

THE EFFECT OF EXCHANGE RATE VOLATILITY ON ENTRANCE AND EXIT FOR FOREIGN TOURISTS BEFORE AND AFTER COVID-19 IN INDONESIA

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ABSTRACT

The research aimed determine the rupiah exchange rate for foreign tourists and its effect on gross domestic product (GDP), before and after Covid-19. Data includes tourist visits, exchange rates, purchasing power and gross regional domestic product (GRDP). Data were analyzed using Ordinary Least Squares method and processed using the Eviews 12. The ARIMA model was used to compare the AIC and SC values of the Least Squares method. Test results show exchange rate volatility has had a significant impact on tourists to Indonesia, both before and after Covid-19. The empirical results of the GARCH model show that the MYR, USD, CNY and SGD exchange rates show significant volatility, and influence the number of tourist visits. The AUD exchange rate analyzed using ARIMA shows a more stable impact. The stability and predictability of the exchange rate remains an important factor in supporting the growth of the tourism in Indonesia.

Keywords: Covid-19, Exchange Rate, Gross Domestic Product, International Tourists.

INTRODUCTION

The Indonesian tourism sector is known to have various destinations such as Bali, Raja Ampat, Labuhan Bajo, Lake Toba, Mount Bromo, Borobudur Temple, and many other destinations (Bima, et al, 2020). The Covid-19 pandemic caused Indonesia's tourism sector to experience a severe blow, this impact was felt widely. The tourism sector in Indonesia has experienced a negative impact due to the Covid-19 pandemic, both in terms of domestic and foreign tourists (Riadi, 2020). The decrease in the number of trips made by foreign tourists was 28.20% when compared from 2019 to 2020. Data from Central Statistics Agency (BPS) namely from 722.16 million trips to 518.59 million trips (BPS, 2021a). The number of visits by foreign tourists also decreased drastically, namely by 53.36% in January - May 2020 and 88.80% in June 2020 compared to the same period in 2019 (BPS, 2020a). In 2021, the decline in tourist visits will continue, namely 61.82% in January - November 2021 compared to January - November 2020 (BPS, 2021b). However, there was an increase in the number of foreign tourists by 3.06% in November 2021 compared to October 2021 (BPS, 2021b). According to the 2020 Tourism Trends and Policies report from the Organization for

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Economic Co-Operation and Development (OECD), the tourism sector plays a very important role in the Indonesian economy. In 2017, its contribution reached around 536.8 trillion rupiah or around 4.10% of Indonesia's total GDP. In 2019, the contribution increased to 6.10%. The tourism sector also has a significant impact on job creation by providing jobs for around 12.7 million people, equivalent to around 10.50% of total national employment (Jauhariyah, et al. 2023). According to the Central Statistics Agency (BPS), the contribution of the tourism sector to Indonesia's Gross Domestic Product (GDP) in 2019 was 5.70%, with the number of foreign tourist visits amounting to 16.11 million. However, in 2020, the contribution of the tourism sector decreased drastically to 2.24% of GDP, with the number of foreign tourist arrivals only 4.02 million. This decline shows a decline in income from the tourism sector by 74.80% (Santika, 2023). Based on the problems above, this research was used to determine the volatility of the influence of the rupiah exchange rate on visits by foreign tourists to Indonesia, before and after the occurrence of Covid-19 and how foreign tourist visits affected GDP in Indonesia.

METHOD

The research uses Dynamic Time Series data by collecting data from 2017 to 2023. The data source comes from the Central Statistics Agency (BPS), Indonesia Bank, and if the data is insufficient, use CEIC data.

Jarque-Bera Test (Normality test)

The Jarque-Bera test is used to check whether the independent variables (Tourist Visits and Volatility) and the dependent variable (GDP) in the regression model have a normal distribution or not. The criteria used are that data is considered normally distributed if the significance value is greater than 0.05, and data is considered not normally distributed if the significance value is less than 0.05.

Multicollinearity Test

The Multicollinearity Test is used to evaluate the linear relationship between the independent variables of a regression model. Multicollinearity detection to test whether there is a correlation between independent variables in a multiple regression model. Multicollinearity problems can make it difficult to understand the influence of explanatory variables on the variables being explained.

