

Original Article

Beyond Oil Prices: Import Dependency and Macroeconomic Fundamentals as Drivers of Exchange Rate Stability in Indonesia

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ABSTRACT: *Exchange rate stability is a key pillar of macroeconomic resilience in emerging economies, particularly those with growing dependence on imported energy. Despite extensive research on the relationship between energy and exchange rates, previous studies have predominantly emphasized oil price shocks while paying limited attention to the structural vulnerability arising from energy import dependence. This paper fills these gaps by analyzing the EIDR effect on the rupiah exchange rate in Indonesia during 1996–2023, with economic growth, trade openness, as well as foreign direct investment (FDI) included in the model. The data were annual, collected from the World Development Indicators (World Bank), and analyzed using Ordinary Least Squares (OLS) by means of a series of classical diagnostic tests. The findings demonstrate that exchange rate dynamics in Indonesia are predominantly influenced by domestic economic fundamentals and the systemic reliance of the Indonesian economy on imported energy. Higher EIDR gives a positive and statistically significant influence on the Rupiah exchange rate, meaning stronger depreciation pressures will occur as foreign currency demand increases for energy imports, intermediate goods and capital goods. Conversely, the appreciation of exchange rates is primarily driven by economic growth and trade openness through better external balances that give rise to greater foreign currency receipts. We also find that FDI has no direct statistically significant impact, implying the importance of indirect effects through improved productive capacity and competitiveness in a long-memory context, as this type of capital flow is not necessarily an immediate foreign exchange inflow. These findings emphasize that attracting foreign investment is not sufficient to stabilize exchange rates. Policies should focus on lowering reliance on imported energy, speeding up the growth of industrial downstreams and high-value-added manufactured export ventures while enhancing domestic-industry-FDI linkages. This paper makes a contribution to the literature by introducing the Energy Import Dependency Ratio as a structural forms of external vulnerability that give more explanation of the dynamics of the exchange rate by using a conventional oil price channel appropriate for energy-importing emerging economies.*

KEYWORDS: *Energy Import Dependency; Exchange Rate; Trade Openness; Economic Growth; Foreign Direct Investment.*

JEL CLASSIFICATION: F31, F21, F14, Q43

1. INTRODUCTION

Stability of the exchange rate is among a small set of macroeconomic conditions that make for resilience, particularly so in developing countries which still rely heavily on external trade and imports of strategic goods. Recent decades have seen the energy landscape evolve and become more globalized, with increased oil price volatility; geopolitical uncertainties that are both immediate (Russian incursion into Ukraine) and much longer-term in scope, such as US-China relations; and finally significant disruptions to international supply chains. Whereas exchange rate movements used to be largely understood as a byproduct of monetary policy, interest differentials, or international capital flows, this global economic backdrop suggests energy resilience has become one of the primary factors that now ultimately determines whether a country can remain stable currency-wise. For energy import-dependent countries, this creates a double whammy risk: not only do they need to spare more foreign exchange for financing imports, but they also become even more susceptible to global price volatility. These conditions imply that exchange rate depreciation is no longer a mere vestige of financial market behaviour, but also evidence for weak structural resilience in the domestic energy sector (International Energy Agency 2024). The relationship between the energy sector and the exchange rate has long been a focus of attention in the international economic literature. Amano and Van Norden (1998) demonstrated that changes in oil prices have a long-term relationship with the real exchange rate because rising energy prices increase the foreign exchange needs of oil-importing countries. Furthermore, Chen and Chen (2007) found that this relationship is much stronger in net oil-importing countries, as rising import costs directly worsen the trade balance and increase pressure on the domestic currency. More recent evidence indicates that after Indonesia transitioned to net oil importer status, oil-specific demand shocks became a key determinant of the rupiah's depreciation, whereas their impact was relatively minor when Indonesia was still an oil-exporting country. These findings suggest that changes in energy structure can alter the transmission mechanism of external shocks on exchange rate stability.

Nevertheless, most previous studies still treat global oil prices as the primary indicator of the energy sector. While this approach can explain the impact of commodity price changes on the exchange rate, it does not fully capture a country's structural vulnerability to its reliance on foreign energy supplies. Two countries may face the same international oil prices but have different levels of exchange rate risk if their import dependency levels differ. Thus, the vulnerability of the exchange rate is determined not only by how high global oil prices are but also by the extent to which domestic energy needs depend on imports. This view differentiates EIDR as a more accurate variable to describe the energy sector and exchange rate stability from international oil price indicators alone.

Since the late 1990s, Indonesia has witnessed a spectrum of changes that transformed it from an oil-exporting nation into one which was increasingly becoming a net oil importer due to a fall in domestic production failing to match booming energy consumption. This structural shift has caused the foreign exchange requirements to finance energy imports to rise significantly, making the national economy increasingly sensitive to fluctuations in energy prices and changes in the exchange rate. Consequently, the stability of the rupiah is no longer influenced solely by monetary factors but is increasingly determined by Indonesia's ability to meet its energy needs through domestic production. The trends in the rupiah's exchange rate against the dollar and the energy import dependency ratio from 1996 to 2023 are shown in Figure 1.

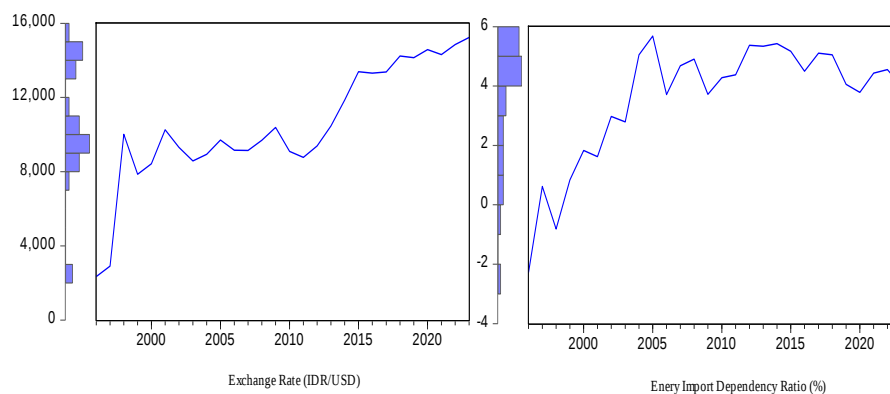


FIGURE 1 Trends in the Exchange Rate of the Rupiah Against the U.S. Dollar and the Energy Import Dependency Ratio, 1996–2023
Source: World Development Indicators (World Bank)

This phenomenon can clearly be seen in Figure 1, where the evolution of the Rupiah exchange rate to USD and Indonesia's energy import dependency ratio during the period 1996–2023 are depicted. In the 1997–1998 Asian financial crisis, as demonstrated in this graph, the Rupiah experienced a dramatic depreciation of post-crisis exchange rates, skyrocketing from approximately Rp2.300 per US\$ to over Rp15.000perUS\$. The economy recovered after the crisis period; however, it never regained its pre-crisis level and, since the mid-2010s, again showed a depreciation trend to Rp14,000- Rp16,000 per US\$ toward the end of the observation period. At the same time, the Energy Import Dependency Ratio has shown a consistent upward trend. This increase indicates that national energy needs are becoming increasingly dependent on foreign supplies, so that any increase in domestic energy consumption is directly followed by a rise in foreign exchange requirements to finance imports.

Figure 1 does not show that an increase in energy import dependency is always followed by a depreciation of the rupiah every year. In some periods, the exchange rate remained relatively stable even as the energy import dependency ratio increased. It indicates that the correlation between these two variables cannot be seen from a linear, mechanistic perspective it is ultimately an expression of structural turnaround in Indonesia's political economy. With energy import dependency increasing, higher demand for foreign currency becomes structural. The impact on the exchange rate is much larger in cases of external shocks, such as global oil price inflation, international financial crisis (e.g. collapse of Lehman Brothers), COVID-19 pandemic or geopolitical turmoil [4]. So, saturation level and over-trade penetration rises influence the increase of energy import dependency ratio but do not directly impact either RP or depreciation of the rupiah currency exchange rate; meanwhile, they will enhance a flux channel pathway transfer from one market condition to another via external shocks. This interpretation is infinitely more significant than simply observing the statistical correlation between metrics, as it narrates what high energy structure variations postulate in terms of long-term macroeconomic risks.

As the balance of payments theory states that demand and supply for foreign currency determine e-rates. A rise in imports, especially energy ones raises the demand for foreign currency necessary to pay off international transactions. Unless this increase in imports is balanced by enough growth of exports or capital inflows, the pressures on domestic currency to depreciate will grow (Krugman; Obstfeld & Melitz 2018). This mechanism could be understood through the Mundell–Fleming Model which describes that for an open economy, and due to a growing demand of imports leading to deterioration in current account balance position and thus exerting downward pressure on exchange rate especially for developing nations heavily

reliant upon strategic commodity imports (Mundell, 1963; Fleming 1962). It follows, then the greater with import dependency in energy supply, the larger foreign currency requirements for continuing domestic economic activity.

