A Study on the Relationship between Indonesian Rupiah Exchange Rate and Cryptocurrencies (2018-2022)

Partial Fulfilment of Requirements to Obtain the Bachelor's Degree at the Faculty of Business & Economics, Islamic University of Indonesia, Yogyakarta

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DECLARATION OF AUTHENTICITY

Herein I declare the originality of the thesis; I have not presented anyone else's work to obtain my university degree, nor have I presented anyone else's words, ideas or expression without acknowledgment. All quotations are cited and listed in the bibliography of the thesis.

If in the future this statement is proven to be false, I am willing to accept any sanction complying with the determined regulation or its consequence.

Yogyakarta, December 28, 2023

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II

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Dedication

This work is dedicated to my enduringly supportive parents, the bedrock of my life. My heartfelt gratitude extends to my siblings, whose unwavering support fuelled my journey. I acknowledge the remarkable educators whose lessons shaped my being, expressing profound gratitude for their impact. Special thanks to my guide, Rokhedi Priyo Santoso, whose mentorship brought wisdom and light to my research journey.

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Abstrak

Dalam lanskap ekonomi digital yang terus berkembang, konsep mata uang kripto semakin banyak ditemui. Seiring berjalannya waktu, aset-aset digital ini telah mengambil peran yang dulunya merupakan domain eksklusif mata uang tradisional, tidak hanya itu tetapi diperkirakan juga akan berdampak negatif pada aset-aset tersebut. Penelitian ini bertujuan untuk menyelidiki hubungan antara nilai tukar Rupiah Indonesia (IDR) dan mata uang kripto serta untuk mengukur dan mengevaluasi dampak mata uang kripto terhadap nilai tukar Rupiah Indonesia. Data untuk analisis dikumpulkan setiap bulan mulai tanggal 1 Januari 2018 hingga 31 Desember 2022. Model regresi linier dinamis digunakan untuk menguji hubungan dalam model penelitian menggunakan perangkat lunak analisis statistik EViews 10. Temuan penelitian menyarankan bahwa dalam jangka pendek , baik CMC maupun XRP mempunyai dampak yang signifikan terhadap Rupiah (IDR). Lebih khusus lagi, kenaikan harga XRP mengakibatkan terdepresiasinya nilai tukar IDR terhadap dolar AS, dan peningkatan harga CMC juga menyebabkan terdepresiasinya nilai tukar IDR. Di sisi lain, ITR, R dan TREG sebagai variabel kontrol (indikator ekonomi) ditemukan memiliki dampak yang signifikan terhadap Rupiah (IDR) dalam jangka panjang. Kami merekomendasikan Bank Indonesia (Bank Sentral Indonesia) untuk mengatur mata uang kripto dan mempertimbangkan untuk menerbitkan Rupiah digitalnya. Penelitian kami berkontribusi pada literatur tentang bagaimana cryptocurrency mempengaruhi nilai tukar Rupiah Indonesia.

Kata Kunci: Cryptocurrency, Rupiah, Nilai Tukar, Indonesia

Abstract

In the evolving landscape of the digital economy, the concept of cryptocurrency has become increasingly ubiquitous. Over time, these digital assets have assumed roles that were once the exclusive domain of traditional currencies, not just this but expected to have a negative impact on them. This study aims to investigate the relationship between the Indonesian Rupiah (IDR) exchange rate and cryptocurrencies and to measure and evaluate the impact of cryptocurrencies on the Indonesian Rupiah exchange rate. Data for the analysis were collected monthly from 1 January 2018 to 31 December 2022. The dynamic linear regression model was used to examine the relationships in the research model using the statistical analysis software EViews 10. The findings of the research suggested that in the short term, both CMC and XRP had a significant impact on the Indonesian Rupiah (IDR). More specifically, an increase in the price of XRP results in the depreciation of the IDR against the US dollar, and an increase in the price of CMC led to the depreciation of the IDR as well. In the other hand, ITR, R and TREG as control variables (economic indicators) were found that they had a significant impact on the Indonesian Rupiah (IDR) in the long run. We recommend that Bank Indonesia (Central Bank of Indonesia) regulate cryptocurrencies and consider issuing its digital Rupiah. Our research contributes to the literature on how cryptocurrencies influence the Indonesian Rupiah exchange rate.

Keywords: Cryptocurrencies, Indonesian Rupiah, Exchange rate, Indonesia.

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CHAPTER I
INTRODUCTION

1.1 Background of the Study

The digital economy has undergone significant transformation with the emergence of cryptocurrencies, digital assets supported by blockchain technology. In Indonesia, there has been a notable increase in cryptocurrency adoption, driven by factors such as the tech-savvy nature of the population and a growing interest in alternative investments (Statista, 2023). Blockchain technology, the foundation of cryptocurrencies, has the potential to redefine traditional financial systems by offering transparency, security, and immutability in financial transactions (Nakamoto, 2009).

Bitcoin (BTC), Ethereum (ETH), Binance (BNB), and XRP are prominent cryptocurrencies that have gained significant attention in recent years. These digital currencies have profoundly impacted traditional currencies and the financial landscape.

Bitcoin, the first and most well-known cryptocurrency, was introduced in 2009 by an anonymous person or group, Satoshi Nakamoto. It operates on a decentralized network called blockchain, which ensures transparency and security in transactions. Bitcoin's decentralized nature and limited supply have led to its use as a store of value and a medium of exchange (Nakamoto, 2009).

Ethereum, introduced in 2015 by Vitalik Buterin, is a blockchain-based platform that enables the creation of smart contracts and decentralized applications. Unlike Bitcoin, Ethereum's blockchain allows for the development of programmable applications, expanding its use cases beyond just a digital currency (Buterin, 2013).

Binance Coin (BNB) is the native cryptocurrency of the Binance exchange, one of the largest cryptocurrency exchanges globally. BNB is primarily used to pay transaction fees on the

Binance platform and participate in token sales (Binance, n.d.). It has gained popularity due to its utility within the Binance ecosystem and its potential for investment purposes.

XRP, created by Ripple Labs in 2012, is both a digital payment protocol and a cryptocurrency. It aims to facilitate fast and low-cost international money transfers. XRP's unique consensus algorithm, XRP Ledger, enables quick settlement times and scalability (Ripple, n.d.).

The impacts of these cryptocurrencies on traditional currencies have been significant. They have challenged the traditional financial system by offering centralized banking and payment systems alternatives. The decentralized nature of cryptocurrencies allows for peer-to-peer transactions without intermediaries, potentially reducing transaction costs and increasing financial inclusion (Swan, 2015).

However, the volatility of cryptocurrencies has raised concerns about their stability and potential impact on traditional currencies. The rapid price fluctuations of cryptocurrencies can create challenges for businesses and consumers regarding pricing and financial planning (Baur & Dimpfl, 2018).

While the adoption of cryptocurrencies presents opportunities, it also raises questions about their impact on Indonesia's economy, particularly to what extent cryptocurrencies influence the exchange rate of the Indonesian Rupiah. Scholars like Garratt and Wallace (2017) have provided valuable insights into the complex relationship between cryptocurrencies and traditional currencies. Surveys and reports from reputable sources like the Pew Research Center[1] offer essential data on the preferences and behaviours of the tech-savvy Indonesian population regarding cryptocurrency usage.

As the cryptocurrency landscape evolves, regulatory considerations become increasingly relevant. Exploring publications from Bank Indonesia and other regulatory bodies illuminates the governing framework for cryptocurrencies in Indonesia. Additionally, a comparative study of

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[1] Source: https://www.pewresearch.org/

cryptocurrency regulations in other countries informs discussions on potential regulatory measures for Indonesia.

From January 2018 to December 2022, the Indonesian Rupiah exhibited notable fluctuations against the USD (Figure 1.1). These fluctuations were influenced by various factors, including the potential impact of cryptocurrencies on the currency's value. For instance, in January 2018, the Indonesian Rupiah was valued at 13,387 IDR/USD. However, by March 2020, it peaked at 16,300 IDR per US Dollar. Subsequently, the Indonesian Rupiah experienced a significant decline, reaching 15,565 IDR/USD by December 2022.

Source: https://www.bi.go.id/
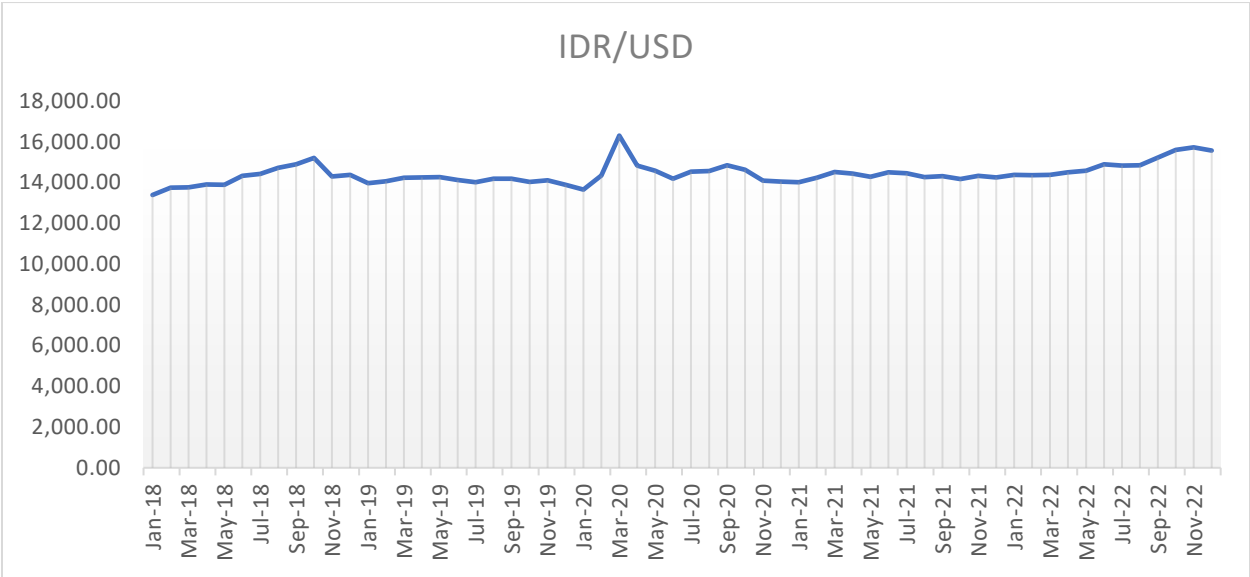
Figure 1.1. Price change of Indonesian Rupiah against USD from Jan-2018 to Dec-2022

As of December 31, 2022, the collective market capitalization of various cryptocurrencies amounted to $798.4 billion. Table 1.1 below provides the market values of four prominent cryptocurrencies. The table includes the respective rankings, names, symbols, current prices in USD, and total market capitalizations in billions of USD. Additionally, understanding the potential impact of these cryptocurrencies on the Indonesian Rupiah exchange rate is crucial. Factors such as increased adoption, regulatory developments, and market sentiment toward these digital assets can significantly influence the exchange rate dynamics in Indonesia. Monitoring these trends can provide valuable insights for investors and policymakers alike.

