothesis.

From the results of this study, it is suggested some policies, namely: (1) To control the rate of inflation can be applied monetary policy by raising interest rates so that the circulation of money in the community is reduced and decrease the rate of inflation, while the fiscal policy can be applied to reduce government spending. (2) To reduce the use of imported material in the process of production of export goods, the government can conduct a policy of import quotas to export materials and to better utilize the Resources you have available. (3) the Determination of the tariff policy to protect goods local, so local goods can compete in the market. (4) the Provision of subsidies to reduce the price of local goods. (5) Control of interest rates to maintain the stability of the rupiah exchange rate over the American dollar.

The study also does not terlepas of the limitations experienced. The limitations in this study, the lack of series a time used, therefore for further research it is recommended to add a series of time so that the results obtained from the analysis with the model VECM can be used effectively.

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