This is compounded by the industrial structure of Indonesia, which still relies heavily on raw material goods, capital goods and energy imports. From 1996 to 2023, the growth in that industry was primarily based on outsourcing production inputs from overseas; therefore, increases in economic activity often came with an upsurge of imported goods. Nopiana et al. (2022) show that the depreciation of the rupiah raises import prices for raw materials, which then disrupts efficiency in domestic industries and reduces profitability. Machmud (2020) also presented similar findings, arguing that: “The structure of Indonesia's imports continues to be dominated by industrial raw materials and capital goods. Thus, the depreciation of the rupiah not only raises import costs but also increases national production costs, thus lowering industrial competitiveness; in other words, it adds supply-side inflation pressures. These facts imply that high dependency on imports does not only represent greater international commerce, but also illustrates the bottleneck for domestic production capability in satisfying national industrial requirements. Exchange rate dynamics are not solely influenced by increasing dependence on energy imports. Economic literature indicates that exchange rate stability is also determined by macroeconomic fundamentals, particularly economic growth, trade openness, and foreign investment flows. Therefore, to provide a more comprehensive picture of changes in Indonesia's economic fundamentals during the study period, Figure 2 presents the developments of these three indicators.

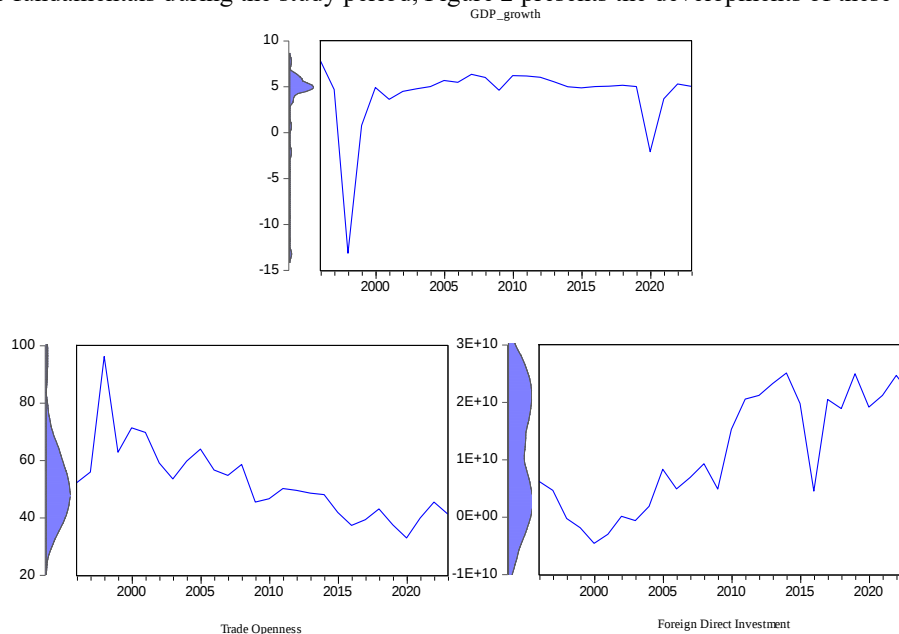


FIGURE 2 Trend of Economic Growth, Trade Openness, and Foreign Direct Investment in Indonesia, 1996–2023

Source: *World Development Indicators* (World Bank)

Figure 2 shows that the three macroeconomic indicators exhibited different trends during the study period. Economic growth contracted sharply during the 1998 Asian financial crisis and weakened again during the 2020 COVID-19 pandemic before recovering in the subsequent period. In contrast, trade openness showed a gradual downward trend after peaking in the early 2000s, while Foreign Direct Investment (FDI) flows tended to increase over the long term despite fluctuations caused by various global shocks. These patterns indicate that Indonesia's macroeconomic fundamentals continued to undergo structural changes throughout the study period.

Theoretically, these three indicators should strengthen macroeconomic fundamentals and support exchange rate stability. However, the facts show that the rupiah has continued to trend toward depreciation over the long term. One of the most rational explanations is that the benefits of economic growth, foreign investment, and international trade have not been fully able to offset Indonesia's increasing dependence on energy imports and production inputs from abroad. Thus, the stability of Indonesia's exchange rate is determined not only by the strength of macroeconomic fundamentals but also by structural changes in the energy sector, which have so far received relatively little attention in the empirical literature.

Although the relationship between the energy sector and the exchange rate has long been a focus of attention in the international economic literature, there is still no consensus on the factors that most determine exchange rate vulnerability in energy-importing countries. Most studies identify oil price shocks as the primary determinant of exchange rate volatility because rising energy prices increase import costs, worsen the trade balance, and drive up demand for foreign currency (Amano & Van Norden, 1998; Chen & Chen, 2007). As Indonesia has transformed into a net oil importer, the impact of oil-specific demand shocks on the depreciation of the rupiah has become increasingly pronounced. This indicates that changes in the

energy structure have increased the vulnerability of the exchange rate. An approach that relies solely on oil prices still has conceptual limitations. Oil prices represent external shocks but do not reflect a country's level of dependence on imported energy. Indeed, countries with equal oil prices but differing amounts of energy domestically produced will have unequal exchange rate pressures. Thus, Energy Import Dependency Ratio (EIDR) is a more suitable indicator for typifying an economy's structural basic orientation regarding energy shocks than oil prices separated from practices too (International Energy Agency 2024). More dependence on energy imports means that foreign currency is more stressed to sustain economic activity; the exchange rate will become even more sensitive as well.

Conversely, it has been documented in the literature that macroeconomic fundamentals are important determinants of exchange rate stability. The Balassa–Samuelson hypothesis states that economic growth leads to higher productivity and improves competitiveness, which means a stronger real exchange rate (Balassa 1964; Samuelson 1964). International trade theory also finds that through the efficiency of international expansion firms can improve their output and exports via openness (Frankel & Romer, 1999). Provided that, this is not always the case with countries that remain dependent on imported energy, raw materials, or Capital Goods. As such, Rodrik (2008) argues that trade openness benefits are dominantly shaped by a nation's trading structure; Romelli et al. These remnants establish a direct link to the core finding that the effectiveness of trade openness influencing exchange rate stability is conditional on non-reserved industry activities being able to earn foreign currency through exports (Romer 1993, Keefe & Saha 2022).

In Indonesia, although economic growth, foreign investment, and trade integration have continued to increase over the past two decades, the rupiah has nevertheless shown a long-term weakening trend. This situation indicates that the strengthening of macroeconomic fundamentals has not yet been fully able to offset the increasing dependence on energy imports and production inputs from abroad. Thus, the stability of Indonesia's exchange rate is determined not only by macroeconomic performance but also by structural changes in the energy sector that are driving a sustained increase in demand for foreign exchange.

According to the Eclectic Paradigm, foreign investment decisions are more influenced by ownership, location, and internalization advantages than by short-term exchange rate fluctuations (Dunning, 1988). In line with this, Narayan et al. (2022) show that FDI flows are determined more by market size, institutional quality, and trade policies than by changes in nominal exchange rates. In the case of Indonesia, the dominance of foreign investment in the manufacturing, mining, and energy sectors means that a significant portion of the foreign exchange inflows is reinvested to finance imports of machinery, technology, and raw materials. Consequently, FDI's contribution to exchange rate stability occurs primarily indirectly through increased production capacity and economic competitiveness.

This literature synthesis indicates that the main debate is no longer whether energy, trade, economic growth, or foreign investment affects the exchange rate, but rather how the interaction of these factors shapes exchange rate vulnerability in countries undergoing energy transition. However, most studies still use global oil prices as a proxy for the energy sector and analyze each factor separately. This approach has not yet been able to explain how energy import dependence interacts with macroeconomic fundamentals in influencing exchange rate stability. Furthermore, empirical evidence regarding Indonesia remains limited, even though the country's transition to becoming a net oil importer, its increasing energy dependence, and various global shocks have altered the nature of the relationship between the energy sector and the exchange rate. So, based on these phenomena, this study aims to analyze the effects of the energy import dependency ratio, economic growth, trade openness, and foreign direct investment on the stability of the Indonesian rupiah exchange rate during the period 1996–2023. The findings are expected to enrich the literature on the relationship between energy security and macroeconomic stability and provide an empirical basis for policies aimed at strengthening energy security, reducing dependence on strategic imports, and strengthening the external sector to maintain the stability of the rupiah exchange rate.

2. METHOD

This study employs a quantitative approach with an explanatory research design to analyze the effects of the energy import dependency ratio, trade openness, GDP growth, and foreign direct investment on the Indonesian rupiah exchange rate. The analysis was based on time series data for the period 1996–2023, sourced from secondary databases. This period was chosen due to the fact that during it several major economic shocks occurred: from the 1997–1998 Asian Crisis, through the 2008 Global Financial Crisis and Alexandra Kurdin / Polina Ivanova (2014) tapper tantrum in May 2013, up to COVID-19 pandemic along with global energy crisis or external factors making it possible impact on Indonesia's exchange rate dynamics as well as its' economy. All data were sourced from official records: the World Development Indicators (World Bank), the domestic milk price prescribed by Bank Indonesia (BI) and food prices for nutrition-level variables compiled using estimates published in reports of BI, BPS or IEA.