Table 1.1. Market Values of Popular Cryptocurrencies

No.	Cryptocurrencies	Signal	Current price (USD)	Total market cap (billion USD)
1	Bitcoin	BTC	16,604.52	319.61
2	Ethereum	ETH	1,203.16	147.19
3	Binance coin	BNB	247.04	39.50
4	XRP	XRP	0.344	17.29

Source: https://coinmarketcap.com/

From January 2018 to December 2022, the value of cryptocurrencies such as Bitcoin (BTC), Ethereum (ETH), Binance coin (BNB), and XRP (XRP) experienced significant fluctuations against the USD. These fluctuations are expected to impact the Indonesian Rupiah (IDR) against the USD. However, further analysis will be shown in Chapter Five to check our expectations and to determine the extent of this effect.

For instance, in January 2018, Bitcoin was valued at only 10,284 BIT/USD. However, by November 2021, its value had surged to $68,789.63. Subsequently, Bitcoin experienced a significant decline, reaching 16,564 BIT/USD (Figure 1.2). These fluctuations in BTC's value against the USD will impact the IDR/USD exchange rate.

Source: https://coinmarketcap.com/.
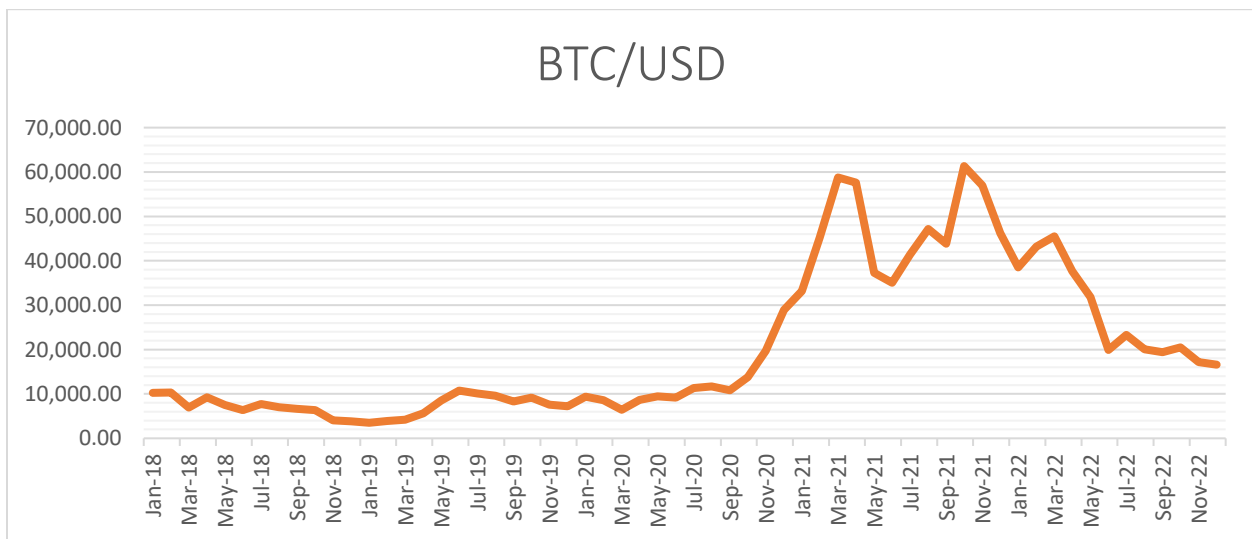
Figure 1.2. Price change of Bitcoin against USD from Jan-2018 to Dec-2022

Moving on to Ethereum (ETH), its price in January 2018 was 1,103.99; by December 2022, it reached 1,195.65. Like BTC, ETH also experienced highs and lows during this period. The highest value was 4,631.22 in November 2021, while the lowest was 106.30 in January 2019 (Figure 1.3). These ETH fluctuations against the USD can influence the IDR/USD exchange rate.

Source: https://coinmarketcap.com/
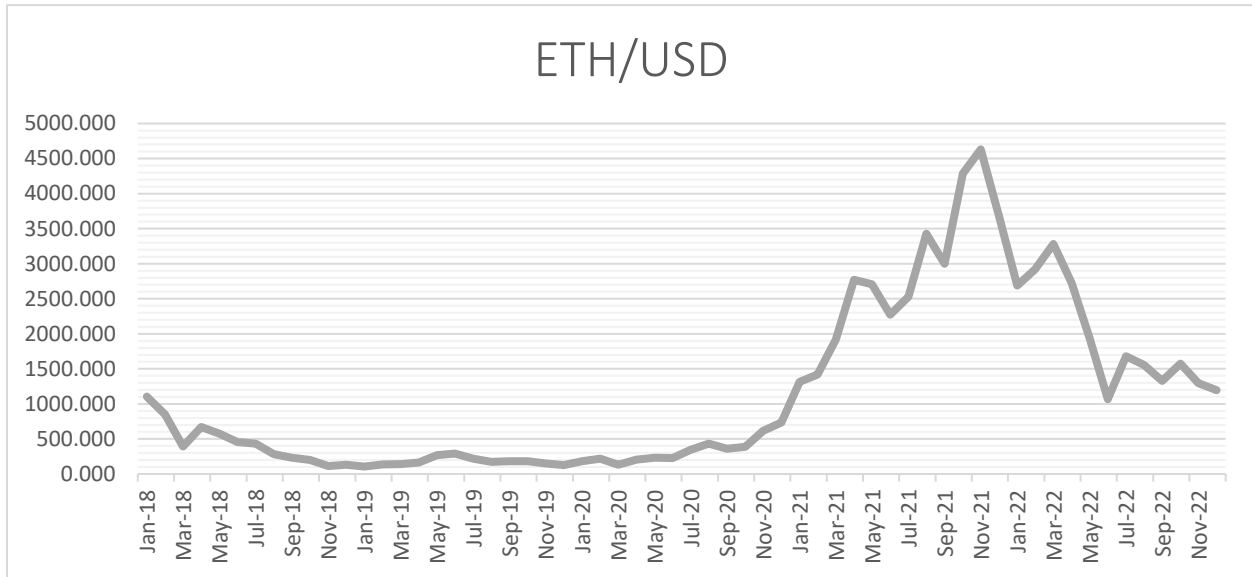
Figure 1.3. Price change of Ethereum against USD from Jan-2018 to Dec-2022.

Next, let us consider the Binance coin (BNB). Its price in January 2018 was 11.31; by December 2022, it reached 246.10. BNB experienced significant growth during this period, with the highest value being 524.46 in October 2021 and the lowest value being 9.49 in October 2018 (Figure 1.4). The fluctuations in BNB's value against the USD can impact the IDR/USD exchange rate.

In addition to BNB, three other prominent cryptocurrencies have also shown noteworthy market values. Bitcoin (BTC), for instance, had a price of $10,433 in January 2018 and reached $63,346 by December 2022. Ethereum (ETH) started at $1,131 in January 2018 and soared to $4,352 by December 2022. Ripple (XRP) had a price of $2.30 in January 2018 and reached $1.05 by December 2022.

These market values of cryptocurrencies can potentially impact the Indonesian Rupiah (IDR) exchange rate. As more individuals and businesses adopt cryptocurrencies, the demand for IDR may be affected. Fluctuations in the values of these prominent cryptocurrencies against the USD can influence the attractiveness of investing in IDR, potentially leading to changes in the IDR/USD exchange rate.

It is essential to closely monitor the market values of these cryptocurrencies and their potential impact on the IDR exchange rate. Factors such as market sentiment, regulatory developments, and global economic conditions can also shape the relationship between cryptocurrencies and the IDR exchange rate.

Source: https://coinmarketcap.com/
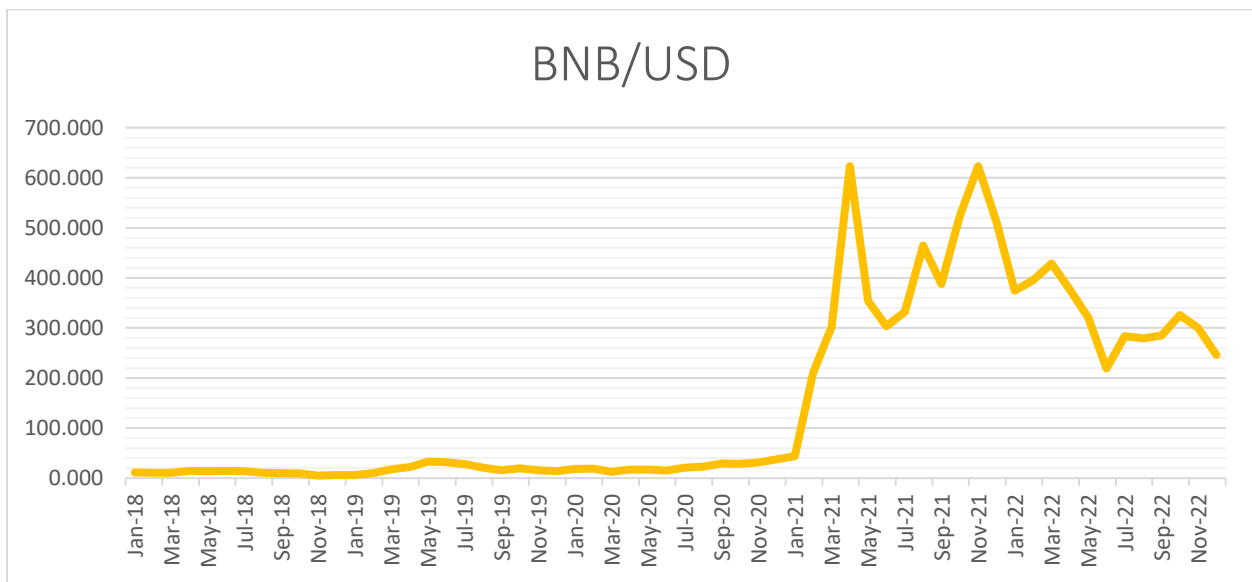
**Figure 1.4.** Price change of Binance against USD from Jan-2018 to Dec-2022

Lastly, we have XRP. Its price in January 2018 was 1.13931; by December 2022, it reached 0.33899. XRP experienced both highs and lows, with the highest value of 1.59858 in April 2021 and the lowest value of 0.19290 in December 2019 (Figure 1.5). XRP value fluctuations in against the USD can influence the IDR/USD exchange rate. Considering the market values of four prominent cryptocurrencies, including XRP, it is important to analyse their potential impact on the Indonesian Rupiah exchange rate. The volatility of these cryptocurrencies can influence investor sentiment and capital flows, which in turn may affect the IDR/USD exchange rate. Monitoring the

trends and fluctuations in these cryptocurrencies can provide valuable insights into the potential risks and opportunities for the Indonesian economy. Additionally, understanding the relationship between XRP's value and the IDR/USD exchange rate can help policymakers and investors make informed decisions regarding currency exchange and investment strategies.

