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The impact of covid-19 in mediating the effect of exchange rates on exports and imports in asean countries

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Abstract
The ASEAN Economic Community (AEC), a significant initiative of ASEAN, intends to establish an integrated production base and single market throughout the ASEAN area. Because they have the power to impact a nation's economy, exchange rates are crucial macroeconomic factors in international trade. COVID-19 is one of the things that makes it difficult for international trade to occur nowadays. The purpose of this study is to examine the direct effects of exchange rates and COVID-19 on imports and exports in ASEAN nations. Furthermore, the impact of COVID-19 mediation on the influence of currency rates on imports and exports in the ASEAN area is also assessed in this study.This research method uses quantitative data types. The quantitative data used is panel data. The data used in this study are secondary data. The results showed that COVID-19 negatively affected exports and imports in ASEAN countries, exchange rates negatively affected exports and positively affected imports, COVID-19 indirectly negatively affected exchange rates through export mediation had a positive effect on exchange rates through import mediation and exchange rates were able to mediate exports in ASEAN countries.

Keywords: ASEAN, covid 19, exchange rate

Introduction

The era of globalization makes every country establish cooperation both in terms of politics, economy, and socio-culture. International trade is carried out by countries that adopt an open economy. The open *economy causes* the establishment of international trade that allows export and import activities between countries. (Ichsan *et al* ., 2016) [4]

ASEAN *(Association of Southeast Asian Nations)* is a regional alliance made up of ten Southeast Asian nations. Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Laos, Myanmar, and Cambodia are the current members. Additionally, ASEAN promotes economic cooperation among its constituent nations. because it has different economic levels, so that cooperation with partners is one way to accelerate economic progress and encourage economic growth globally. (Salamah, 2017) [8]

The ASEAN Economic Community (AEC), a significant initiative of ASEAN, intends to establish an integrated production base and single market throughout the ASEAN area. The AEC aims to facilitate free trade, investment flows, labour mobility, and harmonization of economic regulation (Winantyo *et al* ., 2008) [11]

In support of international trade, ASEAN has also established the ASEAN *Free Trade Area* (AFTA) which aims to reduce trade barriers among its members. AFTA removes or reduces import tariffs between member countries, improves market access, and encourages intra-ASEAN trade growth. Ummaya *et al* ., 2023) [10]

In international trade, exchange rates are very important macroeconomic variables, because exchange rates can affect a country's economy The stronger the exchange rate of ASEAN countries against the US dollar, the better the economy of ASEAN countries. Vice versa, when the exchange rate of ASEAN countries depreciates, the economy of ASEAN countries will get worse. A stable exchange rate is necessary for the creation of a conducive climate for all economic activities. (Pridayanti, 2014) [7]

One of the factors that hinder the current occurrence of international trade is COVID-19.

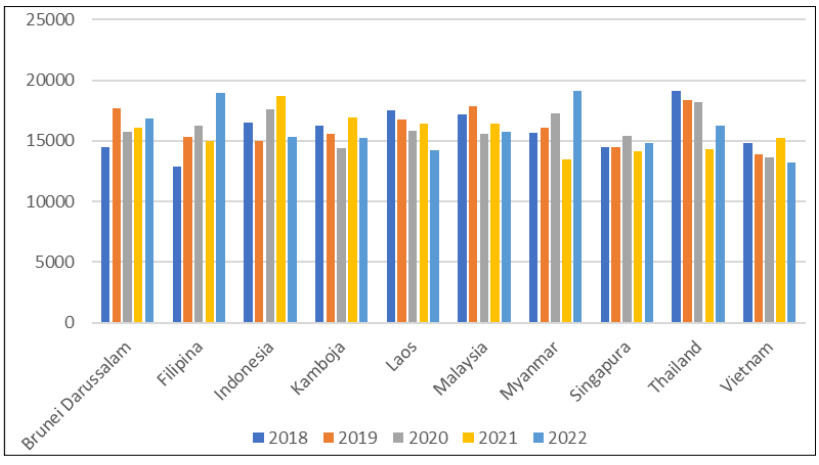

Fig 1: ASEAN Exchange Rates 2018-2022

Figure 1 shows the exchange rates of ASEAN Countries from 2018 to 2022. In 2018 and 2019, Indonesia, Malaysia, Singapore, Thailand, the Philippines, Brunei Darussalam, Vietnam, Laos, Myanmar and Cambodia had different exchange rate fluctuations with no COVID-19 cases.