The dependent variable in this study is the exchange rate of the Rupiah against the U.S. Dollar (Rp/US\$), where an increase in the exchange rate indicates a depreciation of the Rupiah. The independent variables include the import dependency ratio (IDR) as an indicator of energy import dependence; Trade Openness (TO), measured by the ratio of total exports and imports to GDP;

GDP Growth (GDPG) as an indicator of annual real economic growth; and Foreign Direct Investment (FDI), measured based on net inflows in current U.S. dollars. The relationships among the variables were analysed using a multiple linear regression model based on annual time-series data. The empirical model of this study is formulated as follows:

$$EXCR_t = \alpha + \beta_1 IMP_DR_t + \beta_2 TO_t + \beta_3 GDP_GR_t + \beta_4 FDI_t + \varepsilon_t$$

Where EXCR is the exchange rate of the rupiah against the U.S. dollar; IMP_DR is the import dependency ratio; TO is trade openness; GDP_GR is economic growth; FDI is foreign direct investment; and while β_1 , β_2 , β_3 , β_4 represent the magnitude of the influence of the import dependency ratio, trade openness, GDP growth, and foreign direct investment on variations in the exchange rate of the Indonesian Rupiah against the U.S. Dollar, t denotes the time period (1996–2023), and ε is an error term that captures the influence of other variables not included in the model.

They also carried out an extensive suite of classical diagnostic tests to evaluate the robustness of their estimated model following conventional econometric best practices. The Jarque–Bera test was used to assess for residual normality, whereas the Breusch–Godfrey Lagrange Multiplier (LM) test evaluated serial correlation. The Breusch–Pagan–Godfrey test was used to check for the presence of heteroscedasticity, while (ii) the correlation matrix was consulted when examining multicollinearity among explanatory variables. Following standard econometric practice, we interpreted a correlation above 0.80 as suggesting potential multicollinearity. In accordance with the methodological recommendations made by Gujarati and Porter (2009) as well as Wooldridge (2016), these diagnostic procedures are crucial to check classical assumptions in order to obtain reliable, unbiased, consistent and efficient parameter estimates. After the model satisfied the diagnostic criteria, hypothesis tests were estimated using a t-test to determine isolated significance of each covariate and an F-test for joint inclusivity in predicting the regression. Lastly, the estimated coefficients were interpreted to determine both the directions and magnitude of relationships with carbon intensity per facility’s category, while the coefficient of determination (R^2) was used in order to assess how much variation in carbon intensity can be explained by the model.

3. RESULT AND DISCUSSION

3.1. RESULT

Table 1 presents the descriptive statistics for the five variables used in this study: the exchange rate of the rupiah against the U.S. dollar, the import dependency ratio, trade openness, economic growth, and foreign direct investment for the period 1996–2023.

TABLE 1 Data Statistics

	EXCR	IMP_DR	TO	GDP_GR	FDI
Mean	10609.62	3.655080	51.93846	4.157692	1.22E+10
Median	10137.24	4.404233	49.10000	5.040000	1.23E+10
Maximum	15236.88	5.687254	96.20000	7.820000	2.51E+10
Minimum	2342.296	-2.277833	33.00000	-13.13000	-4.55E+09
Std. Dev.	3318.087	2.070085	13.54743	3.988154	9.87E+09
Skewness	-0.705938	-1.478386	1.372401	-3.434439	-0.182516
Kurtosis	3.441242	4.259305	5.458363	15.00248	1.548818
Jarque-Bera	2.370426	11.18904	14.70894	207.1777	2.425775
Probability	0.305681	0.003718	0.000640	0.000000	0.297337
Sum	275850.1	95.03207	1350.400	108.1000	3.18E+11
Sum Sq. Dev.	2.75E+08	107.1313	4588.322	397.6343	2.44E+21

(Source: Processed research data (2026))

Table 1 presents the descriptive statistics for the five variables used in this study: the exchange rate of the rupiah against the U.S. dollar, the import dependency ratio, trade openness, economic growth, and foreign direct investment for the period 1996–2023. The Rupiah exchange rate had a mean of Rp10,609.62 per US\$, with a standard deviation of Rp3,318.09, indicating that the exchange rate experienced considerable fluctuations during the study period. The range between the minimum value of Rp2,342.30 per US\$ and the maximum value of Rp15,236.88 per US\$ indicates very significant changes in Indonesia’s exchange rate position. These conditions reflect that throughout the observation period, the rupiah exchange rate experienced several episodes of considerable pressure in response to changes in domestic macroeconomic conditions as well as external shocks. The large standard deviation relative to the mean also indicates that exchange rate volatility was an inherent characteristic of the Indonesian economy during the study period. Furthermore, the import dependency ratio variable has an average value of 3.66% with a standard deviation of 2.07. A peak of 5.69% means that there were certain times Indonesia relied significantly on imports for its needs, especially fuel, industrial raw materials and capital goods over the past two decades (2000–2023). Alternatively, the bottom value of –2.28% refers to durations when it was less dependent on imports compared with previous periods. This range indicates that the degree of dependence on imports here is not stable, but directly

dependent on changes in energy needs, domestic production structure and international trade dynamics. Yet, the persistence of this average above zero points out that import dependence is an important feature in the Indonesian economy.

On the other hand, in 1996–2023 period, Trade Openness variable had an average of 51.94%, maximum value:96.20%, minimum:33.00% Such a large variation suggests that the contribution of international trade to Indonesian economy experienced considerable changes in the study period. The very progressive nature of trade openness at several times shows that Indonesia is getting closer to foreign markets through exports and imports. In contrast, salary declines in the trade sector during other phases demonstrate a comparatively low position of this segment and also outline weak links between developments in the global trade context and domestic economic structure throughout reforms performed at the national level.

Meanwhile, Foreign Direct Investment (FDI) had an average value of approximately US\$12.2 billion with a standard deviation of US\$9.87 billion, indicating that foreign direct investment flows experienced relatively high volatility. The maximum value of US\$25.1 billion reflects Indonesia’s growing appeal as an investment destination during a specific period, while the minimum value of –US\$4.55 billion indicates a net capital outflow, a condition where outbound investment exceeds inbound investment. These variations indicate that FDI flows are highly sensitive to changes in the investment climate, economic stability, and global economic conditions, causing their movements to be more volatile than those of other macroeconomic variables.

3.1.1. RESULTS OF THE CLASSICAL ASSUMPTIONS TEST

The normality test confirms that the dataset used in this study is normally distributed.

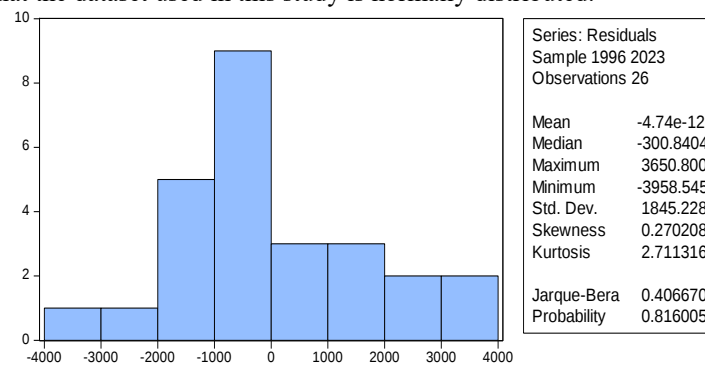


FIGURE 3 Normality Test Results

Source: Processed research data (2026)

The normality of the regression residuals was assessed using the Jarque-Bera test. The test produced a Jarque–Bera statistic of 0.4067 with a corresponding p-value of 0.8161, indicating that the null hypothesis of normally distributed residuals cannot be rejected at the 5% significance level. Furthermore, the residual distribution exhibits skewness of 0.2702 and kurtosis of 2.7113, both of which are close to the expected values for a normal distribution. These findings suggest that the residuals are approximately normally distributed, supporting the validity of statistical inference based on the estimated OLS model. Details of the results are presented in Table 1.

TABLE 2 Autocorrelation Test Results

<i>Breusch-Godfrey Serial Correlation LM Test</i>			
F-statistic	0.956759	Prob. F(3,18)	0.4344
Obs*R-squared	3.575766	Prob. Chi-Square(3)	0.3111

Source: Research data (Processed 2026)

Based on the results of the autocorrelation test in Table 1, the Probability F-statistic was found to be 0.4344 and the Prob. Obs*R-squared was 0.3111, both of which are greater than the 5% significance level. These results indicate that the null hypothesis cannot be rejected, meaning the model does not contain autocorrelation up to the third lag. Thus, the assumption of residual independence has been met, so the Ordinary Least Squares (OLS) estimation still satisfies the Gauss–Markov assumptions and produces a Best Linear Unbiased Estimator (BLUE) in the absence of residual autocorrelation. The regression model was also tested to ascertain the presence or absence of heteroscedasticity. The test results show no indication of heteroscedasticity, as indicated by the Chi-Square probability value on Obs*R-squared of 0.5908. A summary of the heteroscedasticity test results can be seen in Table 2.

Finally, a multicollinearity test was conducted to assess the relationship between independent variables. The results of these tests are presented in Table 3.

TABLE 3 Heteroskedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey:			
F-statistic	0.635144	Prob. F(4.21)	0.6431
Obs*R-squared	2.806005	Prob. Chi-Square(4)	0.5908

Source: Research data (Processed 2026)

TABLE 4 Multicollinearity Test Results

Variable	IMP_DR	TO	GDP_GR	FDI
IMP_DR	1	-0.534	0.421	0.591
TO	-0.534	1	-0.532	-0.703
GDP_GR	0.421	-0.532	1	0.256
FDI	0.591	-0.703	0.256	1

Source: Research data (Processed, 2026)

Table 3 shows that all correlation coefficients between the independent variables are below the 0.80 threshold. This finding indicates that the model does not suffer from multicollinearity, meaning there are no excessive linear relationships among the independent variables. Therefore, parameter estimation using the Ordinary Least Squares (OLS) method can produce coefficients that are stable, consistent, and easy to interpret. Furthermore, the regression results of this study can be seen in Table 4, providing insights into the partial and simultaneous effects of Brent oil price and oil demand on oil emissions in Indonesia during 1993–2023.