Source: https://coinmarketcap.com/
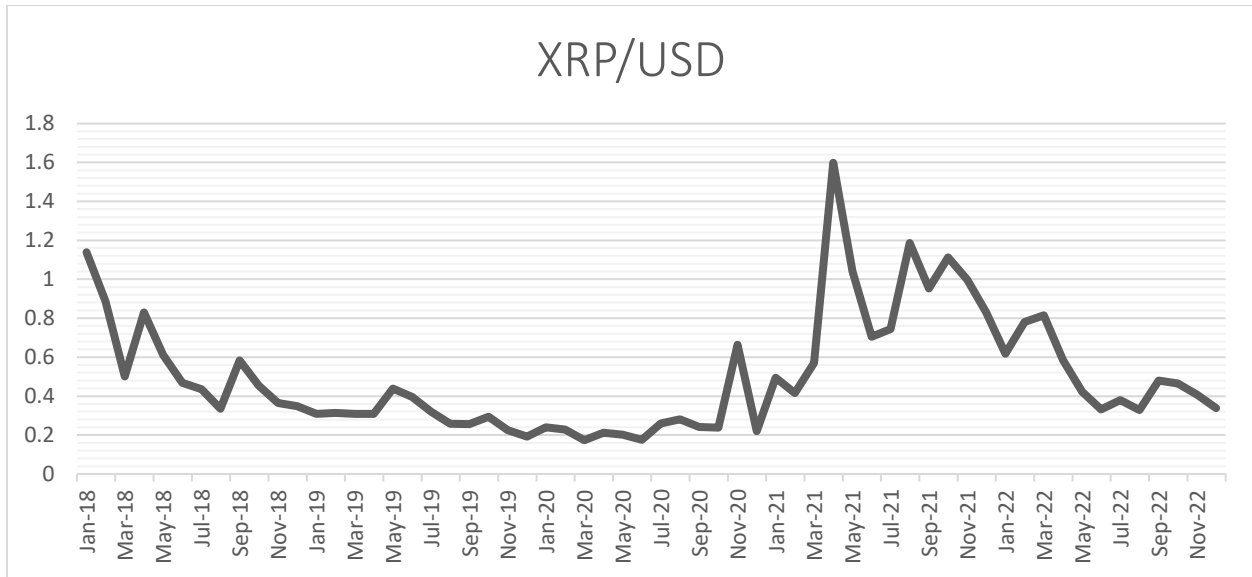
Figure 1.5: Price change of XRP against USD from Jan-2018 to Dec-2022

It is important to note that several factors, including economic conditions, market sentiment, and global events, influence the exchange rate of the Indonesian Rupiah against the USD. While the fluctuations in the value of cryptocurrencies can have an impact, it is also necessary to consider these other factors.

Despite the growing popularity of cryptocurrencies in Indonesia, limited research has been conducted on their impact on the country's exchange rate. The relationship between cryptocurrencies and the IDR is complex and influenced by several factors, including global economic conditions, regulatory developments, and investor sentiment. Understanding this relationship is crucial for policymakers, investors, and businesses operating in Indonesia's financial markets.

In conclusion, Bitcoin, Ethereum, Binance Coin, and XRP are prominent cryptocurrencies that significantly impacted traditional currencies. Their decentralized nature and unique features have challenged the traditional financial system and offered alternatives for transactions and investments. However, the volatility of cryptocurrencies remains a concern for their stability and widespread adoption. This research aims to contribute to the existing literature by investigating the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies, specifically focusing on 2018 to 2022.

By drawing on reports, studies, and academic papers, the research aims to provide a nuanced understanding of how the adoption and impact of cryptocurrencies unfold in the dynamic context of Indonesia's digital economy.

1.2 Research Objectives

Based on the above, the following are the research objectives:

1. **Examine the Relationship between Cryptocurrencies and IDR Exchange Rate:**
    Investigate the correlation between cryptocurrencies and the Indonesian Rupiah (IDR) exchange rate to understand the dynamics of this relationship. By analysing historical data and market trends, this objective seeks to uncover the potential influence of cryptocurrencies on the IDR exchange rate.

2. **Quantify the Impact of Cryptocurrencies on IDR Exchange Rate:**
    Measure and evaluate the extent to which cryptocurrencies influence the Indonesian Rupiah exchange rate, providing a quantitative assessment of their impact. This objective aims to provide empirical evidence on the relationship between cryptocurrencies and the IDR exchange rate, shedding light on the magnitude of their influence.

These objectives aim to provide a nuanced and comprehensive analysis of the relationship between cryptocurrencies and the Indonesian Rupiah exchange rate, offering insights that can inform regulatory decisions and contribute to academic discourse.

1.3 Research Contributions

This research significantly contributes to the existing body of knowledge by enhancing our understanding of the relationship between cryptocurrencies and exchange rates in emerging economies, specifically focusing on Indonesia. By examining the unique context of Indonesia's digital economy, this research aims to provide empirical evidence on how cryptocurrencies impact the exchange rate of the Indonesian Rupiah. The findings of this research offered valuable insights for policymakers, investors, and businesses operating within Indonesia's financial markets.

Moreover, this research seeks to provide insights that can assist policymakers and investors in effectively managing the potential risks and opportunities associated with cryptocurrencies in the Indonesian context. By comprehending the dynamics of the relationship between cryptocurrencies and the IDR exchange rate, policymakers can make well-informed decisions regarding regulating cryptocurrencies. Similarly, investors can develop more effective investment strategies and implement risk management practices based on the findings of this research.

In conclusion, this comprehensive analysis of the impact of cryptocurrencies on the Indonesian Rupiah exchange rate from 2018 to 2022 aims to provide valuable insights for policymakers, investors, and businesses operating within Indonesia's financial markets. The results of this research contributed to informed decision-making regarding cryptocurrency regulation, investment strategies, and risk management practices.

CHAPTER II
REVIEW OF RELATED LITERATURE

2.1 Theoretical Review

This section provides a theoretical review of the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies from 2018 to 2022. The literature review aims to explore the existing theories, concepts, and empirical studies related to this topic.

2.1.1 Indonesian Rupiah Exchange Rate

The Indonesian Rupiah (IDR) is Indonesia's official currency and is crucial to the country's economy. Several factors, including economic indicators, monetary policies, and external shocks, influence the exchange rate of the IDR against other major currencies. Some research has examined the determinants of the IDR exchange rate, such as inflation, interest rates, trade balance, and foreign direct investment.

Inflation is one of the key factors affecting the IDR exchange rate. High inflation erodes the purchasing power of the currency, leading to a depreciation in its value. Central banks often respond to high inflation by raising interest rates, which can attract foreign investors seeking higher returns. This increased demand for the IDR can strengthen its exchange rate. Conversely, low inflation or deflation can lead to a depreciation of the IDR.

Pratiwik and Prajanti (2023) suggested that inflation expectations significantly determine the IDR exchange rate. When inflation expectations are high, investors may anticipate a currency depreciation and demand other currencies, leading to a depreciation of the IDR. On the other hand, if inflation expectations are low, investors may anticipate a stable or appreciating IDR, leading to an appreciation of the currency.

Interest rates also play a significant role in determining the IDR exchange rate. Higher interest rates can attract foreign investors, as they can earn higher returns on their investments.

This increased demand for the IDR can lead to an appreciation in its value. Conversely, lower interest rates can discourage foreign investors, leading to a depreciation of the IDR.

According to Lee (2019), the relationship between interest rates and the IDR exchange rate can sometimes be complicated. In some cases, a decrease in interest rates may lead to an appreciation of the IDR if positive economic indicators, such as strong economic growth or low inflation, accompany it. This research suggested that the overall economic conditions and investor sentiment also play a role in determining the impact of interest rates on the IDR exchange rate.

The trade balance is another crucial factor influencing the IDR exchange rate. A trade surplus, where a country exports more than it imports, can lead to an appreciation of the currency. This happened because the increased demand for the country's goods and services generates a demand for its currency. On the other hand, a trade deficit, where a country imports more than it exports, can lead to currency depreciation.

Empirical studies have shown mixed results regarding the relationship between the trade balance and the IDR exchange rate. Some studies suggested that a trade surplus is associated with an appreciation of the IDR, while others found no significant relationship (Jones, 2017). This may be due to other factors, such as capital flows or investor sentiment, which can influence the IDR exchange rate independently of the trade balance.

Foreign direct investment (FDI) also affects the IDR exchange rate. FDI inflows can strengthen the IDR as foreign investors need to convert their currencies into IDR to invest in the country. This increased demand for the IDR can be appreciated for its value. Conversely, FDI outflows can lead to a depreciation of the IDR as foreign investors convert their IDR holdings back into their home currencies.

Research by Jones (2017) suggested that FDI inflows positively impact on the IDR exchange rate, especially when accompanied by positive economic indicators, such as strong economic growth or political stability. However, the impact of FDI on the IDR exchange rate may vary depending on the sector and the nature of the investment.

In recent years, the rise of cryptocurrencies has introduced a new element of uncertainty in the foreign exchange market. Cryptocurrencies, such as Bitcoin, have gained popularity as an alternative currency. However, their volatility and lack of regulation can have a negative impact on traditional currencies, including the IDR. The sudden fluctuations in the value of cryptocurrencies can create uncertainty and instability in the foreign exchange market, leading to increased exchange rate volatility for traditional currencies like the IDR.

The impact of cryptocurrencies on the IDR exchange rate is still a new area of research. Some studies suggested that the rise of cryptocurrencies has increased exchange rate volatility for traditional currencies, including the IDR. However, more research is needed to fully understand the relationship between cryptocurrencies and the IDR exchange rate.

In conclusion, the Indonesian Rupiah (IDR) exchange rate is influenced by several factors, including inflation, interest rates, trade balance, and foreign direct investment. These factors interact with each other and with external shocks to determine the value of the IDR against other major currencies. Additionally, the rise of cryptocurrencies has introduced a new element of uncertainty in the foreign exchange market, which can have a negative impact on traditional currencies like the IDR.

2.1.2 Cryptocurrencies

Cryptocurrencies have become a subject of significant interest and research in recent years. These digital currencies, including Bitcoin, Ethereum, and Ripple, operate on decentralized networks using blockchain technology (Nakamoto, 2009). As a result, they have raised questions about their impact on traditional financial systems, particularly about exchange rates (Bouri et al., 2017). To understand the implications of cryptocurrencies on exchange rates, researchers have explored various economic variables, such as stock markets, interest rates, and exchange rates (Cheah & Fry, 2015; Dyhrberg, 2016).

One theoretical framework that has been used to analyse the relationship between cryptocurrencies and exchange rates is the asset pricing model. According to this model, the value of an asset, including a cryptocurrency, is determined by its expected future cash flows and the risk associated with those cash flows. Researchers have applied this model to cryptocurrencies and found that market sentiment, liquidity, and macroeconomic variables can influence their value and exchange rates (Cheah & Fry, 2015).