The autocorrelation test

The autocorrelation test is used to evaluate the relationship between errors in the current period (t) and errors in the previous period (t-1) in a linear regression model. In the LM test, a comparison is made between the ObsR-squared value and the χ^2 (chi-squared) value in the probability table of 0.05. If the ObsR-squared value is greater than the value in the χ^2 table with a probability of 0.05, then the model has an autocorrelation problem. Conversely, if the ObsR-squared value is smaller than the value in the χ^2 table with a probability of 0.05, then the model is considered not to experience an autocorrelation problem.

Arima Models

Identification of AR (Autoregressive) and MA (Moving Average) models on time series data can be done via correlograms. Correlograms, or Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) plots, are used to identify the order of the AR and MA components in the ARIMA model. Through correlogram analysis, for forecasting steps and volatility analysis.

Regression Analysis Model

Regression analysis in this research uses the OLS (Ordinary Least Square) method which is processed with the Eviews 12 program. d. exchange rate log return volatility using the best identified ARCH-GARCH model.

RESULTS

Jarque-Bera Test (Normality test)

The normality test uses Jarque-Bera statistical analysis using the Fixed Effect Model approach, with results as in **Figure 1**.

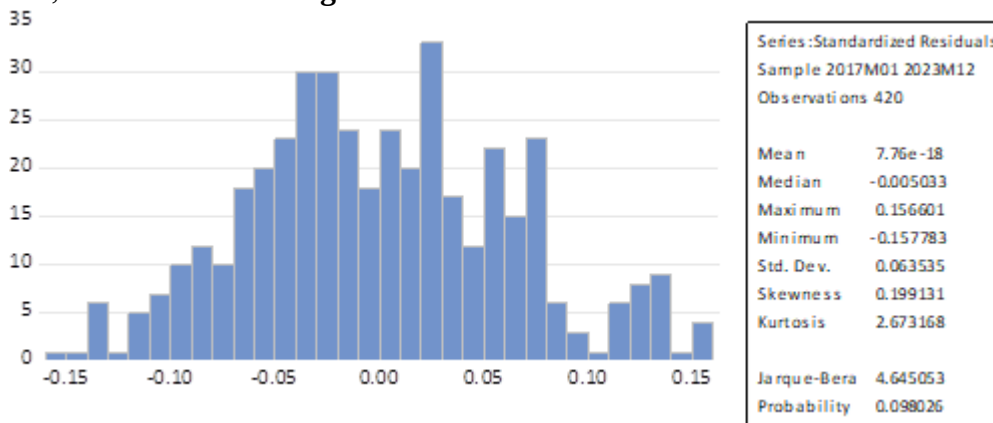


Figure 1. Result Normality test

Based on the results of the normality test table, the probability value of the regression equation has a value of 0.098 which is greater than $\alpha = 0.05$ percent, so it can be concluded that the data is normally distributed. Detection of multicollinearity in the model can be done one way by looking at the correlation value between independent variables. If the correlation value between variables is less than 0.8, it is said that the model is free from multicollinearity problems. On the other hand, if the correlation value between variables shows more than 0.8, then it is said that there is a multicollinearity problem in the research model.

Table 1. Multicollinearity test

	Kurs	Visitors
Kurs	1.000.000	-0.1818059
Visitors	-0.180588	1.000.000

Based on the table of multicollinearity test results showing that the correlation value between the independent variables is smaller than 0.8, it is concluded that this research does

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not have a multicollinearity problem between the independent variables. According to (Ghozali, 2013) to detect the presence or absence of heteroscedasticity is to carry out the Glejser test. The Glejser test proposes to regress the absolute value of the residual against the independent variable. Probability results are said to be significant if the significance value is above the confidence level of 5% or 0.05. The following is a table of heteroscedasticity test results using the Glejser test.

Table 2. Heteroscedasticity Test with Glejser

Dependent Variable: ABS_RESID

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-256133.7	96182.66	-2.662992	0.0080
KURS	22.46515	10.70525	2.098518	0.0365
LOG_VISITORS	20013.09	2644.251	7.568528	0.0000

From the Glejser test it is known that the independent variable used does not have a significant effect on the dependent variable, namely absolute error. This can be seen from the significance level of the independent variable studied, where the significance level of the independent variable is 0.000 or no greater than 5% or 0.05. So it can be concluded that there is no heteroscedasticity in this research.