TABLE 5 Multiple Linear Regression Results

Var.	Coeff.	S.E	t-Stat.	Prob.
C	14999.40	3405.645	4.404276	0.0002
IMP_DR	932.9653	257.2453	3.626753	0.0016
TO	-113.7986	48.73427	-2.335083	0.0295
GDP_GR	-519.8425	126.8956	-4.096615	0.0005
FDI	2.22E-08	6.42E-08	0.345889	0.7329
R ² : 0.690739				
Adj.R ² : 0.631833				
F-statistic: 11.72597				
Prob (F-Statistic): 0.000000				

Source : Research Data (processed, 2026)

Based on the test results in Table 4, the regression equation is obtained as follows:

$$EXCR_t = 14999 + 932.9653IMP_DR_t - 113.9653TO_t - 519.8425GDP_GR_t + 2.22e - 08FDI_t + \varepsilon_t$$

3.1.2. HYPOTHESIS TEST

Based on the regression results in Table 4, the R² value was 0.6907 and the Adjusted R² was 0.6318, indicating that 69.07 percent of the variation in the rupiah exchange rate can be explained by the Import Dependency Ratio, Trade Openness (TO), GDP Growth (GDP_GR), and Foreign Direct Investment (FDI). At the same time, 30.93 percentage is caused by other factors that are not included in this model F-statistic: 11.72597, p-value: 0.00000 The result indicates that all independent variables simultan has significant effect to the Rupiah exchange rate, so this model are enough to explain. In addition, using a partial analysis the Import Dependency Ratio had coefficient 932.9653 and p =0.0016 Thus this finding suggests that Import Dependency Ratio has a positive and signifikan impact on the exchange rate of Rupiah This result indicates that the higher level of import dependence drives depreciation in Rupiah, which is presumably because relatively oscillation and rising consumption urge more foreign currency into economic activity.

On the other side, for trade Openness variable received a coefficient value equal to -113.7986 with probability 0.0295 These finding suggests that trade Openness has a negative and significant impact on Rupiah, or in other word: As the increase of trade openness will depreciate rupiah. These findings suggest that increasing cross-border trade activities could enhance the exchange rate via higher foreign-exchange earnings and improved allocative efficiency in international commerce. Likewise, GDP Growth variable has a negative and significant effect on the rupiah. This is evidenced with the coefficient value of -519.8425 and a probability p-0,0005 This calls for higher economic growth in the economy to which it is expected that will also be followed by an appreciation of the rupiah. This shows that as relative economic fundamentals improve it can drive market confidence and reinforce exchange rate stability. On the other hand, for foreign direct investment (FDI), a coefficient of 2.22E-08 was obtained with a probability of 0.7329 These findings suggest that foreign direct investment do not have a significant impact on the exchange rate of rupees.

3.2. DISCUSSION

Through the following regression results, we found that Import Dependency Ratio coefficient is 932.9653 and P-value equals to 0.0016. These findings suggest that the Import Dependency Ratio has a positive and significant impact on the rupiah exchange rate. This indicates that every 1 percent increase in the RDI (Import Dependency Diagram) is expected to cause an exchange rate of another currency against the rupiah by Rp.932,97 and implies a deterioration of market norms for all other variables. Images layer-shapefiles are held constant. The results of the research indicate that crude oil Import Dependency Ratio has a positive and significant effect on rupiah exchange rate. Using the Rp/US\$ exchange rate as a proxy for nominal GDP, sign condition with positive coefficient indicates that each increasing measure of import dependency strengthens the rupiah against U.S. dollar (namely: depreciation of Rupiah). This result implies that Indonesia has been more and more reliant on foreign goods with a particular emphasis in energy imports which puts high pressure for demand of foreign exchange so the risks toward it to remain stable rises as well. Additionally, this result is substantial and in line with the limited empirical evidence related to Indonesia's external sector. In *Exchange Rate Depreciation, Oil Prices and Energy Intensive Growth: Evidence of Inelastic Energy Import Demand in Indonesia* (Septriani 2025), the author highlights that Indonesian energy import demand tends to resist from exchange rate depreciation. This means increased import dependency maintains a structural demand for foreign currency, which in turn perpetuates depreciation pressures on the rupiah. In addition, Septriani (2025) showed that global oil prices have a high significance towards Indonesian energy needs also indicating the structural vulnerability caused by an over-reliance in using imported energy.

Empirically, these results align with changes in Indonesia's energy structure over the past three decades. The 1997–1998 Asian financial crisis caused the Rupiah to depreciate sharply and revealed the exchange rate's high sensitivity to external pressures. Following that period, domestic energy consumption continued to rise in tandem with population growth, industrialization, and the expansion of the transportation sector, while national oil production showed a downward trend. These conditions caused Indonesia to transition from an oil-exporting country to a net oil importer in the mid-2000s, leading to a continuous increase in the need for crude oil and fuel imports. Consequently, demand for the U.S. dollar as the primary currency for international transactions grew, exerting downward pressure on the rupiah. Bank Indonesia also emphasized that import dynamics particularly oil and gas imports are one of the factors influencing the balance of the external sector and the stability of the rupiah's exchange rate (Bank Indonesia, 2024).

This phenomenon reemerged during the surge in global oil prices in 2008, the “taper tantrum” turmoil of 2013, and the global energy crisis following the COVID-19 pandemic in 2022. Although Indonesia has managed to post a trade surplus in recent years, the high value of oil and gas imports continues to increase demand for foreign exchange, thereby intensifying pressure on the exchange rate. Data from the Central Statistics Agency (BPS) show that Indonesia's imports are still dominated by raw materials and intermediate goods, while oil and gas imports remain a key component of the national import structure. In 2023, the value of Indonesia's imports reached USD221.9 billion, with oil and gas imports totaling USD35.8 billion, indicating that energy import needs continue to weigh on Indonesia's external sector.

The finding that the import dependency ratio has a positive and significant effect on the rupiah exchange rate means that the higher the domestic economy's dependence on imported goods, the greater the depreciationary pressure on the rupiah. This direction makes economic sense because increased import demand raises the demand for foreign currency particularly the U.S. dollar thereby pushing up the rupiah-to-dollar exchange rate. Although the previous studies did not merely use “import dependency ratio” as a key term, they recurrently indicated that diminishing Rupiah will soon inflict increasing production costs, greater fees and profit cuts to renewable non-renewable raw materials used in real sector when domestic products depend on imported goods (Nopiana (2022); Hidayat et al. (2024); Alqorni & Widayatsari, 2026). Nopiana (2022); Mandeij (2020); sareng Suidarma et al. (2028), with the weakening of the rupiah against the U.S. dollar (USD), it follows that imported raw materials are relatively expensive, resulting in more soaring prices on rampant commodity prices—of course those whose production process uses lots of imports.

The methods proposed theoretically correspond to a foreign exchange demand approach in the foreign currency market. The more imports, the more importers have to change rups into dollars in order to settle international transactions. By contrast, if larger imports are not compensated by either a surge in exports or by capital inflow that constitutes the current account surplus, demand-side pressure on the dollar undertakes prominence and eventually leads to weakening of Rupiah. This affiliation is also consistent with the interpretation that depreciation raises imported goods' prices because domestic production's employment of foreign raw materials makes producing output more expensive and may therefore squeeze into corporate profits as well interest in investment (Nopiana, 2022; Engelica et al., 2025). These additional aspects support the conclusion published by Septriani (2025) that energy imports are an essential part of: production systems within Indonesia. Thus, increased dependence on imported energy affects environmental performance as well and increases the demand for a foreign exchange which will result in depreciating exchange rate.

The empirical justification for this explanation is rather compelling if one examines the industrial structure in Indonesia during 1996 and through to 2023. Over that extended period, Indonesia's manufacturing sector has relied heavily on imports of raw

materials, auxiliary materials, and capital goods. Therefore, an increase in the import dependency ratio does not merely reflect rising consumption of foreign goods but also indicates that domestic production capacity itself requires external inputs. The literature on Indonesian imports shows that the depreciation of the rupiah does indeed significantly curb import growth for consumer goods, raw and auxiliary materials, and capital goods alike underscoring the importance of imports in Indonesia's economic structure (Machmud, 2020).

There are two important implications of this mechanism. First, when the import dependency ratio rises during economic growth, demand for imported production inputs also increases. In such situations, growth may actually be accompanied by a surge in demand for dollars. Second, if import dependency is high, a depreciation of the rupiah does not always quickly improve the external position, as the cost of imports for production also rises. This explains why some studies have found that a depreciation of the rupiah does not automatically boost exports and imports in a beneficial way; dependence on imported inputs actually reduces the net benefits of a weaker exchange rate (Hidayat, et al., 2024; Alqorni & Widayatsari, 2026).