Another concept explored about cryptocurrencies and exchange rates is the efficient market hypothesis (EMH). The EMH suggested that financial markets are efficient and that asset prices reflect all available information. However, when it comes to cryptocurrencies, the market is new and less regulated, leading to increased volatility and potential inefficiencies. Empirical studies have found evidence of market inefficiencies in the cryptocurrency market, which can impact exchange rates (Dyhrberg, 2016).

Furthermore, the concept of risk appetite has been examined in the context of cryptocurrencies and exchange rates. Risk appetite refers to the willingness of investors to take on risky assets. Cryptocurrencies are often considered high-risk assets due to their volatility and lack of regulation. Studies have found that changes in risk appetite can affect the demand for cryptocurrencies, which can impact exchange rates (Bouri et al., 2017).

In addition to these theoretical frameworks and concepts, empirical studies have provided insights into the relationship between cryptocurrencies and exchange rates. For example, research has shown that the introduction of Bitcoin futures contracts on traditional financial markets can influence the value of Bitcoin and, consequently, exchange rates (Cheah & Fry, 2015). Other studies have found a positive relationship between cryptocurrency returns and exchange rate volatility, suggesting that cryptocurrency fluctuations can spill over into exchange rate movements (Dyhrberg, 2016).

To summarize, the impact of cryptocurrencies on exchange rates is a complex and multifaceted topic. Theoretical frameworks such as the asset pricing model and the efficient market hypothesis provide a basis for understanding the relationship between cryptocurrencies and

exchange rates. Concepts like risk appetite further contribute to our understanding of how changes in investor sentiment can affect exchange rates. Empirical studies have provided evidence of the influence of factors such as market sentiment, liquidity, and the introduction of Bitcoin futures contracts on exchange rates. However, given cryptocurrencies' new and evolving nature, further research is needed to understand their impact on exchange rates fully.

2.1.3 Relationship Between Indonesian Rupiah Exchange Rate and Cryptocurrencies

The relationship between the Indonesian Rupiah exchange rate and cryptocurrencies is an unexplored area of research. Understanding this relationship is crucial for policymakers, investors, and market participants. Some research has investigated the impact of cryptocurrencies on exchange rates in other countries (Baur et al., 2018; Corbet et al., 2019). However, there needs to be more research specifically focusing on the Indonesian context.

We can start with a theoretical review to explore the existing theories, concepts, and empirical studies related to the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies. This review will provide a foundation for understanding the potential factors and mechanisms that may influence this relationship.

One of the key theories that can be applied to this context is the theory of exchange rate determination. According to this theory, exchange rates are determined by the supply and demand for currencies in the foreign exchange market. Factors such as interest rates, inflation rates, economic growth, and geopolitical events can affect the supply and demand for currencies, thereby influencing exchange rates (Mishkin, 2016).

In the case of cryptocurrencies, their impact on exchange rates can be attributed to several factors. First, cryptocurrencies are often seen as alternative investment assets, and their attractiveness to investors can affect the demand for traditional currencies, including the Indonesian Rupiah. For example, if cryptocurrencies are perceived as a more profitable investment option, investors may sell their Rupiah holdings to buy cryptocurrencies, leading to a depreciation of the Rupiah exchange rate.

Second, the regulatory environment surrounding cryptocurrencies can also influence their impact on exchange rates. Countries have adopted varying approaches to regulating cryptocurrencies, ranging from outright bans to more lenient regulations. These regulatory measures can influence the perception of cryptocurrencies as legitimate investment assets, which can affect their demand and exchange rates (Baur et al., 2018).

Furthermore, the volatility of cryptocurrencies can also contribute to their impact on exchange rates. Cryptocurrencies are known for their price volatility, with significant fluctuations occurring within short periods. This volatility can create uncertainty and risk for investors, leading to changes in their demand for traditional currencies. If investors perceive cryptocurrencies as highly volatile and risky, they may prefer to hold more stable currencies like the Indonesian Rupiah, leading to an appreciation of the Rupiah exchange rate.

Empirical studies have provided some insights into the relationship between cryptocurrencies and exchange rates in other countries. For example, Baur et al. (2018) examined the impact of Bitcoin on exchange rates in major economies and found evidence of a significant relationship. They argued that the impact of Bitcoin on exchange rates is driven by factors such as investor sentiment, market liquidity, and macroeconomic conditions.

Corbet et al. (2019) conducted a comprehensively analysed of the relationship between cryptocurrencies and exchange rates in a sample of twenty-seven countries. They found that cryptocurrencies significantly impact exchange rates, but the magnitude and direction of the impact vary across countries. They also highlighted the importance of regulatory factors in shaping this relationship.

However, it is important to note that these studies focused on a broader international context and did not specifically examine the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies. Therefore, further research is needed to understand the specific dynamics and factors in the Indonesian context.

In conclusion, the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies is an area that requires further exploration. Theoretical frameworks such as the theory of exchange rate determination can provide a foundation for understanding the potential factors and mechanisms that may influence this relationship. Empirical studies in other countries have highlighted the significance of investor sentiment, market liquidity, macroeconomic conditions, and regulatory factors. However, more research specifically focusing on the Indonesian context is needed to provide a comprehensive understanding of this relationship.

2.2 Theoretical Framework

This section reviews of the related literature on the relationship between Indonesian Rupiah (IDR) exchange rate and cryptocurrencies. The theoretical framework provides a foundation for understanding the factors that influence the exchange rate and the impact of cryptocurrencies on the IDR exchange rate.

2.2.1 Exchange Rate Determinants

Several factors, including economic fundamentals, market sentiment, and policy decisions, influence the exchange rate. Economic fundamentals such as inflation, interest rates, and economic growth are crucial in determining the exchange rate (Cheung, Chinn, & Fujii, 2019). Market sentiment, on the other hand, reflects investors' expectations and perceptions of the currency's value (Bekaert, Hoerova, and Lo Duca, 2013). Policy decisions, including monetary and fiscal policies, can also impact the exchange rate (Obstfeld, Shambaugh, and Taylor, 2010).

Exploring the existing theories, concepts, and empirical studies related to this topic is essential to understand the determinants of exchange rates. This section will provide an overview of the theoretical framework surrounding exchange rate determinants.

One of the most widely accepted theories in this field is the purchasing power parity (PPP) theory. According to this theory, the exchange rate between two countries should equalize the prices of a basket of goods and services in both countries. In other words, the exchange rate should reflect the relative purchasing power of each currency (Cheung et al., 2019). However, empirical

studies have shown that the PPP theory does not hold in the short run due to several factors, such as transaction costs, trade barriers, and market imperfections (Bekaert et al., 2013).

Another important theory is the interest rate parity (IRP) theory. According to this theory, the difference in interest rates between two countries should be equal to the expected change in the exchange rate. In other words, if the interest rate in one country is higher than that of another, the country's currency with the higher interest rate should depreciate to equalize the returns on investments (Obstfeld et al., 2010). However, empirical studies have shown mixed results regarding the validity of the IRP theory, suggesting that other factors may also influence exchange rates (Cheung et al., 2019).

In addition to these theories, several other factors have been found to influence exchange rates. One such factor is the balance of payments, which reflects the flow of goods, services, and capital between countries. A country with a surplus in its balance of payments will likely experience an appreciation of its currency. In contrast, a country with a deficit will likely experience a depreciation (Bekaert et al., 2013).

Furthermore, market sentiment and investor expectations can significantly impact exchange rates. For example, suppose investors believe that a country's economy is performing well, and its currency is likely to strengthen. In that case, they may increase their demand for that currency, leading to an appreciation (Obstfeld et al., 2010). On the other hand, if investors have negative perceptions about a country's economic prospects, they may sell off its currency, leading to a depreciation.

Policy decisions, particularly monetary and fiscal policies, can also influence exchange rates. Central banks, through their monetary policy tools, such as interest rate adjustments and open market operations, can affect the supply and demand for a country's currency, thereby influencing its exchange rate (Cheung et al., 2019). Similarly, fiscal policies, such as changes in government spending and taxation, can impact a country's economic fundamentals and, consequently, its exchange rate (Bekaert et al., 2013).

It is important to note that exchange rates are influenced by a complex interplay of these factors, and their relative importance may vary over time and across countries. Therefore, it is challenging to predict exchange rate movements accurately. Many empirical studies have attempted to identify the key determinants of exchange rates, but the results often need to be more conclusive or context-specific (Obstfeld et al., 2010).

In conclusion, the exchange rate is influenced by a combination of economic fundamentals, market sentiment, and policy decisions. Economic fundamentals such as inflation, interest rates, and economic growth are crucial in determining exchange rates. Market sentiment reflects investors' expectations and perceptions of a currency's value. Policy decisions, including monetary and fiscal policies, can also impact exchange rates. Understanding the determinants of exchange rates is important for policymakers, investors, and businesses operating in the global economy. However, due to the complex nature of exchange rate determination, accurately predicting exchange rate movements remains challenging.

2.2.2 Role of Cryptocurrencies in the Digital Economy

Cryptocurrencies have gained significant attention in the digital economy due to their potential to disrupt traditional financial systems (Bouri et al., 2017). They offer decentralized and secure transactions, bypassing intermediaries such as banks (Nakamoto, 2008). Cryptocurrencies have also emerged as alternative investment assets, attracting investors seeking diversification and potentially high returns (Bouri et al., 2017).

In the digital economy, cryptocurrencies play a crucial role in reshaping financial transactions and investment practices. This section explores the existing theories, concepts, and empirical studies related to the role of cryptocurrencies in the digital economy.

One of the key theoretical frameworks that can be applied to understand the role of cryptocurrencies is the concept of decentralization. Cryptocurrencies, such as Bitcoin, are built on blockchain technology, which enables decentralized and transparent transactions. This decentralization eliminates the need for intermediaries, such as banks, and allows for peer-to-peer

transactions (Nakamoto, 2008). The decentralized nature of cryptocurrencies provides individuals with greater control over their financial transactions and reduces reliance on centralized financial institutions.

Another theoretical framework that can be applied is the concept of financial inclusion. Cryptocurrencies have the potential to provide financial services to the unbanked and underbanked populations, particularly in developing countries. Traditional banking systems often exclude individuals who lack access to formal financial institutions. However, cryptocurrencies can enable individuals to participate in the digital economy and access financial services through smartphones or other digital devices (Bouri et al., 2017). This can contribute to reducing the global financial inclusion gap and empowering individuals with greater financial autonomy.

Empirical studies have also explored the role of cryptocurrencies in the digital economy. For example, research has examined the impact of cryptocurrencies on financial markets and investment portfolios. Bouri et al. (2017) found that cryptocurrencies exhibit low correlations with traditional asset classes, such as stocks and bonds, making them attractive for diversification purposes. This suggests that cryptocurrencies can potentially provide investors with an additional asset class to enhance portfolio performance.