Autocorrelation test

Autocorrelation test to test a linear regression model, there is a correlation between confounding errors in period t and errors in period $t-1$, by carrying out the Durbin-Watson (DW) test from the Ordinary Least Square (OLS) method residuals. The DW test is a way to detect whether there is autocorrelation in research (Fitriani, 2022). Based on the regression model used in this research, it is known that the DW value has a significance level (error) of 5% ($\alpha = 0.05$) with the number of independent variables ($k = 2$). The number of samples ($n = 420$) was 0.1044. So based on the dL value = 1.83507 and the dU value = 1.84461 as well as the $4-dL$ value = 2.2089 and the $4-dU$ value = 2.1995, it is included in the positive autocorrelation criteria because the DW value is smaller than 1.83507.

F test

The F test is used to show whether all the independent variables entered have a joint or simultaneous influence on the dependent variable. Following are the results of the F test in Table 3.

Table 3. F Test Results on the Fixed Effect Model

Root MSE	174901.9	R-squared	0.198803
Mean dependent var	2755094.	Adjusted R-squared	0.187164
S.D. dependent var	195633.2	S.E. of regression	176377.9
Akaike info criterion	27.01517	Sum squared resid	1.28E+13
Schwarz criterion	27.08251	Log likelihood	-5666.186
Hannan-Quinn criter.	27.04179	F-statistic	17.07982
Durbin-Watson stat	0.104448	Prob(F-statistic)	0.000000

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Based on the results of the panel data test using the Fixed Effect Model which produces an Fcount value of 17.07982 with an F table of 2.85, it can be concluded that all independent variables have a simultaneous effect on the dependent variable.

Descriptive Statistics of Gross Domestic Product

Gross domestic gross descriptive statistics can be seen in **Figure 2**

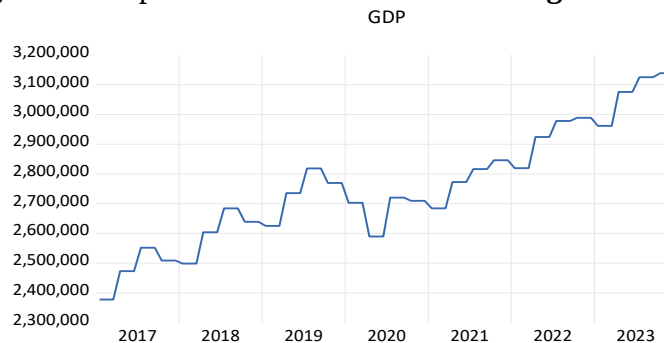


Figure 2. Indonesia Gross domestic bruto 2017 – 2023.

Based on this chart, overall there is an increasing trend in Indonesia's GDP during this period. This means that the Indonesian economy is experiencing positive growth. There are fluctuations in the graph, especially in 2020. The sharp decline in that year is likely related to the impact of the Covid-19 pandemic which affected many economic sectors. However, after this period, GDP recovered and continued to increase until 2023.

Arima test models

The results of the Correlogram for each exchange rate are as follows:

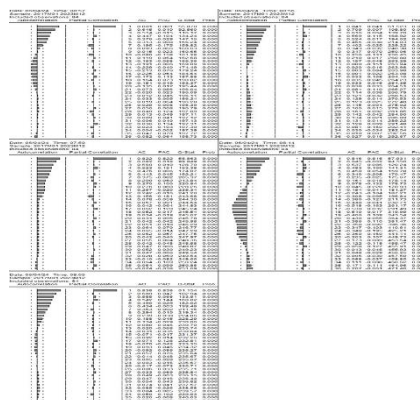


Figure 3. Exchange Correlogram

Based on the results of the correlogram analysis, we can interpret that the ACF which intersects the interval line at lag 1 shows a significant correlation at lag 1. This means that observations at time t are correlated with observations at time $t-1$. Meanwhile, PACF which cuts the interval line at lag 1 shows that only lag 1 makes a significant contribution after controlling for the other lags. This determines the order of the AR (Auto Regressive) components in the ARIMA model.