Indonesia's high dependence on imports of raw materials and capital goods has led to increased demand for foreign currency particularly the U.S. dollar to finance domestic production activities. This mechanism has the potential to weaken the rupiah's exchange rate when import needs rise (Nopiana et al., 2022; Hidayat et al., 2024). The depreciation of the rupiah further increases import costs because most production inputs are traded in foreign currencies, thereby raising production costs, reducing industrial efficiency, and potentially driving supply-side inflation (Erika, 2022; Engelica et al., 2025). Furthermore, the positive effect of depreciation on export performance is not fully realized, given that Indonesia's export structure remains dominated by primary commodities with relatively low value added, while the export-oriented manufacturing sector continues to rely heavily on imported raw materials. Consequently, a weaker exchange rate may not necessarily lead to a significant improvement in export competitiveness (Alqorni & Widayatsari, 2026; Sandi et al., 2024).

According to balance of payments theory, the exchange rate is determined by the equilibrium of foreign currency supply and demand. When imports increase without being offset by an increase in exports or capital inflows, demand for foreign currency rises, thereby driving the depreciation of the domestic currency. This view is further supported by the Mundell–Fleming model, which states that in an open economy, an increase in import demand can weaken the current account position and put pressure on the exchange rate, particularly in developing countries that remain dependent on strategic commodity imports (Krugman et al., 2018).

The findings of this study are also supported by various empirical studies. For example, Amano & van Norden (1998) demonstrated that changes in oil prices have a long-term relationship with the exchange rates of oil-importing countries, as rising import costs increase demand for foreign currency. Similar findings were reported by Chen and Chen (2007), who found that oil prices and exchange rates are closely correlated in net oil-importing countries. Several studies indicate that an increase in energy imports intensifies pressure on the current account balance and heightens the rupiah's vulnerability to external shocks, particularly during periods of rising global oil prices and a weakening global economy.

Nevertheless, the results of this study also suggest that the impact of import dependence on the exchange rate is determined not only by the volume of imports but also by the structure of Indonesia's imports. The majority of Indonesia's imports still consist of industrial raw materials, capital goods, and energy that cannot yet be fully produced domestically. Consequently, increased economic activity is often accompanied by a rise in import demand. This situation leads to a structural increase in demand for foreign currency, making Rupiah depreciation more likely to occur when the economy faces external shocks.

The results of this study confirm that the Import Dependency Ratio is one of the key determinants in explaining the dynamics of the rupiah exchange rate during the 1996–2023 period. The higher Indonesia's dependence on imports particularly energy imports the greater the pressure on foreign exchange demand and the higher the risk of Rupiah depreciation. Therefore, efforts to enhance energy resilience through increased domestic production, diversification of energy sources, development of renewable energy, and reduced reliance on imports are crucial strategies for strengthening exchange rate stability and the resilience of Indonesia's external sector.

Meanwhile, based on the regression results, the coefficient for Trade Openness (TO) was found to be 133.7986 with a probability of 0.0295. The estimation results indicate that Trade Openness (TO) has a negative and significant effect on the Rupiah exchange rate. With a coefficient of -133.7986 and a probability value of 0.0295, this finding indicates that every 1 percent increase in trade openness is estimated to lower the exchange rate of the rupiah against the U.S. dollar by approximately 133.80 rupiah, which implies a depreciation of the rupiah, *ceteris paribus*. These findings suggest that the higher the level of Indonesia's trade integration with the global economy, the stronger the external sector's ability to support exchange rate stability, thereby reducing downward pressure on the rupiah. These results are in line with Septriani (2025) which found that trade openness positively contributes to Indonesia's economic performance. Stronger export-oriented trade improves foreign exchange earnings and strengthens external sector resilience, thereby helping reduce depreciation pressure on the rupiah.

Economically, this negative relationship can be explained through the balance of payments mechanism. Increased trade openness expands the flow of exports and imports, but if trade expansion is driven more by increased exports or improved international trade efficiency, then national foreign exchange earnings will also rise. The increased supply of foreign currency in the domestic market reduces pressure on demand for the U.S. dollar, causing the IDR/US\$ exchange rate to tend to decline or the rupiah to appreciate. In addition to strengthening the foreign exchange position, trade openness also enhances Indonesia's integration with global markets, improves investor perceptions of domestic economic prospects, and encourages capital inflows, which ultimately further strengthen the fundamentals of the exchange rate. Similar evidence was also reported by Juniarti and Septriani (2024) that greater trade openness enhances economic performance across ASEAN economies by expanding market access and improving production efficiency. These improvements indirectly strengthen external balances and support exchange rate stability.

These research findings align with the concept of an open economy, which states that countries with higher levels of trade openness possess better external adjustment capabilities when facing global shocks. In a more open economy, adjustments to external shocks are not achieved solely through exchange rate depreciation but also through improvements in the trade balance and current account. Consequently, the need for exchange rate depreciation as an external balancing instrument is reduced. Cross-country empirical evidence presented by Romelli et al. (2018) shows that countries with higher levels of economic openness tend to experience lower exchange rate depreciation pressures when facing a "sudden stop," as external sector adjustments occur primarily through improvements in the current account and trade balance rather than through sharp exchange rate depreciation.

According to Keefe & Saha (2021), the effect of economic openness on the exchange rate is nonlinear (threshold effect). In emerging and developing economies with higher levels of trade openness, movements in the nominal effective exchange rate are more heavily influenced by interest rate differentials and real economic growth, while the exchange rate's sensitivity to external shocks is relatively lower compared to countries with low levels of openness. In other words, increased trade openness strengthens the economy's adjustment mechanisms, so exchange rate fluctuations do not need to be extreme to restore external balance. This situation is relevant to Indonesia's experience following the 1998 Asian financial crisis, when trade liberalization, economic institutional reforms, and increasing integration into international trade gradually strengthened the external sector's resilience to various global shocks. For Indonesia, the negative relationship between trade openness and the exchange rate can also be explained in terms of the structure of foreign exchange earnings. A rising trade-to-GDP ratio not only reflects increased export and import activity but also indicates the economy's growing ability to generate foreign exchange when trade expansion is driven primarily by increased exports. Hidayat (2024) demonstrates that economic openness makes a positive contribution to Indonesia's economic growth through improvements in production efficiency, productivity, and international trade activity. Higher economic growth subsequently strengthens macroeconomic fundamentals and enhances the economy's capacity to generate export foreign exchange, thereby helping to underpin the stability of the rupiah's exchange rate.

Historically, the findings of this study also reflect the dynamics of Indonesia's trade during periods when foreign exchange earnings increased due to stronger exports, particularly during the commodity boom and the global trade recovery. During those periods, an increase in the trade-to-GDP ratio expanded the supply of foreign currency in the domestic market, thereby supporting the appreciation of the rupiah or at least reducing depreciation pressure. Nevertheless, the positive impact of trade openness on exchange rate stability is conditional. If increased openness is driven more by import growth than by export growth, the demand for foreign currency will rise, potentially exerting depreciation pressure on the rupiah. Therefore, the negative relationship found in this study likely reflects conditions where an increase in Indonesia's aggregate trade openness primarily strengthens foreign exchange receipts and reduces the need for extreme exchange rate adjustments (Romelli, 2018; Jain & Mohapatra, 2026).

The findings of this study have policy implications: trade openness serves not only as an instrument to drive economic growth but also as a key pillar in maintaining exchange rate stability by strengthening the external sector. However, the benefits of trade openness for exchange rate stability are conditional and highly dependent on the structure of national trade. If increased openness is driven primarily by export expansion thereby increasing the trade surplus, improving the current account position, and boosting foreign exchange earnings then pressure on the rupiah to depreciate will be reduced. Conversely, if trade openness is dominated by increased imports particularly of raw materials, capital goods, and energy demand for foreign currency will rise, potentially weakening the rupiah's exchange rate. Thus, the results of this study indicate that during the observation period, the increase in Indonesia's aggregate trade openness primarily strengthened foreign exchange earnings rather than increasing the demand for foreign currency to finance imports. This finding is consistent with Romelli et al. (2018), who assert that a more open economy requires smaller exchange rate adjustments when facing external shocks, and are supported by Jain & Mohapatra (2026), who demonstrate that the impact of trade openness on exchange rate stability is largely determined by the balance between exports, imports, and the external sector's ability to generate foreign exchange. Therefore, Indonesia's trade policy must not only focus on increasing the volume of international trade but must also be oriented toward enhancing export competitiveness, diversifying high-value-added products, promoting industrial downstreaming, and reducing dependence on strategic imports. This strategy will sustainably strengthen the foreign exchange surplus, enhance the resilience

of the external sector, and ultimately reinforce the stability of the rupiah exchange rate in the face of various global economic shocks.

Furthermore, based on the regression results, the coefficient for GDP Growth was found to be 519.8425 with a probability of 0.0005. These findings indicate that GDP Growth has a negative and significant effect on the Rupiah exchange rate. A coefficient value of -519.8425 with a significance level of 0.0005 indicates that every 1 percent increase in economic growth is estimated to lower the rupiah's exchange rate against the U.S. dollar by approximately 519.84 rupiah, which implies a strengthening of the rupiah, *ceteris paribus*. This finding suggests that higher economic growth contributes to the strengthening of macroeconomic fundamentals, thereby enhancing exchange rate stability and reducing downward pressure on the rupiah.