In 2020, COVID-19 emerged so that the exchange rates of several countries depreciated, including Brunei Darussalam, Cambodia, Laos, Vietnam, Indonesia and Malaysia. In 2021, several countries began to recover with the appreciation of the exchange rates of several countries, such as Brunei Darussalam, Indonesia, Cambodia, Laos, Malaysia and Vietnam. In 2022, several countries have begun to recover with the appreciation of currency exchange rates, one of which is the Philippines. However, COVID-19 still has an impact on exchange rates. in (Nurjanah &; Anwar, 2021) [6] its research stated that a 1% increase in COVID-19 cases led to the depreciation of the Rupiah against the US Dollar by 0.02%. Based on the results of the study, exchange rates tend to fluctuate during COVID-19. In addition, Changes in the currency rates of the ASEAN-5 countries are significantly impacted by Covid-19. (Indonesia, Malaysia, the Philippines, Singapore and Thailand). Hasian (2021) [3]

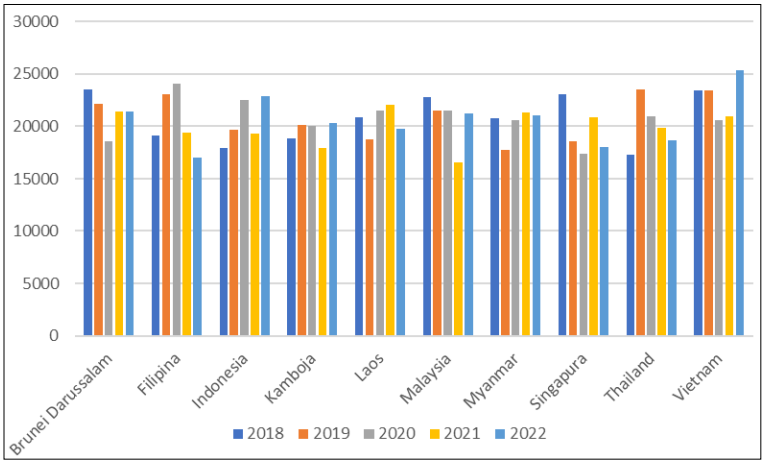

Fig 2: ASEAN Export Fluctuations (million US$) for 2018-2022

Figure 2 shows the value of exports in the 10 ASEAN countries from 2018 to 2022. In 2018 and 2019, Indonesia, Malaysia, Singapore, Thailand, the Philippines, Brunei Darussalam, Vietnam, Laos, Myanmar, and Cambodia had different fluctuations in export values. In that year, there were no reported cases of Covid-19 in these countries. However, the situation changed in 2020 with the advent of COVID-19. On January 13, 2020, the first case of COVID-19 appeared in Thailand, resulting in a decrease in Thai exports and in several other ASEAN countries such as Brunei Darussalam, Singapore, and Vietnam. Despite this, some countries such as the Philippines, Indonesia, Laos and Myanmar showed an increase in exports. Madina &; Rikumahu, 2021) [5]

In 2021, several countries began to recover with an increase in exports. Despite this, some countries such as the Philippines, Indonesia, Cambodia, Malaysia and Thailand still show a decline in their export activities. Although the pandemic is still ongoing, handling and adaptation measures have been taken by these countries. This is reflected in the economic recovery and increased trade activity.