ARCH-GARCH estimation model

The ARCH-GARCH estimation model is identified by temporary estimation, namely the GARCH (1.0) and GARCH (1.1) models.

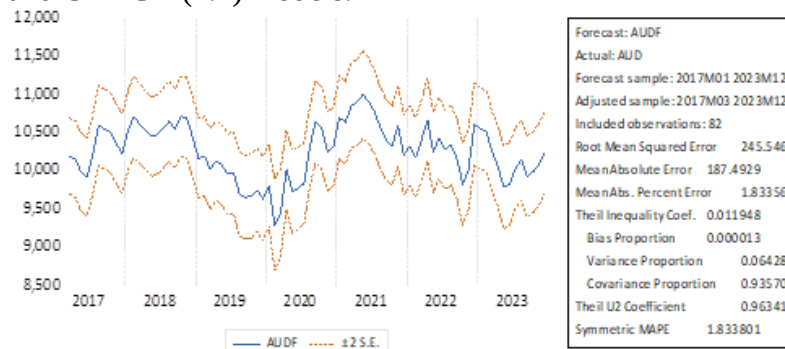


Figure 4. Forecasting the AUD Exchange Rate against IDR

Analysis of the results of forecasting the AUD exchange rate against IDR shows that the model performance has a measurable error rate, especially when compared with the results of previous analyzes namely CNY-IDR, USD-IDR, SGD - IDR, MYR - IDR. The Mean Absolute Error (MAE) value is 245.5462 and the Root Mean Squared Error (RMSE) is 187.4929 indicating a relatively high level of error in predicting exchange rate changes. Likewise, the Mean Absolute Percentage Error (MAPE) is 1.833560, which shows the relative error of the prediction in percentage of the actual value. Additional performance indicators such as the Theil Inequality Coefficient of 0.011948 and Variance Proportion of 0.064286 indicate that this model may be less reliable in predicting AUD against IDR exchange rate movements, especially considering the high variation observed in the actual data. Following the Covid-19 pandemic, global tourism patterns have experienced drastic changes due to travel restrictions and global economic uncertainty. However, the exchange rate has again become an important factor as global conditions recover. According to (Puarattanaarunkorn's, 2021) research findings show that the pandemic caused increased volatility in the tourism sector, but the impact was not significant in the long term. Recent research by (Ortiz, 2023) shows that supportive economic policies can help overcome the negative impact of currency depreciation on tourism. Tourists from countries with depreciating currencies may prefer cheaper destinations, so Indonesia can attract more tourists with the right promotional strategies.

DISCUSSION

Explanation of Discussion 1

Previous research results show that exchange rates and their volatility have different influences on tourist arrivals depending on global economic conditions. Research (Dincer, et al, 2015) found that there is no long-term relationship between REER and tourism income, but volatility remains an important factor. The results of other research (Caiado, 2023 & Thi, 2023) using the ARCH/GARCH method show that exchange rate volatility can have an impact on tourists' decisions, but the impact can vary depending on market conditions and the policies implemented.

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Explanation of Discussion 2

The exchange rate forecasting model used in this research shows that the exchange rate remains an important factor in tourism, both before and after Covid-19. For example, the GARCH (1,1) model for MYR, USD, and CNY exchange rates shows the ability to capture significant volatility, indicating that exchange rate fluctuations can influence tourist flows. Likewise with the SGD exchange rate with the GARCH (1.0) model, although the fluctuations in the SGD exchange rate are not as strong as those in several other currencies. Research by (Moraghen, 2023 & Manaliyo, 2022) shows that exchange rate volatility has varying impacts depending on the market context and economic policies implemented.

CONCLUSION

The conclusion of this research confirms that exchange rate volatility has a significant impact on foreign tourist visits to Indonesia, both before and after the Covid-19 pandemic. Empirical results from the GARCH model show that the MYR, USD, CNY, and SGD exchange rates display significant volatility, which directly influences the number of tourist arrivals from these countries. In contrast, the AUD exchange rate analyzed using the ARIMA model shows a more stable impact. Tourism has a significant impact on Indonesia's Gross Domestic Product (GDP). The test uses the F test and t test which shows that the tourist visit variable has a significant influence on GDP. The stability and predictability of the exchange rate remains a crucial factor in supporting the growth of the tourism sector in Indonesia.