Furthermore, studies have investigated the role of cryptocurrencies in cross-border transactions and remittances. Cryptocurrencies can facilitate faster, and cheaper cross-border transactions compared to traditional banking systems. For individuals in developing countries who rely on remittances from abroad, cryptocurrencies can offer a more efficient and cost-effective means of receiving funds (Bouri et al., 2017). This can significantly affect financial inclusion and economic development in these regions.

It is important to note that the role of cryptocurrencies in the digital economy is challenging and challenging. Regulatory frameworks and legal considerations vary across countries, which can impact the adoption and use of cryptocurrencies. Additionally, the volatility and speculative nature of cryptocurrencies pose risks for investors and can lead to market instability (Bouri et al., 2017).

Therefore, policymakers, regulators, and market participants must carefully consider the implications and potential risks associated with cryptocurrencies.

In conclusion, cryptocurrencies have emerged as disruptive forces in the digital economy, offering decentralized and secure transactions while attracting investors seeking diversification and potential high returns. Theoretical frameworks such as decentralization and financial inclusion provide insights into the role of cryptocurrencies in reshaping financial transactions and investment practices. Empirical studies highlight cryptocurrencies' potential benefits in portfolio diversification, cross-border transactions, and financial inclusion. However, challenges and risks, including regulatory considerations and market volatility, need to be carefully addressed. The role of cryptocurrencies in the digital economy continues to evolve, and further research is needed to fully understand their impact and potential implications.

2.2.3 Impact of Cryptocurrencies on Exchange Rates

Cryptocurrencies have gained significant attention recently, with Bitcoin being the most prominent example (Bouri et al., 2017). As the popularity of cryptocurrencies continues to grow, researchers have started exploring their impact on various aspects of the economy, including exchange rates. This theoretical review examines existing theories, concepts, and empirical studies related to the impact of cryptocurrencies on exchange rates. By analysing the findings of previous research, we can gain insights into the relationship between cryptocurrencies and currency values.

Several studies have investigated the relationship between cryptocurrencies and exchange rates. Bouri et al. (2017) conducted a comprehensive analysis and found that cryptocurrencies, such as Bitcoin, can act as a hedge against traditional currencies during periods of economic uncertainty. This finding suggests that investors may turn to cryptocurrencies as a haven asset, impacting exchange rates.

Furthermore, Bouri et al. (2017) identified a positive relationship between Bitcoin and exchange rates. This implies that changes in Bitcoin prices can influence currency values. The authors argue that this relationship can be attributed to the increasing acceptance and integration

of cryptocurrencies into the global financial system. As cryptocurrencies gain wider adoption, their impact on exchange rates becomes more significant.

Dyhrberg (2016) also explored the relationship between Bitcoin returns and exchange rate volatility. The research found evidence of a positive relationship, indicating that fluctuations in Bitcoin prices can affect exchange rate volatility. This finding suggested that cryptocurrencies can introduce additional volatility into the foreign exchange market, potentially impacting currency values.

To understand the impact of cryptocurrencies on exchange rates, it is essential to consider relevant theoretical frameworks. One such framework is the portfolio balance approach. According to this theory, investors allocate their wealth between different assets based on risk-return profiles. If cryptocurrencies are perceived as a viable investment option, investors may allocate a portion of their wealth to cryptocurrencies, leading to changes in exchange rates.

Another theoretical perspective is the market efficiency hypothesis. This hypothesis suggests that financial markets quickly incorporate all available information into asset prices. If cryptocurrencies provide new information or reflect market sentiment, their prices may influence exchange rates. This implies that changes in cryptocurrency prices can lead to adjustments in currency values.

In addition to the theoretical frameworks, empirical studies provide valuable insights into the impact of cryptocurrencies on exchange rates. For example, Cheah and Fry (2015) examined the relationship between Bitcoin prices and exchange rates for several major currencies. They found evidence of a positive relationship, indicating that changes in Bitcoin prices can affect currency values.

Moreover, Ciaian et al. (2016) investigated the impact of Bitcoin on exchange rates using a panel data approach. The study analysed data from multiple countries and found that Bitcoin has a significant impact on exchange rates, especially in countries with higher Bitcoin trading volumes.

This suggested that the influence of cryptocurrencies on exchange rates may vary across different countries.

The impact of cryptocurrencies on exchange rates is a complex and evolving topic. Existing studies have provided valuable insights into the relationship between cryptocurrencies, such as Bitcoin, and currency values. The findings suggest that cryptocurrencies can hedge during economic uncertainty and influence exchange rates. However, further research is needed to fully understand how cryptocurrencies affect exchange rates and explore the potential implications for policymakers and market participants.

2.2.4 Regulatory Considerations

Given the potential impact of cryptocurrencies on exchange rates, regulatory measures have been proposed to manage their risks. Some countries have implemented regulations to monitor and control cryptocurrency activities (Cheah & Fry, 2015). However, the effectiveness of these regulations in mitigating risks and ensuring stability in the exchange rate remains a topic of debate (Cheah & Fry, 2015).

In recent years, the rise of cryptocurrencies has sparked a global debate on the need for regulatory measures to address the risks associated with these digital assets. This section provides a theoretical review of existing theories, concepts, and empirical studies related to the regulatory considerations of cryptocurrencies and their impact on exchange rates.

One key theory underpinning the need for regulatory measures is the efficient market hypothesis (EMH). According to the EMH, financial markets are efficient and reflect all available information, making it difficult for investors to consistently outperform the market (Fama, 1970). However, the emergence of cryptocurrencies has challenged this hypothesis, as these digital assets are highly volatile and subject to manipulation and fraud (Cheah & Fry, 2015). Therefore, regulatory measures are necessary to protect investors and ensure market stability.

Another theoretical perspective that informs regulatory considerations is the concept of market failure. Market failure occurs when the free-market mechanism fails to allocate resources efficiently, leading to suboptimal outcomes (Stiglitz, 2000). In cryptocurrencies, market failure can arise due to information asymmetry, lack of transparency, and the absence of a central authority to regulate and supervise transactions (Cheah & Fry, 2015). Regulatory measures aim to address these market failures and create a more secure and transparent environment for cryptocurrency transactions.

Empirical studies have also shed light on the impact of regulatory measures on exchange rates and market stability. For example, Cheah and Fry (2015) studied the relationship between Bitcoin, the most well-known cryptocurrency, and exchange rates. They found that government regulatory announcements and actions significantly impacted Bitcoin prices and exchange rates. This suggested that regulatory measures can influence the stability of exchange rates by affecting the demand and supply dynamics of cryptocurrencies.

Furthermore, the experiences of different countries provide valuable insights into the effectiveness of regulatory measures in managing the risks associated with cryptocurrencies. For instance, Japan has been at the forefront of cryptocurrency regulation, implementing a licensing system for cryptocurrency exchanges and introducing consumer protection measures (Nakamura, 2018). This proactive approach has helped to enhance market confidence and stability in Japan's cryptocurrency market.

On the other hand, countries like China have taken a more restrictive stance towards cryptocurrencies, banning initial coin offerings (ICOs) and shutting down cryptocurrency exchanges (Zetzsche et al., 2019). While these measures aimed to curb speculative activities and protect investors, they also led to a decline in cryptocurrency trading volumes and market activity in China.

In conclusion, the regulatory considerations surrounding cryptocurrencies and their impact on exchange rates are complex and multifaceted. Theoretical perspectives such as the efficient market hypothesis and market failure provide a framework for understanding the need for regulatory measures. Empirical studies and country experiences further contribute to the ongoing

debate on the effectiveness of these measures in mitigating risks and ensuring stability in the exchange rate. As the cryptocurrency market evolves, policymakers and regulators must adapt their approaches to balance innovation and investor protection.

2.2.5 The Case of Indonesian Rupiah

In Indonesia, limited research has been conducted on the relationship between the IDR exchange rate and cryptocurrencies. This research aims to fill this gap by examining the impact of cryptocurrencies on the IDR exchange rate from 2018 to 2022. By analysing the dynamics between cryptocurrencies and the IDR exchange rate, this research contributes to understanding how cryptocurrencies influence the Indonesian Rupiah.

To understand the relationship between cryptocurrencies and the IDR exchange rate, exploring existing theories, concepts, and empirical studies related to this topic is important. Several theories and concepts can provide insights into the potential impact of cryptocurrencies on the IDR exchange rate.

One relevant theory is the efficient market hypothesis (EMH), which suggests that financial markets are efficient and reflect all available information. According to this theory, if cryptocurrencies are widely adopted and traded in Indonesia, their prices should reflect all relevant information, including factors influencing the IDR exchange rate. Empirical studies have examined the efficiency of cryptocurrency markets in other countries, such as the United States and Japan, but more research needs to be conducted in the Indonesian context.

Another concept that can be explored is the concept of capital flight. Capital flight refers to the movement of assets, including cryptocurrencies, out of a country due to economic or political instability. If investors in Indonesia perceive the IDR exchange rate to be unstable or depreciating, they may choose to convert their IDR holdings into cryptocurrencies as a means of preserving their wealth. This could potentially lead to a decrease in demand for the IDR and put downward pressure on its exchange rate.

Furthermore, the concept of speculative trading can also be relevant in understanding the relationship between cryptocurrencies and the IDR exchange rate. Cryptocurrencies are known for their volatility, and speculative traders may take advantage of price fluctuations to make profits. If speculative trading in cryptocurrencies becomes prevalent in Indonesia, it could potentially impact the IDR exchange rate through increased trading volumes and price volatility.

Empirical studies can provide valuable insights into the impact of foreign currencies on cryptocurrencies. For example, Bashar Almansour (2020) analysed the relationship between Bitcoin and the exchange rates of various foreign currencies. The research found that some foreign currencies studied were significant at a 90 percent significance level. This suggested that other factors, such as economic fundamentals and government policies, may have a stronger influence on the exchange rate of the Indonesian Rupiah (IDR) compared to cryptocurrencies.

Another empirical study by Chen et al. (2020) investigated the relationship between cryptocurrency trading volumes and exchange rate volatility in several Asian countries, including Indonesia. The study found that higher cryptocurrency trading volumes were associated with increased exchange rate volatility in some countries. This implies that the trading activity in cryptocurrencies can have spillover effects on traditional currency markets, potentially affecting the IDR exchange rate.

In conclusion, limited research has been conducted on the relationship between cryptocurrencies and the IDR exchange rate in Indonesia. This research aimed to fill this gap by examining the impact of cryptocurrencies on the IDR exchange rate from 2018 to 2022. By exploring existing theories, concepts, and empirical studies, this research seeks to contribute to understanding how cryptocurrencies influence the Indonesian Rupiah. The efficient market hypothesis, capital flight, and speculative trading are some theories and concepts that can provide insights into this relationship. Empirical studies have shown mixed results, with some suggesting a significant impact of cryptocurrencies on exchange rates while others find a small effect. Further research is needed to fully understand the dynamics between cryptocurrencies and the IDR exchange rate.