In 2022, data showed that exports fluctuated again. Some countries, such as Indonesia, Laos, Vietnam, Malaysia and Cambodia, showed significant increases in trade activities. However, the Covid-19 pandemic is still a factor affecting the economic situation in the region. Despite this some countries such as the Philippines, Laos, Singapore, and Thailand still show a decline in their export activities. (Saragih *et al* ., 2021) [9]

Fluctuations in export value are not only influenced by the COVID-19 pandemic, but also by other factors that can have an impact on the global economy. Some of these other factors include changes in commodity prices, trade policies, political stability, and the state of the domestic economy of each country.

The import activities in ASEAN countries can be seen in the following picture.

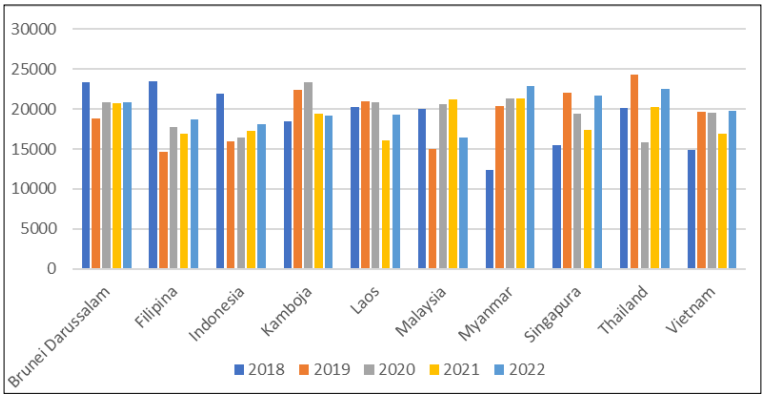

Fig 3: Import Fluctuations of ASEAN Countries (MILLION US$) for 2018-2022

Figure 3 shows import data in ASEAN countries from 2018 to 2022. In 2018 and 2019, ASEAN countries had different fluctuations in import values. At the time, there were no reported cases of COVID-19 in the country. On January 13, 2020, the first case of COVID-19 appeared in Thailand, resulting in a decrease in imports in the country due to travel restriction policies.

In 2021, several countries began to recover with an increase in imports. Although there are several countries that still experience a decline in import activities such as Brunei Darussalam, the Philippines, Cambodia, Laos, Singapore, and Vietnam. Although the pandemic is still ongoing, handling and adaptation measures have been taken by these countries. This is reflected in the economic recovery and increased trade activity.

In 2022, data shows that imports have fluctuated again. Some countries, such as Singapore, Cambodia and Malaysia still show a decline in import activities. While some countries such as the Philippines, Laos, Indonesia, Thailand and Vietnam showed a significant increase in import activities. However, the Covid-19 pandemic is still a factor affecting the economic situation in the region.

Overall, data on imports, exports, and Covid-19 cases in that time frame showed a significant impact on trade activities in Southeast Asian countries. The Covid-19 pandemic has affected the economic and health sectors, but some countries have managed to adapt and recover from the impact. (Darmastuti *et al* ., 2021) [2]

The diverse findings of research results that examine the relationship between COVID-19, exchange rates, exports, and imports encourage researchers to look more at conducting this research, especially on the impact of C0VID-19 in mediating the effect of exchange rates on exports and imports in ASEAN countries.

This study aims to examine the direct impact of currency rates and COVID-19 on exports in ASEAN nations. Examine the impact of COVID-19 on imports in ASEAN nations, as well as the direct effects of the virus and exchange rates on exports. Additionally, examine the role that COVID-19 plays in mediating the impact of exchange rates on imports in ASEAN countries.

Research Methods

There were quantitative data kinds in this investigation. Ten ASEAN nations are included in the panel data, which is a quantitative set of data that spans the years 2019–2022. The ASEANStatDataPortal website and the Central Bureau of Statistics website are the sources of the data. Secondary data from the ASEANStatDataPortal and the Indonesian Central Bureau of Statistics websites were used in this investigation. Panel data were employed as the study's data source. claims that panel data (Damodar, 2013) [1] or also called Cross-sectional data and time series are combined to create longitudinal data. Panel data were employed as the study's data source. claims that panel data, also known as mixed data, is a mixture of cross section*and* time series *data.* Time series data is information gathered over time against a single person, whereas cross section data is information gathered all at once against numerous individuals.