REFERENCES

- Bima, A. P., Jofari, H. A., & Chandra, E. P. 2020. Tantangan Indonesia Dalam Penataan Pariwisata Super Prioritas Dalam Persaingan Global. Prosiding Simposium Nasional "Tantangan Penyelenggaraan Pemerintahan di Era Revolusi Industri 4. O", 1551-1570.
<https://www.bps.go.id/id/publication/2022/09/29/63fea546c28b8eb2c3c71004/statistik-wisatawan-nusantara-2021.html>
<https://www.bps.go.id/id/publication/2021/12/14/fab1c19a78b537d19ced25db/statistik-wisatawan-nusantara-2021.html>
- Jauhariyah, N. A., Syafa'at, A. M., & Khusnudin, I. 2023. Analisis Potret Pertumbuhan Kunjungan Wisatawan Terhadap Pendapatan Asli Daerah Di Kabupaten Banyuwangi. Sifebri's, 1(1), 156-162.
- Santika, I. Z., Wibowo, A., & Lestari, E. (2023). Masalah dan Tantangan Desa Wisata Pasca Pandemi Covid-19: Studi Kasus Embung Pengantin Kecamatan Mojolaban. Sadar Wisata: Jurnal Pariwisata, 6(2), 52-61.
- Ghozali, I., Haris, A., & Najmudin, N. (2022). Indicators of financial distress condition in Indonesian banking industry. Accounting, 8(1), 27-36.
- Fitriani, R., Darmanto, D., & Pusediktasari, Z. F. (2022). A dynamic-time dependent spatial autocorrelation detection for East Java's Covid-19 regional percent of cases, March 2020-March 2021 (Indonesia). Regional Statistics, 12(3), 18-53.
- Puarattanaarunkorn, O., Autchariyapanitkul, K., & Kiatmanaroach, T. (2023). An analysis of dependency of stock markets after unlimited QE announcements during COVID-19 pandemic. Asian Journal of Economics and Banking, 7(3), 310-332.

Proceeding 2nd Medan International Economics and Business

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“Human Resource Transformation and Collaborative Innovation to Build Independent and Competitive Business in the Digital Era”

- Reivan-Ortiz, G. G., Cong, P. T., Wong, W. K., Ali, A., Thu, H. T. T., & Akhter, S. (2023). Role of geopolitical risk, currency fluctuation, and economic policy on tourist arrivals: temporal analysis of BRICS economies. *Environmental Science and Pollution Research*, 30(32), 78339-78352.
- Dincer, M. Z., Dincer, F. I., & Ustaoglu, M. 2015. Reel effective exchange rate volatilities impact on tourism sector in Turkey: An empirical analysis of 2003-2014. *Procedia economics and finance*, 23, 1000-1008.
- Caiado, J., & Lúcio, F. (2023). Stock market forecasting accuracy of asymmetric GARCH models during the COVID-19 pandemic. *The North American Journal of Economics and Finance*, 68, 101971.
- Thi, T. D. P., Do, H. D., Paramaiah, C., Duong, N. T., & Shamansurova, Z. (2023). Sustainable economic performance and natural resource price volatility in the post-covid-pandemic: Evidence using GARCH models in Chinese context. *Resources Policy*, 86, 104138.
- Moraghen, W., Seetanah, B., & Sookia, N. U. H. (2023). The impact of exchange rate and exchange rate volatility on Mauritius foreign direct investment: A sector-wise analysis. *International Journal of Finance & Economics*, 28(1), 208-224.
- Manaliyo, J. C. (2022). An assessment of the effects of political risk and exchange rate on the tourist inflows to South Africa using time series data and the ARDL model. *Artha Journal of Social Sciences*, 21(4).
- Riadil, I. G. (2020). Tourism industry crisis and its impacts: investigating the Indonesian tourism employees perspectives' in the pandemic of COVID-19. *Jurnal Kepariwisata: Destinasi, Hospitalitas Dan Perjalanan*, 4(2), 98-108.