2.3 Research Hypotheses

This research investigated the potential relationship between the Indonesian Rupiah exchange rate and cryptocurrencies during 2018-2022. The following hypotheses have been formulated:

a. **The first hypothesis is:**

   Null Hypothesis (H_0): There is no significant relationship between the Indonesian Rupiah exchange rate and cryptocurrencies.

   Alternative Hypothesis (H_1): There is a significant relationship between the Indonesian Rupiah exchange rate and cryptocurrencies.

b. **The second hypothesis is:**

   Null Hypothesis (H_0): Cryptocurrencies do NOT impact the Indonesian Rupiah exchange rate.

   Alternative Hypothesis (H_1): Cryptocurrencies impact the Indonesian Rupiah exchange rate.

   These hypotheses guided the research and helped determine whether there is a meaningful connection between the Indonesian Rupiah exchange rate and the world of cryptocurrencies.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Data and Sample

Monthly time series data for the Indonesian Rupiah exchange rate or IDR (against the US Dollar) and the top 4 cryptocurrencies, Cryptocurrency Market Cap2, Cryptocurrency Trading Volume (24h)3, and five different economic Indicators for the period between January 2018 and December 2022 were obtained from Bank Indonesia (the Central Bank of the Republic of Indonesian)4, CoinMarketCap5, investing.com and from Federal Reserve Economic Data (FRED)6 Respectively.

The research consisted of 60 samples for the Indonesian Rupiah (IDR), the top four cryptocurrencies such as Bitcoin, Ethereum, Binance, and XRP and also consists of Cryptocurrency Market Cap, Cryptocurrency Trading Volume, and the most important five economic Indicators in the case study such as Inflation rate, Interest rate, Consumer Price Index, International Trade Rate and Total Reserves Excluding Gold.

Once the exchange rate price data were obtained from various sources, they were compiled into one cohesive data frame. In addition, incomplete information due to differences in the dates of the data for the cryptocurrencies was omitted.

3.2 Study Variables

The research used the following variables to examine the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies:

- **Dependent Variable:** Indonesian Rupiah exchange rate (IDR).

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[2] Total market value of the circulating supply of all cryptocurrencies, including stablecoins and tokens.
[3] Overall 24-hour spot trading volume of all cryptocurrencies, including stablecoins and tokens.
[4] https://www.bi.go.id/en/
[5] https://coinmarketcap.com
[6] https://fredhelp.stlouisfed.org/

- **Independent Variables:**

  o Cryptocurrencies: Bitcoin (BTC), Ethereum (ETH), Binance Coin (BNB), and Ripple (XRP).

  o Cryptocurrency Market Cap (CMC): The total market capitalization of all cryptocurrencies.

  o Cryptocurrency Trading Volume (CTV): The total trading volume of all cryptocurrencies in the past 24 hours.

- **Control Variables (Economic Indicators):**

  o Inflation Rate: The rate at which prices for goods and services are increasing.

  o Interest Rate: The rate at which banks charge borrowers for loans.

  o Consumer Price Index (CPI): A measure of the average change in prices paid by consumers for a basket of consumer goods and services.

  o International Trade Rate: The ratio of a country's exports to its imports.

  o Total Reserves excluding Gold: The total amount of foreign currency reserves held by a country's central bank, excluding gold reserves.

3.3 Study Model Specification

The dynamic logarithm linear model used in this research is as follows:

$$\log(\text{IDR})_t = \beta_0 + \beta_1 \log(\text{BTC})_t + \beta_2 \log(\text{ETH})_t + \beta_3 \log(\text{BNB})_t + \beta_4 \log(\text{XRP})_t$$
$$+ \beta_5 \log(\text{CMC})_t + \beta_6 \log(\text{CTV})_t + \beta_7 \log(\text{INF})_t + \beta_8 \log(\text{R})_t + \beta_9 \log(\text{CPI})_t$$
$$+ \beta_{10} \log(\text{ITR})_t + \beta_{11} \log(\text{TREG})_t + e_t$$

$$(1)$$

Whereas:

β_0: intercept.

β_n: Coefficient.

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e: Error.

log(IDR) = Indonesian Rupiah Exchange rate (IDR/USD),

log(BTC) = Bitcoin (BTC/USD);

log(ETH) = Ethereum (ETH/USD).

log(BNB) = Binance (BNB/USD);

log(XRP) = Ripple (XRP/USD).

log(CMC) = Cryptocurrency Market Cap (in US Dollar).

log(CTV) = Cryptocurrency Trading Volume (24h) (in US. Dollar).

log(INF) = Inflation Rate.

log(R) = Interest Rate.

log(CPI) = Consumer Price Index: All Items: Total for Indonesia.

log(ITR) = International Trade Rate; and

log(TREG)= Total Reserves Excluding Gold.

The ARDL model equation for equation (1) can be written as follows:

$$\Delta \log(IDR)_t = \theta_0 + \theta_1 \Delta \log(IDR)_{t-1} + \theta_2 \Delta \log(BTC)_t + \theta_3 \Delta \log(ETH)_t + \theta_4 \Delta \log(BNB)_t$$
$$+ \theta_5 \Delta \log(XRP)_t + \theta_6 \Delta \log(CMC)_t + \theta_7 \Delta \log(CTV)_t + \theta_8 \Delta \log(INF)_t$$
$$+ \theta_9 \Delta \log(R)_t + \theta_{10} \Delta \log(CPI)_t + \theta_{11} \Delta \log(ITR)_t + \theta_{12} \Delta \log(TREG)_t$$
$$+ \theta_{13} ECT_{t-1} + u_t$$

$$(2)$$

3.4 Statistical Methods

The research methodology involved a comprehensive suite of statistical methods to analyse the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies while considering economic indicators. The initial phase included Descriptive Statistics to understand the central tendencies and dispersion of the data. Correlation analysis was then performed to detect multicollinearity among variables, ensuring the independence of factors influencing the Indonesian Rupiah.

Furthermore, Autocorrelation tests were conducted to examine the presence of serial correlation. To mitigate autocorrelation issues, the research used the Heteroscedasticity and Autocorrelation Consistent (HAC) model. This method addressed potential heteroscedasticity and serial correlation, enhancing the reliability of the estimations.

Another crucial step involved Stationarity tests for the monthly time series data. Utilizing Group Unit Root tests the study evaluated stationarity, a fundamental assumption in time series analysis. Establishing stationarity ensured the reliability of statistical inferences and the accurate estimation of parameters.

Subsequently, the research used the Dynamic Logarithm Linear Model and its Auto Regressive Distributed Lag (ARDL) form for long-run and short-run relationship analysis. EViews 10 software facilitated the analysis, leveraging its advanced regression techniques tailored for such estimations. This rigorous statistical approach allowed for a robust examination of the interplay between the Indonesian Rupiah exchange rate, cryptocurrencies, and key economic indicators.

CHAPTER IV
STUDY RESULTS

4.1 Descriptive Statistics

This section presents the descriptive statistics of the variables used in this research on the relationship between the Indonesian Rupiah (IDR) exchange rate and cryptocurrencies. The variables considered in the analysis included IDR, Bitcoin (BTC), Ethereum (ETH), Binance (BNB), Ripple (XRP), Cryptocurrency Market Cap (CMC), Cryptocurrency Trading Volume (CTV), Inflation Rate (INF), Interest Rate (R), Consumer Price Index (CPI), International Trade Rate (ITR), and Total Reserves Excluding Gold (TREG).

Table 4.1 provides an overview of the descriptive statistics for each variable. The mean, median, maximum, minimum, standard deviation, skewness, and kurtosis are reported for each variable. Descriptive statistics offer valuable insights into the distribution and characteristics of the variables. They provide a foundation for further analysis and exploration of the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies.

The descriptive statistics results indicate the following:

1. The Indonesian Rupiah (IDR) exchange rate showed a mean value of 14,423.4 with a median of 14,322.5. The maximum and minimum values were 16,300 and 13,387, respectively. The standard deviation was 515.9652, indicating an elevated level of volatility. The skewness value of 1.273152 suggested a positive skew, indicating a longer right tail in the distribution. The kurtosis value of 5.417306 indicated a leptokurtic distribution, implying heavy tails and a higher probability of extreme values.

2. Bitcoin (BTC) showed a mean value of 20,338.99, with a median of 10,769.5. The maximum value was 61,330, while the minimum value was 3,501.1. The standard deviation was 16,937.8, indicating a significantly higher level of volatility compared to IDR. The skewness value of 0.991896 suggested a slightly positive skew, indicating a longer right tail. The kurtosis value of 2.641739 indicated a platykurtic distribution, implying lighter tails compared to IDR.

3. Ethereum (ETH) exhibited a mean value of 1,147.711, with a median of 515.64. The maximum and minimum values were 4,631.22 and 106.3, respectively. The standard deviation was 1,208.631, indicating an elevated level of volatility. The skewness value of 1.160682 suggested a positive skew, indicating a longer right tail. The kurtosis value of 3.297888 indicated a leptokurtic distribution, implying heavy tails.

4. Binance (BNB) showed a mean value of 152.5482, with a median of 28.12. The maximum and minimum values were 623.33 and 5.12, respectively. The standard deviation was 185.5804, indicating an elevated level of volatility. The skewness value of 0.959105 suggested a slightly positive skew, indicating a longer right tail. The kurtosis value of 2.613992 indicated a platykurtic distribution.

5. Ripple (XRP) exhibited a mean value of 0.505208, with a median of 0.411765. The maximum and minimum values were 1.59858 and 0.1736, respectively. The standard deviation was 0.305056, indicating a low level of volatility compared to other cryptocurrencies. The skewness value of 1.358537 suggested a positive skew, indicating a longer right tail. The kurtosis value of 4.576707 indicated a leptokurtic distribution.

6. The Cryptocurrency Market Cap (CMC) showed a mean value of 803,000,000,000, with a median of 364,000,000,000. The maximum and minimum values were 2,670,000,000,000 and 122,000,000,000, respectively. The standard deviation was 735,000,000,000, indicating a significantly elevated level of variability. The skewness value of 0.957766 suggested a slightly positive skew, indicating a longer right tail. The kurtosis value of 2.534129 indicated a platykurtic distribution.

7. Cryptocurrency Trading Volume (CTV) exhibited a mean value of 79,900,000,000, with a median of 74,200,000,000. The maximum and minimum values were 214,000,000,000 and 11,800,000,000, respectively. The standard deviation was 50,800,000,000, indicating an elevated level of variability. The skewness value of 0.638233 suggested a slightly positive

skew, indicating a longer right tail. The kurtosis value of 3.007744 indicated a leptokurtic distribution.

8. The Inflation Rate (INF) showed a mean value of 0.028057, with a median of 0.02855. The maximum and minimum values were 0.0595 and 0.0132, respectively. The standard deviation was 0.011593, indicating a low level of variability. The skewness value of 0.837265 suggested a positive skew, indicating a longer right tail. The kurtosis value of 3.442960 indicated a leptokurtic distribution.