Results of Research And Discussion

Research Results

Panel Data Regression Results

Panel data regression has several stages to choose the best model to use, including the *Chow test*, Hausman *test, and* Lagrange Multiplier *test*. The stages for the selection of the best model are as follows.

Table 1: Best Model Selection

Probability				
Type	**Test *Chow***	**Hausman Test**	**Lagrange Multiplier *Test***	**Result**
Model (1)	0.1126	-	0.3629	CEM
Model (2)	0.0740	-	0.2336	CEM
Model (3)	0.0000	0.0000	-	FEM
Model (4)	0.0000	0.0000	-	FEM

The parameter coefficients for this investigation were obtained using the panel data regression model. Following the completion of the four models' testing phases, the top model was chosen, as indicated in Table 1. Given that model 1's Chow test findings (CEM and FEM) indicate p-value < a significance level of 5% of 0.1126 > 0.05, meaning Ha is rejected and H0 is accepted, it can be said that CEM was the model of choice. Next, the Breusch Pagan Lagrange Multiplier (CEM and REM) results revealed p-values > significance levels of 0.3629 > 0.05, indicating that H0 is accepted, and it was determined that the CEM model was the one selected. Model selection for model 2, Chow test results (CEM and FEM) show p-value < 5% significance level of 0.0740 > 0.05 which means H0 is accepted and Ha is rejected, it can be concluded that the selected model is CEM. Then the *results of the Breusch Pagan Lagrange Multiplier* (CEM and REM) showed p-values > significance levels of 0.2336 > 0.05 which means H0 is accepted, and concluded the chosen model is CEM. As for models 3 and 4, the results of the *Chow test* (CEM and FEM) show p-values < a significance level of 5% of 0.0000 < 0.05 which means H0 is rejected and Ha is accepted, so it can be concluded that the model chosen is FEM. Then the results of the Hausman test (REM and FEM) showed a p-value > a significance level of 0.0000 < 0.05 which means Ha is accepted, and it was concluded that the model chosen was FEM.

Regression results in model (1) which tested the effect of COVID-19 (DC) and Exchange Rate (NT) on Exports (EXP), obtained panel regression results as follows:

Table 2: Model Panel Data Regression Results (1)

Variable	Coefficient	ONE	t-stat	Probability
DC	-133.6638	228.3082	-0.585453	0.0005
NT	-0.000147	0.014553	-0.010119	0.0009
C	19297.36	192.0632	140.9516	0.0000
R-Squared	0.203575			
Adj. R-Squared	-0.202773			
F-Stat	0.000554			
Prob (F-stat)	0.001222			
Equation : $EXP_{it} = \alpha_0 + \alpha_2 DC_{it} + \alpha_2 NT_{it} \varepsilon_{2it}$				

Table 2 shows that the P value for the constant is less than the 5% significance level, indicating that the constant has an effect on EXP. If the COVID-19 (DC) variable is zero, the Export value is 19297.36. The DC variable has a p-value of < 0.05 with a coefficient value of -133.6638 which means

that the DC variable negatively affects EXP, meaning that when there is an increase in COVID-19 cases, exports will decrease. The NT variable has a p-value of < 0.05 with a coefficient value of -0.000147 which means that the NT variable negatively affects EXP, meaning that when the exchange rate is depreciated, exports will increase by 0.000147. The regression equation of model panel (1) is as follows.

$$EXP_{it} = 19218.21 - 133.6638DC_{it} - 0.000341NT_{it}$$

Regression results in model (2) which tested COVID-19 (DC) and Exchange Rate (NT) against imports (IMP), obtained panel regression results as follows:

Table 3: Model Panel Data Regression Results (2)