Theoretically, this relationship can be explained by the strengthening of domestic economic performance. High economic growth generally reflects rising productivity, an expansion in production activities, and improved business prospects. These conditions foster positive expectations among market participants regarding the national economy, strengthen investor confidence, and increase capital inflows into the country. Increased capital inflows will expand the supply of foreign exchange in the foreign exchange market, thereby reducing pressure on demand for the U.S. dollar. Ultimately, the rupiah exchange rate tends to appreciate or at least become more stable. Thus, economic growth not only reflects an increase in real economic activity but also serves as a key indicator of a country's economic fundamentals and its ability to maintain external sector balance.

These findings are consistent with the research by Keefe & Saha (2021), which shows that among emerging and developing economies, real economic growth is one of the primary determinants of movements in the nominal effective exchange rate. The study found that in countries with higher levels of economic openness, exchange rate dynamics are influenced more by differences in economic growth and macroeconomic fundamentals than by short-term trade pressures. In other words, strong economic growth can improve market expectations, increase the economy's capacity to generate foreign exchange, and strengthen the exchange rate's resilience against various external shocks.

Although most studies in Indonesia have primarily examined the relationship in the opposite direction namely, the impact of the exchange rate on economic growth these results still provide a relevant empirical foundation for explaining the findings of this study. Various studies indicate that both a depreciation of the rupiah and increased exchange rate volatility can hinder economic growth through higher import costs for capital goods and raw materials, rising inflationary pressures, and a decline in investment activity (Erika & Sasana, 2022; Engelica et al., 2025; Nurajizah et al., 2024). Therefore, if exchange rate depreciation is shown to hinder economic growth, the reverse relationship can also be logically explained: higher economic growth will strengthen macroeconomic fundamentals, boost market confidence, and ultimately support the stability of the Rupiah's exchange rate.

This relationship can also be understood through investment mechanisms. Sustainable economic growth increases market size, expands profit opportunities, and improves business prospects, thereby enhancing Indonesia's attractiveness as an investment destination. Research by Susetyo (2022), Dari & Astuti (2025), and Arifin et al. (2025) indicates that economic growth has a positive impact on foreign direct investment (FDI) flows in both the short and long term. Although the FDI variable was not found to have a significant effect on the rupiah exchange rate in this research model, the relationship between economic growth and investment remains an important transmission mechanism. Increased investment will expand national production capacity, enhance export competitiveness, create more job opportunities, and strengthen foreign exchange earnings, thereby supporting exchange rate stability in the long term. Additional support comes from Septriani (2024) which found that higher economic growth is closely associated with increased export capacity and productive investment. These improvements strengthen foreign exchange earnings and provide long-run support for exchange rate stability. The findings of this study are supported by Indonesia's economic history during the 1990–2023 period. Based on World Bank (2024) data, changes in Indonesia's economic growth rate show a pattern that is relatively consistent with the dynamics of the rupiah's exchange rate against the U.S. dollar. During the 1998 Asian financial crisis, Indonesia's economy contracted by -13.13%, followed by a sharp depreciation of the rupiah due to capital outflows, rising economic uncertainty, and weakening market confidence. Following the recovery process, economic growth returned to the 5–6% range during the 2004–2012 period, even reaching 6.35% in 2007, 6.01% in 2008, 6.22% in 2010, and 6.17% in 2011. During that period, the stability of the rupiah exchange rate was relatively well maintained, supported by improving macroeconomic fundamentals, rising investment, stronger export performance, and growing foreign exchange reserves. A similar pattern reemerged during the COVID-19 pandemic. When economic growth contracted again by -2.07% in 2020, the rupiah faced depreciation pressure amid rising global uncertainty and capital outflows. Conversely, as economic growth recovered to 3.70% in 2021, 5.31% in 2022, and 5.05% in 2023, the stability of the Rupiah's exchange rate gradually improved alongside the recovery of domestic economic activity, rising exports, and strengthening investor confidence in Indonesia's economic outlook (World Bank, 2024; Bank Indonesia, 2024).

The negative relationship between economic growth and the exchange rate found in this study is not merely a statistical correlation but is also evident in Indonesia's macroeconomic dynamics over the past three decades. In this context, higher

economic growth in Indonesia correlates with improved economic fundamentals through increased productivity, investment, international trade, foreign exchange earnings, and a strengthened national foreign exchange reserve position. Improvements in these various indicators have boosted market confidence in the Indonesian economy, thereby reducing downward pressure on the rupiah. Thus, the econometric results obtained are not only statistically significant but are also supported by the historical development of the Indonesian economy. These findings also reinforce the research results of Mehdi et al. (2025) and Rumbia et al. (2023), which affirm that economic growth, international trade, and exchange rate stability are mutually reinforcing components in maintaining long-term macroeconomic resilience.

The results of this study indicate that efforts to maintain exchange rate stability cannot rely solely on monetary policy but also require strategies capable of sustaining economic growth. Strong economic growth will boost national productivity, expand export capacity, attract investment, strengthen foreign exchange earnings, and improve the resilience of the external sector, thereby making the exchange rate's fundamentals more robust. Therefore, economic development policies must be directed toward increasing productive investment, accelerating industrial downstreaming, strengthening the export-oriented manufacturing sector, boosting national productivity, and creating a conducive business climate. These strategies are expected not only to drive inclusive and sustainable economic growth but also to strengthen the resilience of the rupiah exchange rate in the face of various global economic dynamics and uncertainties.

Based on the regression results, the coefficient for Foreign Direct Investment was found to be 519.8425 with a probability of 0.0005. The estimation results indicate that Foreign Direct Investment (FDI) has a positive coefficient but does not have a significant effect on the rupiah exchange rate during the study period of 1990–2023. This finding indicates that an increase in foreign direct investment flows has not yet been a primary determinant in explaining the dynamics of the rupiah exchange rate. In this regard, although FDI theoretically has the potential to increase foreign exchange supply through the inflow of foreign capital, the magnitude of these investment flows has not been strong or consistent enough to produce significant changes in the exchange rate. These results suggest that the stability of the rupiah exchange rate during the observation period was more heavily influenced by other fundamental factors, such as international trade, economic growth, monetary policy, global commodity prices, and the dynamics of global financial markets. This result is broadly consistent with Septriani (2024) emphasized that FDI inflows into Indonesia are influenced more by institutional quality, political stability, and investment climate than by exchange rate movements alone. Consequently, changes in FDI do not necessarily translate directly into exchange rate appreciation.

Although Indonesia has experienced an increase in Foreign Direct Investment (FDI) inflows over the long term, the estimation results show that this variable did not have a significant effect on the Rupiah exchange rate during the 1990–2023 period. This suggests that an increase in foreign investment is not automatically followed by an appreciation of the Rupiah. Theoretically, the impact of FDI on the exchange rate is ambiguous. Within the framework of Balance of Payments Theory, FDI inflows do have the potential to increase the supply of foreign currency, thereby driving the appreciation of the domestic currency. However, this effect is highly dependent on the characteristics of the incoming investment, profit repatriation patterns, the import content of investment projects, and the foreign exchange policies in effect in the host country. Therefore, the magnitude of FDI inflows is not always reflected in changes in the nominal exchange rate, especially if a significant portion of the incoming foreign exchange is used to finance imports of capital goods, royalty payments, dividends, or profits repatriated to the investor's home country.

Theoretically, the relationship between FDI and the exchange rate is indeed complex and does not always operate directly. Within the framework of Balance of Payments Theory, inflows of foreign direct investment increase foreign exchange inflows into the country, which theoretically has the potential to drive the appreciation of the domestic currency. However, the magnitude of this effect depends heavily on the characteristics of the incoming investment, the project's financing structure, profit repatriation patterns, the import content of the investment project, and the foreign exchange policies in effect in the host country. In many developing countries, including Indonesia, the majority of foreign investment still relies on imports of machinery, technology, and raw materials from abroad. As a result, the additional foreign exchange inflows during the initial investment phase often flow back out in the form of payments for capital goods imports, royalties, dividends, or profit repatriation, so that the net foreign exchange supply in the domestic market remains relatively small. These conditions mean that the impact of FDI on the appreciation of the rupiah is not always immediately apparent.

This explanation aligns with various previous studies showing that the relationship between FDI and macroeconomic indicators is not always linear. Hidayat (2024) and Alqorni & Widayatsari (2026) demonstrate that FDI contributes to increases in production capacity, exports, and Indonesia's economic growth. However, these benefits generally only materialize after the investment enters the production phase and is fully operational, so its impact on the exchange rate is not always visible in the short term. Conversely, Dari & Astuti (2025) and Arifin et al. (2025) found that FDI's response to macroeconomic variables differs between the short and long term. These differences in adjustment mechanisms mean that the contribution of foreign investment to exchange rate stability does not always materialize at the time the investment is realized.

The relationship between FDI and the exchange rate also exhibits a two-way mechanism. Several studies have found that long-term exchange rate depreciation actually reduces the attractiveness of foreign investment because it increases macroeconomic uncertainty and lowers investors' expected returns after conversion to their home currency (Dari & Astuti, 2025; Susetyo, 2022; Arifin, et al., 2025). Conversely, short-term depreciation sometimes provides an incentive for foreign investors because domestic asset prices become relatively cheaper compared to before the exchange rate weakened (Dari & Astuti, 2025). This duality indicates that the relationship between FDI and the exchange rate is not straightforward but is influenced by the investment horizon, investor expectations, international trade conditions, and global economic dynamics. Therefore, the positive but insignificant coefficient obtained in this study can be interpreted as an indication that the effect of FDI on the exchange rate does indeed exist in theory, but has not been stable enough to produce a strong statistical relationship during the observation period. Furthermore, Septriani (2025) in the Manufacturing Sector in Eight ASEAN Countries found that the benefits of FDI materialize primarily through improvements in production capacity, employment, and export performance rather than through immediate changes in financial variables such as exchange rates. This supports the argument that the contribution of FDI to exchange rate stability is predominantly indirect and long term.