9. Other variables, such as Interest Rate (r), Consumer Price Index (CPI), International Trade Rate (ITR), and Total Reserves Excluding Gold (TREG), also exhibited their respective descriptive statistics, including mean, median, maximum, minimum, standard deviation, skewness, and kurtosis.

In the short run, these variables can have an impact on the Indonesian Rupiah exchange rate. Factors such as Bitcoin, Ethereum, Binance, Ripple, Cryptocurrency Market Cap, and Cryptocurrency Trading Volume can influence the exchange rate due to their volatility and market dynamics. These cryptocurrencies are known for their price fluctuations and their movements can affect the value of the Indonesian Rupiah in the short term.

Additionally, variables like Inflation Rate, Interest Rate, Consumer Price Index, International Trade Rate, and Total Reserves Excluding Gold can also have an impact on the exchange rate. Changes in these economic indicators can affect the confidence and perception of investors, leading to fluctuations in the exchange rate.

However, in the long run, the impact of these variables on the Indonesian Rupiah exchange rate may diminish. Long-term trends and macroeconomic factors tend to have a more significant influence on the exchange rate. Factors such as economic growth, political stability, trade balances, and monetary policies play a crucial role in determining the long-term value of a currency.

Table 4.1: Summary of descriptive statistics variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
IDR	14,423.4	14,322.5	16,300	13,387	515.9652	1.273152	5.417306
BTC	20,338.99	10,769.5	61,330	3,501.1	16,937.8	0.991896	2.641739
ETH	1,147.711	515.64	4,631.22	106.3	1,208.631	1.160682	3.297888
BNB	152.5482	28.12	623.33	5.12	185.5804	0.959105	2.613992
XRP	0.505208	0.411765	1.59858	0.1736	0.305056	1.358537	4.576707
CMC	803,000,000,000	364,000,000,000	2,670,000,000,000	122,000,000,000	735,000,000,000	0.957766	2.534129
CTV	79,900,000,000	74,200,000,000	214,000,000,000	11,800,000,000	50,800,000,000	0.638233	3.007744
ITR	110.2108	112.6825	142.1144	89.04434	12.47175	0.142631	2.069843
R	0.045	0.0425	0.06	0.035	0.009275	0.381633	1.674756
CPI	116.6346	116.4355	126.0991	109.6979	4.302163	0.392470	2.547931
TREG	127,000,000,000	127,000,000,000	142,000,000,000	112,000,000,000	7,680,000,000	0.022146	2.328283
INF	0.028057	0.02855	0.0595	0.0132	0.011593	0.837265	3.442960

Source: Secondary data processed, 2023

In sum, the descriptive statistics provided an initial understanding of the distribution and characteristics of the variables used in the research. These statistics served as a foundation for further analysis and exploration of the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies as it will be explained in the next part of this analysis (Empirical Results).

EMPIRICAL RESULTS

In this section, several tests such as stationarity, correlation, and dynamic long linear regression were conducted.

4.2 Stationarity Test

Tables A (4.2) and B (4.2) represent ADF & PP test results as follows:

Table A (4.2): Group unit root test in Level: Summary

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	1.63596	0.9491	12	704
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.55612	0.9402	12	704
ADF - Fisher Chi-square	17.1433	0.8425	12	704
PP - Fisher Chi-square	21.5644	0.6052	12	708

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

Source: Secondary data processed, 2023

Table A (4.2) showed that the variables in the study were NOT stationary at level, where the P value (ADF - Fisher Chi-square & PP - Fisher Chi-square) were more than 0.05.

Table B (4.2): Group unit root test in 1st difference: Summary

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-20.9760	0.0000	12	694
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-23.1091	0.0000	12	694
ADF - Fisher Chi-square	369.379	0.0000	12	694
PP - Fisher Chi-square	362.585	0.0000	12	696

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

Source: Secondary data processed, 2023

Table B (4.2) showed that the variables in the study were stationary at 1st difference, where the P value (ADF - Fisher Chi-square & PP - Fisher Chi-square) were less than 0.05.

Table C (4.2): unit root test (Details)

Variable	Level		1st deference		2nd deference	
	ADF Prob	Result	ADF Prob	Result	ADF Prob	Result
IDR	0.0190 0.0258 0.8404	Stationary Stationary None	0.0000	Stationary	0.0000	Stationary
BTC	0.3940	None	0.0000	Stationary	0.0000	Stationary
ETH	0.3264	None	0.0000	Stationary	0.0000	Stationary
BNB	0.4757	None	0.0000	Stationary	0.0000	Stationary
XRP	0.0121 0.0336 0.0352	Stationary Stationary Stationary	0.0000	Stationary	0.0000	Stationary
CMC	0.6648	None	0.0000	Stationary	0.0000	Stationary
CTV	0.1792	None	0.0000	Stationary	0.0000	Stationary
INF	0.9973	None	0.0000	Stationary	0.0000	Stationary
R	0.5820	None	0.0142	Stationary	0.0000	Stationary
CPI	0.9994	None	0.0000	Stationary	0.0000	Stationary
ITR	0.0716	None	0.0000	Stationary	0.0000	Stationary
TREG	0.2321	None	0.0000	Stationary	0.0000	Stationary

Table C (4.2) showed the results of the unit root test for the data of each variable. Where most of the data were not stationary in level but in difference level, so ARDL model is applicable in this case.

4.3 Correlation Results

The correlation matrix in Table 4.3 below presents the correlation coefficients among various variables in the research on the relationship between the Indonesian Rupiah Exchange Rate (IDR) and cryptocurrencies (Bitcoin - BTC, Ethereum - ETH, Binance Coin - BNB, Ripple - XRP). Additionally, the correlations with other economic indicators such as Consumer Price Index (CPI), Trade Balance (TREG), and Inflation (INF) were also included.

The correlation results presented in Table 4.3 provide valuable insights into the relationship between the Indonesian Rupiah Exchange Rate (IDR) and various cryptocurrencies, as well as their associations with other economic indicators. These correlations help us understand the impact of these variables on the IDR exchange rate in the short run and why they may not have the same effect in the long run. The correlation coefficients measure the strength and direction of the linear

relationship between two variables. A correlation coefficient of one indicates a perfect positive correlation, while a coefficient of -1 indicates a perfect negative correlation. A coefficient of zero suggests no linear relationship between the variables.

The correlation results indicate the following:

1. IDR showed a weak positive correlation with BTC (0.078), ETH (0.095), BNB (0.278), CMC (0.110), CTV (0.084), ITR (0.299), CPI (0.540), and INF (0.296). It also showed a weak negative correlation with XRP (-0.205).

2. BTC exhibited a strong positive correlation with ETH (0.927), BNB (0.915), CMC (0.962), and TREG (0.871). It also showed a strong negative correlation with R (-0.860).

3. ETH demonstrated a strong positive correlation with BTC (0.927), BNB (0.905), CMC (0.979), and TREG (0.800). It also showed a strong negative correlation with R (-0.817).

4. BNB displayed a strong positive correlation with BTC (0.915), ETH (0.905), CMC (0.937), and TREG (0.802). It also showed a moderate negative correlation with R (-0.720).

5. XRP exhibited a weak positive correlation with BTC (0.604), ETH (0.754), and CMC (0.688). It also shows a weak negative correlation with R (-0.475).

6. CMC showed a strong positive correlation with BTC (0.962), ETH (0.979), BNB (0.937), and TREG (0.839). It also showed a strong negative correlation with R (-0.838).

7. CTV demonstrated a weak positive correlation with BTC (0.669), ETH (0.435), BNB (0.575), and TREG (0.723). It also showed a weak negative correlation with R (-0.638).

8. ITR exhibited a moderate positive correlation with BTC (0.728), ETH (0.675), BNB (0.726), and TREG (0.761). It also showed a moderate negative correlation with R (-0.745).

9. R, representing the Indonesian Rupiah Exchange Rate, showed a weak positive correlation with IDR (0.002), CPI (0.633), and INF (0.123). However, it showed a strong negative correlation with BTC (-0.860), ETH (-0.817), BNB (-0.720), CMC (-0.838), CTV (-0.745), and TREG (-0.829).

10. CPI demonstrated a moderate positive correlation with IDR (0.540), BTC (0.655), ETH (0.602), BNB (0.812), CMC (0.660), CTV (0.587), ITR (0.779), and INF (0.490). However, it showed a moderate negative correlation with R (-0.515).

11. TREG exhibited a weak positive correlation with BTC (0.655), ETH (0.602), BNB (0.812), CMC (0.660), CTV (0.587), ITR (0.779), and INF (0.490). However, it showed a strong negative correlation with R (-0.829).

12. INF showed a weak positive correlation with IDR (0.296), CPI (0.633), and TREG (0.633). However, it showed a weak negative correlation with BTC (-0.411), ETH (-0.235), BNB (-0.157), XRP (-0.224), CMC (-0.264), CTV (-0.474), ITR (-0.250), and R (0.490).

In the short run, the IDR showed a weak positive correlation with cryptocurrencies such as Bitcoin (BTC), Ethereum (ETH), Binance Coin (BNB), and others. This suggested that in the short term, fluctuations in the values of these cryptocurrencies may have some influence on the IDR exchange rate. Additionally, the IDR also showed weak positive correlations with economic indicators like the Consumer Price Index (CPI) and Inflation (INF). This implied that short-term changes in these indicators may also affect the IDR exchange rate.

However, it is important to note that these correlations were weak, indicating that the impact of cryptocurrencies and economic indicators on the IDR exchange rate in the short run was limited. Other factors, such as market sentiment, investor behaviour, and global economic conditions, may have a more significant influence on the IDR exchange rate in the short term.

In the long run, these correlations may not hold the same significance. The weak positive correlation between the IDR and cryptocurrencies suggested that their impact on the IDR exchange

rate may diminish over time. Similarly, the weak positive correlations between the IDR and economic indicators like CPI and INF also indicated that their influence on the IDR exchange rate may weaken in the long run.

Several factors can explain why these correlations may not hold in the long run. Firstly, the IDR exchange rate was influenced by a wide range of factors, including macroeconomic policies, trade balances, and political stability. These factors may overshadow the influence of cryptocurrencies and economic indicators in the long term.

Secondly, the cryptocurrency market itself was highly volatile and subject to rapid changes. The values of cryptocurrencies can fluctuate significantly over time, making it difficult to establish a consistent and long-term relationship with the IDR exchange rate.

Lastly, global economic conditions and market trends played a crucial role in determining the IDR exchange rate in the long run. Factors such as interest rates, global trade dynamics, and geopolitical events can have a more substantial impact on the IDR exchange rate than individual cryptocurrencies or economic indicators.