Variable	Coefficient	ONE	t-stat	Probability
DC	-166.9979	220.4678	-0.757471	0.0001
NT	0.006508	0.010757	0.605065	0.0005
C	20696.09	179.5284	115.2803	0.0000
R-Squared	0.181545			
Adj. R-Squared	0.181800			
F-Stat	14.61897			
Prob (F-stat)	0.000312			
Equation : $IMP_{it} = \alpha_0 + \alpha_2 DC_{it} + \alpha_2 NT_{it}\varepsilon_{2it}$				

Table 3 shows the P value for the constant is less than the 5% significance level, indicating that the constant has an effect on imports (IMP). If the COVID-19 (DC) variable is zero, then the import value is 20696.09. The DC variable has a p-value of < 0.05 with a coefficient value of -166.9979 which means that the DC variable negatively affects IMP, where when COVID-19 increases, the import value will decrease. The NT variable has a p-value of < 0.05 with a coefficient value of 0.006508 which means that the NT variable has a positive effect on the IMP, meaning that when the exchange rate depreciates, where imports will decrease by 0.006508. then The regression equation of the model panel (2) is as follows.

$$IMP_{it} = 20696.09 - 166.9979DC_{it} - 0.006508NT_{it}$$

Regression results in model (3) which tested the effect of COVID-19 (DC) and exports (EXP) on exchange rates (NT), obtained panel regression results as follows:

Table 4: Model Panel Data Regression Results (3)

Variable	Coefficient	ONE	t-stat	Probability
DC	-0.456793	0.046682	-9.785269	0.0036
EXP	-1.388989	0.082604	16.81496	0.0000
C	17.51648	5.946019	-2.945918	0.0000
R-Squared	0.717209			
Adj. R-Squared	0.714718			
F-Stat	287.8568			
Prob (F-stat)	0.000000			
Equation: $NT_{it} = \beta_0 + \beta_1 DC_{it} + \beta_2 EXP_{it} + \varepsilon_{1it}$				

Table 4 shows model regression results (3) of the impact of COVID-19 and exports on exchange rates. The value of the constanta is less than the significance level of 5%, which indicates that the constant has an effect on NT. If the COVID-19 (DC) and Export (EXP) variables are zero, then the COVID-19 value is 17.51648. DC and EXP variables have a p-value of < 0.05 with coefficient values of -0.456793 and -1.388989 respectively which means that these variables negatively affect the exchange rate. The regression equation of model panel (3) is as follows.

$$NT_{it} = 17.51648 - 0.456793DC_{it} - 1.388989EXP_{it}$$

Regression results in model (4) which tested the effect of COVID-19 (DC) and imports (IMP) on exchange rates (NT), obtained panel regression results as follows:

Table 4.5: Model Panel Data Regression Results (4)

Variable	Coefficient	ONE	t-stat	Probability
DC	-368.9359	1750.853	0.210718	0.0050
IMP	0.058398	0.152629	0.382617	0.0002
C	3945.309	3442.296	1.146127	0.0000
R-Squared	0.881664			
Adj. R-Squared	0.879518			
F-Stat	457.3099			
Prob (F-stat)	0.000000			
Equation: $NT_{it} = \beta_0 + \beta_1 DC_{it} + \beta_3 IMP_{it} + \varepsilon_{1it}$				

Table 4.4 shows model regression results (4) of the impact of COVID-19 and imports on exchange rates. The value of the constant is less than the significance level of 5% which indicates that the constant has an effect on NT. If the COVID-19 (DC) and Export (EXP) variables are zero, then the COVID-19 value is 3945,309. The DC variable has a p-value of < 0.05 with a coefficient value of -368.9359 which means that the variable has a negative effect on the exchange rate and EXP has a p-value of < 0.05 with a coefficient value of 0.058398 which means that the variable has a positive effect on the exchange rate. The regression equation of model panel (3) is as follows.

$$NT_{it} = 3945.309 - 368.9359DC_{it} + 0.058398EXP_{it}$$

Path Analysis

Path analysis is used in this study to be able to analyze the amount of influence given by each independent variable to the dependent variable either directly or indirectly, namely through mediation variables. Indirect influence is an analysis that states that the influence of a variable not only has a linear relationship but also has other impacts through intermediate variables. The path analysis model in this study is as follows:

Table 4.2: Path Analysis

Free Variable	Direct Influence Bound Variables			Indirect Influence	
	EXP	IMP	NT	EXP	IMP
NT	-0.000147**	0.006508**	-	-	-
DC	-133.6638**	-166.9979**	-0.456797**	-0.63448601	-0.02667603

** Significant at 5 percent alpha level

The analysis of the paths formed on the basis of Table 4.2 can be shown as follows:

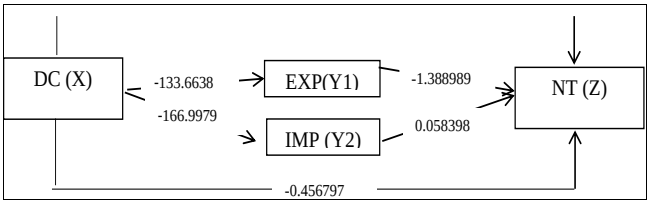

Fig 4.2: Path Analysis

Where:
DCit : Dummy COVID-19 (for i-th and t-time countries) (1-during COVID-19, 0 -before COVID-19)
EXPit: Export (for country i and time t)
IMPit: Import (for country i and time t)
NTit: Exchange Rate (for country i and time t)

Based on Figure 4.2, the model formed shows the direct influence of COVID-19 and exchange rates on exports and imports and the indirect influence of COVID-19 on exchange rates through export and import mediation. COVID-19 negatively affects exports and imports, where if COVID-19 increases, it will cause the value of exports and imports to decrease by 133.6638 and 166.9979 respectively. The exchange rate negatively affects exports, where if the exchange rate appreciates, it will cause exports to decrease by 1.388989. The exchange rate has a positive effect on imports, if the exchange rate appreciates, it will cause imports to increase by 0.058398. This is in line with research from Suryanto & Kurniati (2022) which found that the exchange rate has a negative impact on international trade, meaning that when the rupiah exchange rate appreciates against the US dollar, the value of exports decreases so that Indonesia's trade balance decreases.

COVID-19 indirectly negatively affects the exchange rate through export mediation, meaning that the impact of COVID-19 will cause the exchange rate to depreciate by 0.63448601 through a decrease in the value of exports. COVID-19 indirectly has a positive effect on the exchange rate through import mediation, meaning that the impact of COVID-19 will cause the exchange rate to appreciate by 0.63448601 through an increase in the import value.

Furthermore, a Sobel Test was carried out to see whether the exchange rate has been able to mediate COVID-19 on exports and imports in ASEAN countries. The results of the Sobel Test are as follows:

Table 4.2: Sobel Test Results

Free Variable	Sobel Test Results	Information (Significance 5 percent)
(1)	(2)	(3)
DC (EXP)	0.0009219	Significant
DC (IMP)	0.4069642	Insignificant

Based on the results of the Sobel Test, it was found that the exchange rate was able to mediate exports, but the exchange rate has not been able to mediate the indirect influence of COVID-19 on imports in ASEAN countries

Conclusion

The results of the analysis conducted in this study on the direct influence of COVID-19 and exchange rates on exports and imports in ASEAN countries, as well as the indirect influence of COVID-19 on exchange rates through export and import mediation can be concluded as follows:

1. COVID-19 has negatively affected exports and imports in ASEAN countries. This influence indicates that the emergence of COVID-19 has become one of the biggest obstacles in international trade, resulting in international travel restriction policies, which have an effect on the decline in the trade balance of ASEAN countries, due to declining export and import activities between countries.
2. The exchange rate negatively affects exports and positively affects imports. This is because when the exchange rate appreciates, the price of export products becomes more expensive for other countries, while import prices become cheaper for domestic countries, so exports will decrease and imports increase.
3. COVID-19 indirectly negatively affected the exchange rate through export mediation, positively affected the exchange rate through import mediation.

The exchange rate has been able to mediate exports in ASEAN countries, but the exchange rate has not been able to mediate the indirect influence of COVID-19 on imports in ASEAN countries

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