The lack of significance in FDI's influence can also be explained by the measurement of the variables. This study uses the indicator of net FDI inflows (current US\$), which is nominal in nature; consequently, its value is heavily influenced by fluctuations in the U.S. dollar, sporadic large-scale investment transactions, and changes in the composition of investments across sectors. In Indonesia, the majority of foreign investment is concentrated in the mining, base metals, mineral processing, energy, and manufacturing sectors, which remain highly dependent on imports of machinery, technology, and raw materials. Consequently, the additional foreign exchange inflows generated by FDI are often offset by increased demand for capital goods and production inputs, resulting in a relatively small net impact on the exchange rate. This explanation is consistent with the findings of Hidayat et al. (2024) and Alqorni & Widayatsari (2026), which show that FDI can increase production and export capacity, but its impact on macroeconomic indicators in the short term is not always significant. Findings by Sangur & Liur (2022) also indicate that the relationship between the exchange rate and FDI in Indonesia is not always significant, as it is influenced by various other structural factors.

The historical development of Indonesia's economy during the 1990–2023 period further reinforces this interpretation. Based on data from the World Bank and the Ministry of Investment/BKPM, Indonesia's realized FDI shows a significant upward trend, particularly following the post-1998 crisis economic reforms and again during the 2010s as the investment climate improved and regulatory reforms were implemented. However, an increase in FDI inflows is not always accompanied by an appreciation of the rupiah. For example, during the 2013–2015 period, realized FDI remained relatively high, but the rupiah depreciated due to the "taper tantrum," the normalization of U.S. monetary policy, and rising uncertainty in global financial markets. The same pattern reemerged during the 2022–2023 period, when realized foreign investment reached relatively high levels, while the rupiah exchange rate continued to fluctuate due to the strengthening of the U.S. dollar, Federal Reserve interest rate hikes, commodity price volatility, and rising global economic uncertainty. These historical facts indicate that the dynamics of Indonesia's exchange rate during the study period were determined more by changes in external conditions, portfolio capital flows, monetary policy, commodity prices, and financial market sentiment than by changes in FDI directly.

Based on the Eclectic Paradigm or OLI Framework developed by Dunning (1988), a multinational company's decision to engage in Foreign Direct Investment (FDI) is not solely influenced by changes in exchange rates, but rather results from a combination of three key advantages: ownership advantages, location advantages, and internalization advantages. Under this framework, the exchange rate is not the primary determinant of foreign investment decisions but rather just one of several macroeconomic factors considered alongside various other fundamental factors. Multinational corporations generally make investments with a long-term orientation; thus, investment decisions are based more on profit prospects, market potential, regulatory certainty, institutional quality, and production efficiency than on short-term exchange rate fluctuations. Therefore, changes in the exchange rate do not always directly or consistently explain the dynamics of FDI flows. In many cases, investors still proceed with their investments despite a depreciation of the domestic currency if the host country continues to offer attractive locational advantages, such as a large market, abundant natural resources, or conducive investment policies.

This lack of significance indicates that foreign investment inflows into Indonesia during the 1990–2023 period did not automatically increase the supply of net foreign exchange in the foreign exchange market. The majority of foreign investment in Indonesia is concentrated in the manufacturing, mining, energy, and processing sectors, which remain highly dependent on imports of machinery, technology, production equipment, and raw materials. As a result, foreign exchange entering through FDI in the early stages of investment flows back out to finance imports of capital goods, technology royalty payments, dividends, and the repatriation of profits to parent companies. This situation limits the increase in net foreign exchange supply, making its impact on exchange rate movements insignificant.

Furthermore, the OLI theory also asserts that the relationship between FDI and the exchange rate is more indirect (indirect effect) than direct (direct effect). In the long run, FDI can increase production capacity, promote technology transfer, expand employment opportunities, boost productivity, and strengthen export competitiveness. These improvements in economic

fundamentals can subsequently increase foreign exchange earnings, improve the current account balance, and ultimately support exchange rate stability. However, this process takes time, so its impact is not always reflected in exchange rate changes during the period when the investment is realized. Thus, the results of this study are consistent with Dunning's (1988) view that FDI is a long-term strategic investment decision influenced more by ownership advantages, location advantages, and internalization advantages than by exchange rate fluctuations themselves. Consequently, the lack of a significant effect of FDI on the rupiah exchange rate in this study is a finding that can be theoretically justified through the Eclectic Paradigm, while also indicating that the stability of Indonesia's exchange rate is determined more by other fundamental factors such as the structure of international trade, import dependence, economic growth, monetary policy, and the dynamics of global financial markets than by foreign direct investment flows directly.

The findings of Narayan et al. (2022) and Arifin et al. (2025) also indicate that increases in FDI in Indonesia are determined more by trade openness, international trade agreements, the size of the domestic market, and structural factors than by short-term exchange rate dynamics. These findings are also consistent with various lines of empirical evidence showing that the relationship between Foreign Direct Investment and the exchange rate is not always direct or significant. Foreign investment flows are more strongly influenced by market size, economic growth, institutional quality, and trade openness than by changes in the nominal exchange rate (Narayan et al., 2022; Arifin et al., 2025). Thus, the lack of a significant effect of FDI in this study suggests that during the 1990–2023 period, the stability of the rupiah exchange rate was determined more by macroeconomic fundamentals, the structure of international trade, import dependence, domestic economic growth, Bank Indonesia's monetary policy, and global financial market dynamics than by direct changes in foreign investment flows. Nevertheless, FDI continues to play a strategic role as a factor that strengthens production capacity, increases exports, and drives long-term economic growth (Hidayat, et al., 2024; Alqorni & Widayatsari, 2026; Mehdi, et al., 2025). Consequently, its contribution to exchange rate stability is more indirect through the strengthening of the national economy's fundamentals rather than through direct mechanisms of the foreign exchange market.

4. CONCLUSION

Based on the regression results, it was found that the rupiah exchange rate during the 1990–2023 period was more influenced by economic fundamentals, particularly those related to the structure of trade and domestic economic activity. Import dependence proved to be one of the main sources of pressure on the rupiah due to the increasing demand for foreign currency to finance imports of energy, raw materials, and capital goods. Conversely, the increasing openness of international trade and improving economic growth have contributed to the strengthening of the exchange rate through increased foreign exchange earnings and improved performance of the external sector. On the other hand, foreign direct investment has not yet shown a significant impact on exchange rate movements. These findings indicate that FDI's contribution to exchange rate stability likely occurs through the strengthening of production capacity and economic competitiveness in the long term, rather than through direct changes in foreign exchange supply in the foreign exchange market. The results of this study show that efforts to maintain exchange rate stability cannot rely solely on foreign investment inflows but also require strengthening the domestic economic structure. Therefore, policies should be directed toward reducing dependence on energy and capital goods imports, accelerating industrial down streaming, diversifying high-value-added manufacturing exports, and enhancing linkages between FDI and domestic industries. This study is still limited to the use of annual data and a limited number of macroeconomic variables; thus, future research should consider higher-frequency data, incorporate external factors such as global energy prices, global interest rates, and international capital flows, and employ more dynamic econometric approaches to provide a more comprehensive description of exchange rate adjustment mechanisms.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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REFERENCES

- [1] Farhan Alqorni, Syapsan Syapsan, and Any Widayatsari, "The Influence of Foreign Direct Investment and Exchange Rate on Foreign Exchange Reserves Through Exports in Indonesia from 2003 to 2023," *International Journal of Economics and Management Research*, vol. 5, no. 1, pp. 255–264, Jan. 2026, doi: 10.55606/ijemr.v5i1.633.
- [2] R. A. Amano and S. van Norden, "Oil prices and the rise and fall of the US real exchange rate," *Journal of International Money and Finance*, vol. 17, no. 2, pp. 299–316, Apr. 1998, doi: 10.1016/s0261-5606(98)00004-7.
- [3] S. Arifin, N. Malik, and H. Kusuma, "Analysis of the Role of Economic Factors on Foreign Direct Investment in Indonesia," *Jurnal Ekonomi Pembangunan*, vol. 23, no. 02, pp. 182–194, Dec. 2025, doi: 10.22219/jep.v23i02.41752.

- [4] Badan Pusat Statistik, Statistik perdagangan luar negeri Indonesia impor 2023: Buku I. Badan Pusat Statistik, 2024. [Online]. Available: <https://www.bps.go.id/id/publication/2024/07/05/a341afd3aa91334abb3436e0/foreign-trade-statistics-import-of-indonesia-2023-book-i.html>
- [5] Bank Indonesia, Laporan Perekonomian Indonesia 2023: Sinergi Memperkuat Ketahanan dan Kebangkitan Ekonomi Nasional, Bank Indonesia, 2024.
- [6] B. Balassa, "The Purchasing-Power Parity Doctrine: A Reappraisal," *Journal of Political Economy*, vol. 72, no. 6, pp. 584–596, Dec. 2020, doi: 10.1086/258965.
- [7] S.-S. Chen and H.-C. Chen, "Oil prices and real exchange rates," *Energy Economics*, vol. 29, no. 3, pp. 390–404, May 2007, doi: 10.1016/j.eneco.2006.08.003.
- [8] Tri Ulan Dari, and Rini Dwi Astuti, "Macroeconomic determinants of foreign direct investment in Indonesia: The role of GDP, inflation, and exchange rate (1990–2023)," *Journal Magister Ilmu Ekonomi Universitas Palangka Raya: GROWTH*, vol. 11, no. 1, pp. 35–47, 2025. Doi: <https://doi.org/10.52300/grow.v11i1.21780>
- [9] J. H. Dunning, "The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions," *Journal of International Business Studies*, vol. 19, no. 1, pp. 1–31, Mar. 1988, doi: <https://doi.org/10.1057/palgrave.jibs.8490372>.
- [10] Heni Engolica, Annisa Retno Wulansari, Faridlotun Muthoharoh, Fayi Faizah Azzahra, Nurul Istiqomah, and Selvia Cantikasari, "The effect of foreign direct investment on economic growth in Indonesia: A case study using secondary data for 1995–2023," *Journal of Economic Resilience and Sustainable Development*, vol. 2, no. 1, pp. 15–29, Feb. 2025, doi: 10.61511/ersud.v2i1.2025.1400.
- [11] Erika and H. Sasana, "EFFECT ANALYSIS OF FDI, EXPORTS, EXCHANGE RATES, ON INDONESIA'S ECONOMIC GROWTH 1991–2020," *JOURNAL OF HUMANITIES, SOCIAL SCIENCES AND BUSINESS (JHSSB)*, vol. 2, no. 1, pp. 1–17, Sept. 2022, doi: 10.55047/jhssb.v2i1.362.
- [12] J. M. Fleming, "Domestic financial policies under fixed and under floating exchange rates," *International Monetary Fund*, vol. 9, no. 3, pp. 369–380, 1962.
- [13] J. A. Frankel and D. Romer, "Does Trade Cause Growth?," *American Economic Review*, vol. 89, no. 3, pp. 379–399, June 1999, doi: 10.1257/aer.89.3.379.
- [14] D. N. Gujarati and D. C. Porter, *Basic econometrics*, 5th ed. Usa: McGraw-Hill/Irwin, 2009.
- [15] A. M. Hidayat, E. Purwanda, H. S. Hadijah, and G. Sodik, "Impact of exchange rates, Inflation, foreign direct investment, government spending, and economic openness on exports, imports, and economic growth in Indonesia," *Journal of Infrastructure Policy and Development*, vol. 8, no. 6, p. 3270, June 2024, doi: 10.24294/jipd.v8i6.3270.
- [16] International Energy Agency, *World Energy Outlook 2024*. International Energy Agency, 2024.
- [17] N. Jain and G. Mohapatra, "Uncovering the drivers and inhibitors of trade openness in emerging economies," *Journal of Economic and Administrative Sciences*, pp. 1–19, Mar. 2026, doi: 10.1108/jeas-06-2025-0331.
- [18] R. Juniarti, and S. Septriani, "Analysis Of The Impact of International Trade Openness on GDP in Seven ASEAN Countries," In *Bengkulu International Conference on Economics, Management, Business and Accounting (BICEMBA)*, vol. 2, pp. 1679–1694, 2024.
- [19] H. Keefe, and S. Saha, "Threshold effects of openness on real and nominal effective exchange rates in emerging and developing economies," *The World Economy*, 2021. <https://doi.org/10.1111/twec.13212>
- [20] Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2018). *International economics: Theory and policy* (11th ed.). Pearson.
- [21] A. Machmud, "DAMPAK DEPRESIASI RUPIAH TERHADAP PERKEMBANGAN IMPOR INDONESIA," *Quantitative Economics Journal*, vol. 5, no. 1, Mar. 2020, doi: 10.24114/qej.v5i1.17480.
- [22] D. Mandeij, "Determination of equilibrium exchange rate rupiah against US dollar and its volatility: Application of asset approach," *International Journal of Business and Administrative Studies*, vol. 6, no. 6, pp. 323–336, 2020.
- [23] W. Mehdi, M. Faqir, and M. Hussain, "A time-series analysis of Indonesia's economic growth: The roles of FDI, trade, and exchange rate," *The Critical Review of Social Sciences Studies*, vol. 3, no. 2, pp. 1269–1281, 2025. Doi: <https://doi.org/10.59075/n52vfk94>
- [24] R. A. Mundell, "Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates," *The Canadian Journal of Economics and Political Science / Revue canadienne d'Economie et de Science politique*, vol. 29, no. 4, pp. 475–485, 1963, doi: 10.2307/139336.
- [25] P. K. Narayan, B. N. Rath, and F. Syarifuddin, "Understanding the role of trade agreements in Indonesia's FDI," *Journal of Asian Economics*, vol. 82, p. 101532, Oct. 2022, doi: 10.1016/j.asieco.2022.101532.
- [26] . Nopiana, Z. Habibah, and W. A. Putri, "The Effect of Exchange Rates, Exports and Imports on Economic Growth in Indonesia," *Marginal*, *Journal of Management, Accounting, General Finance and International Economic Issues*, vol. 1, no. 3, pp. 111–122, June 2022, doi: 10.55047/marginal.v1i3.213.
- [27] Syifa Aina Nurajizah, Sinta Allena, Ridho Utama, and Muhammad Kurniawan, "Analisis Pengaruh Nilai Tukar Dan Inflasi Terhadap Pertumbuhan Ekonomi Indonesia Tahun (2014–2023)," *SANTRI : Jurnal Ekonomi dan Keuangan Islam*, vol. 2, no. 3, pp. 229–240, June 2024, doi: 10.61132/santri.v2i3.645.
- [28] D. Rodrik, "The Real Exchange Rate and Economic Growth," *Brookings Papers on Economic Activity*, vol. 2008, no. 2, pp. 365–412, 2008, doi: 10.1353/eca.0.0020.
- [29] D. Romelli, C. Terra, and E. X. Vasconcelos, "Current Account and Real Exchange Rate Changes: The Impact of Trade Openness," *SSRN Electronic Journal*, 2014, doi: 10.2139/ssrn.2439832.
- [30] W. A. Rumbia, A. Jabani, P. Adam, B. Abbas, M. Nur, and Y. P. Pasrun, "Effect of Exchange Rates and Information and Communication Technology on Indonesia's Economic Growth," *Journal of Telecommunications and the Digital Economy*, vol. 11, no. 4, pp. 13–32, Dec. 2023, doi: 10.18080/jtde.v11n4.743.
- [31] P. A. Samuelson, "Theoretical Notes on Trade Problems," *The Review of Economics and Statistics*, vol. 46, no. 2, p. 145, May 1964, doi: 10.2307/1928178.
- [32] A. A. A. Sandi et al., "Analisis pengaruh depresiasi rupiah terhadap dolar Amerika Serikat pada bidang ekspor dan impor. Inisiatif," *Jurnal Ekonomi, Akuntansi dan Manajemen*, vol. 3, no. 3, pp. 90–101, 2024. <https://doi.org/10.30640/inisiatif.v3i3.2580>

- [33] Korneles Sangur and Lisye Magdalena Liur, "DAMPAK PERTUMBUHAN EKONOMI, INFLASI, DAN KURS TERHADAP FOREIGN DIRECT INVESTMENT (FDI) DI INDONESIA," *Cita Ekonomika: Jurnal ekonomi*, vol. 16, no. 2, pp. 121–132, Dec. 2022, doi: 10.51125/citaekonomika.v16i2.7238.
- [34] S. Septriani, "Exchange Rate Depreciation, Oil Prices, and Energy-Intensive Growth: Evidence of Inelastic Energy Import Demand in Indonesia." *Journal of Economics and Business Management*, vol. 3(10), halaman 68–74, 2025, <https://isarpublisher.com/journal/isarjebm>.
- [35] S. Septriani, "How FDI, Export and Productive-age Population Influence GRDP: Insights from Indonesia's Economic Data," *ISAR Journal of Economics and Business Management*, vol. 2, no. 12, pp. 63-68, 2024.
- [36] S. Septriani, "Drivers of Carbon Intensity in Indonesia: Unpacking the Effects of FDI, Energy Imports, and Economic Growth," *Journal of Economics and Business*, vol. 3, no. 2, pp. 47-53, 2025.
- [37] S. Septriani, "Asymmetric Effects of Trade Openness and Chinese FDI on Indonesia's Economic Growth, 2010–2023," *ISAR Journal of Economics and Business Management*, vol. 3, no. 4, pp. 77-83, 2025.
- [38] I. M. Suidarma, I. G. Sanica, P. C. Ayu, and I. G. N. Darma, "Overshooting Indonesian rupiah's exchange rate towards US dollar: Dornbusch model hypotheses test," *International Journal of Economics and Financial Issues*, vol. 8, no. 5, 2018.
- [39] D. Susetyo, "Determinants of Foreign Direct Investment (Fdi) in Indonesia: Short Term and Long Term," *Modern Economics*, vol. 33, no. 1, pp. 72–81, June 2022, doi: 10.31521/modecon.v33(2022)-10.
- [40] World Bank, *World Development Indicators*. World Bank, 2024. <https://databank.worldbank.org/source/world-development-indicators>
- [41] J. M. Wooldridge, *Introductory econometrics: A modern approach*, 6th ed., Cengage Learning, 2016.