Table 4.3. Correlations Matrix

	LOG(IDR)	LOG(BTC)	LOG(ETH)	LOG(BNB)	LOG(XRP)	LOG(CMC)	LOG(CTV)	LOG(ITR)	LOG(R)	LOG(CPI)	LOG(TREG)	LOG(INF)
LOG(IDR)	1	0.078	0.095	0.278	-0.205	0.110	0.084	0.299	0.002	0.540	-0.052	0.296
LOG(BTC)	0.078	1	0.927	0.915	0.604	0.962	0.669	0.728	-0.860	0.655	0.871	-0.411
LOG(ETH)	0.095	0.927	1	0.905	0.754	0.979	0.435	0.675	-0.817	0.602	0.800	-0.235
LOG(BNB)	0.278	0.915	0.905	1	0.550	0.937	0.575	0.726	-0.720	0.812	0.802	-0.157
LOG(XRP)	-0.205	0.604	0.754	0.550	1	0.688	0.040	0.215	-0.475	0.057	0.439	-0.224
LOG(CMC)	0.110	0.962	0.979	0.937	0.688	1	0.538	0.706	-0.838	0.660	0.839	-0.264
LOG(CTV)	0.084	0.669	0.435	0.575	0.040	0.538	1	0.637	-0.638	0.587	0.723	-0.474
LOG(ITR)	0.299	0.728	0.675	0.726	0.215	0.706	0.637	1	-0.745	0.779	0.761	-0.250
LOG(R)	0.002	-0.860	-0.817	-0.720	-0.475	-0.838	-0.638	-0.745	1	-0.515	-0.829	0.490
LOG(CPI)	0.540	0.655	0.602	0.812	0.057	0.660	0.587	0.779	-0.515	1	0.633	0.123
LOG(TREG)	-0.052	0.871	0.800	0.802	0.439	0.839	0.723	0.761	-0.829	0.633	1	-0.485
LOG(INF)	0.296	-0.411	-0.235	-0.157	-0.224	-0.264	-0.474	-0.250	0.490	0.123	-0.485	1

Source: Secondary data processed, 2023

These correlation results provided insights into the relationships between the Indonesian Rupiah Exchange Rate and various cryptocurrencies, as well as their associations with other economic indicators.

In sum, the correlation results provided valuable insights on the relationships among the IDR exchange rate, cryptocurrencies, and economic indicators. It is important to consider other factors and market dynamics to fully understand the impact of these variables on the IDR exchange rate in both the short and long run.

4.4 Cointegration test (Bound testing approach test)

Table 4.4. F-Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	3.304996	10%	1.76	2.77
k	11	5%	1.98	3.04
		2.5%	2.18	3.28
		1%	2.41	3.61
		Finite Sample: n=60		
Actual Sample Size	59			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
		Finite Sample: n=55		
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

Source: Secondary data processed, 2023

Table 4.4 presents the results of the F-Bounds Test which was a cointegration test using the Bound testing approach. The null hypothesis of this test showed that there was no cointegration or long-term relationship among the variables being studied.

The F-Bounds Test was 3.304996. The significance levels provided in the table indicated the critical values for the test at different confidence levels. For example, at a 5% significance

level, the critical value for the F-statistic was 1.98 for I(0) and 3.04 for I(1). Similarly, for a 2.5% significance level, the critical values were 2.18 for I(0) and 3.28 for I(1).

Based on the information provided, the calculated F value of 3.304996 was greater than the lower bound or I(0) value at a 2.5% significance level. This suggested that there was evidence of cointegration among the variables examined, indicating a long-term relationship among them.

4.5 Regression Analysis

The regression analysis was conducted to estimate the ARDL model in the short run (ARDL ECM). The results are presented in Table 4.5 below.

Table A (4.5): Estimating ARDL model in the short run (ARDL ECM)

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.75706	3.985403	3.200946	0.0026
LOG(IDR(-1))*	-0.528119	0.117160	-4.507695	0.0001
LOG(BTC)**	-0.020269	0.020791	-0.974875	0.3353
LOG(ETH)**	0.019684	0.016162	1.217928	0.2302
LOG(BNB)**	0.008693	0.009421	0.922721	0.3616
LOG(XRP(-1))	-0.037635	0.020554	-1.831030	0.0744
LOG(CMC(-1))	0.020287	0.026923	0.753543	0.4554
LOG(CTV)**	0.012712	0.008261	1.538803	0.1315
LOG(ITR(-1))	0.244643	0.085252	2.869641	0.0065
LOG(R)**	2.703196	0.984236	2.746491	0.0089
LOG(CPI(-1))	-0.428401	0.479295	-0.893815	0.3766
LOG(TREG(-1))	-0.305308	0.143841	-2.122541	0.0399
LOG(INF)**	-0.005135	0.014905	-0.344492	0.7322
DLOG(XRP)	-0.020351	0.013282	-1.532176	0.1332
DLOG(CMC)	-0.038892	0.031204	-1.246403	0.2197
DLOG(ITR)	0.109904	0.055909	1.965752	0.0561
DLOG(CPI)	-2.370706	1.001456	-2.367258	0.0227
DLOG(TREG)	-0.672267	0.139537	-4.817851	0.0000

 * p-value incompatible with t-Bounds distribution.
 ** Variable interpreted as Z = Z(-1) + D(Z).

The regression analysis conducted in this research aimed to estimate the ARDL model in the short run, specifically the ARDL ECM model. The results, as presented in Table A (4.5), provided insights into the variables that had an impact on the Indonesian Rupiah exchange rate in the short run, as well as why these variables did not have the same impact in the long run as we will see in Table B (4.5).

The error correction variable, represented by the CointEq (-1) variable, is a vital component of the ARDL ECM model. In this research, the value of the error correction variable was negative and significant, indicating that the ARDL ECM model was valid and demonstrated the presence of cointegration between the dependent variable (Indonesian Rupiah exchange rate) and the independent variables.

In the short run, several variables were found to have an impact on the Indonesian Rupiah exchange rate. These variables included the previous period's Indonesian Rupiah exchange rate (IDR), XPR, CMC, ITR, R, TREG and CPI. The coefficients of these variables provided information about the magnitude and direction of their impact on the exchange rate.

However, it is important to note that the impact of these variables may not persist in the long run. This can be attributed to several factors such as changes in market conditions, economic policies, and external shocks. In the long run, the exchange rate was influenced by a broader range of factors, including macroeconomic fundamentals, trade balances, and investor sentiment.

Therefore, while these variables may have a significant impact on the Indonesian Rupiah exchange rate in the short run, their influence may diminish or change over time. Further analysis and research were needed to understand the long-term dynamics and determinants of the Indonesian Rupiah exchange rate.

Table B (4.5): Estimating the ARDL model in the long run

ARDL Long Run Form and Bounds Test
Dependent Variable: DLOG(IDR)
Selected Model: ARDL(1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 1, 0)

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(BTC)	-0.038380	0.042803	-0.896657	0.3751
LOG(ETH)	0.037272	0.024967	1.492874	0.1431
LOG(BNB)	0.016460	0.011870	1.386731	0.1730
LOG(XRP)	-0.071263	0.039040	-1.825384	0.0752
LOG(CMC)	0.038415	0.051559	0.745057	0.4605
LOG(CTV)	0.024071	0.022758	1.057694	0.2964
LOG(ITR)	0.463235	0.210889	2.196581	0.0338
LOG(R)	5.118532	2.003149	2.555243	0.0144

LOG(CPI)	-0.811182	0.908674	-0.892709	0.3772
LOG(TREG)	-0.578104	0.211526	-2.733016	0.0092
LOG(INF)	-0.009723	0.024562	-0.395838	0.6943
C	24.15564	5.896743	4.096438	0.0002

EC = LOG(IDR) - (-0.0384*LOG(BTC) + 0.0373*LOG(ETH) + 0.0165
    *LOG(BNB) -0.0713*LOG(XRP) + 0.0384*LOG(CMC) + 0.0241*LOG(CTV)
    + 0.4632*LOG(ITR) + 5.1185*LOG(R) -0.8112*LOG(CPI) -0.5781
    *LOG(TREG) -0.0097*LOG(INF) + 24.1556)

Source: Secondary data processed, 2023

Table B (4.5) above presents the results of estimating the ARDL model in the long run for the relationship between the Indonesian Rupiah exchange rate and various independent variables. The coefficients, standard errors, t-statistics, and p-values were provided for each variable.

As we can see in table B (4.5), in the long run, the coefficients of some of independent variables were statistically significant, indicating that they did have a significant impact on the Indonesian Rupiah exchange rate which are International Trade Rate (ITR), Interest Rate (R) and Total Reserves Excluding Gold (TREG). This implies that they did not have a lasting effect on the exchange rate.

In the other hand, the coefficients of some of the independent variables were not statistically significant, indicating that they did not have a significant impact on the Indonesian Rupiah exchange rate. This implies that factors such as the values of cryptocurrencies such as Bitcoin (BTC), Ethereum (ETH), Binance Coin (BNB), Ripple (XRP), Cryptocurrency Trading Volume (CTV) and Cryptocurrencies Market Cap (CMC), as well as two of the macroeconomic variables like Consumer Price Index (CPI) and inflation (INF), did not have a lasting effect on the exchange rate.

However, it is important to note that these results were specific to the long run. In the short run, the relationship between the Indonesian Rupiah exchange rate and these variables was different. The coefficients and significance levels of the variables in the short run are provided in Table A (4.5).

The lack of significance in the long run could be due to assorted reasons. It is possible that the relationship between the Indonesian Rupiah exchange rate and these variables was not stable over time. Additionally, other factors not included in the model may have a stronger influence on the exchange rate in the long run. Further research and analysis were required to fully understand the dynamics of the Indonesian Rupiah exchange rate and its relationship with cryptocurrencies and macroeconomic variables.

CHAPTER V
DISCUSSION AND CONCLUSION

The findings of this research provided valuable insights into the impact of cryptocurrencies on the Indonesian Rupiah (IDR) exchange rate. By analysing monthly data from January 2018 to December 2022, it was found that cryptocurrencies indeed influenced the IDR exchange rate, although this influence varied in the short and long term.

In the short run, the research identified several variables that significantly affect the IDR exchange rate. These variables included the previous IDR period, XRP, CMC, ITR, R and CPI. This suggested that factors such as the previous performance of the IDR, specific cryptocurrencies, market capitalization, interest rates and consumer price index can impact the IDR exchange rate in the short term. These variables reflected the immediate market dynamics and investor sentiment, which could lead to fluctuations in the exchange rate.

In the other hand, in the long run, the coefficients of some of independent variables were statistically significant, indicating that they did have a significant impact on the Indonesian Rupiah exchange rate which are International Trade Rate (ITR), Interest Rate (R) and Total Reserves Excluding Gold (TREG). This implies that they did not have a lasting effect on the exchange rate. It is important to note that this research only covered the period from 2018 to 2022, and further research may be necessary to explore the long-term dynamics between cryptocurrencies and the IDR exchange rate.

Based on these findings, it is recommended that the Bank Indonesia, the country's central bank, implements regulatory measures concerning cryptocurrencies. By regulating cryptocurrencies, the central bank can mitigate potential risks associated with their impact on the IDR exchange rate. This would ensure stability in the financial market and protect the national currency from excessive volatility. Additionally, the study suggests that the central bank should consider introducing its own digital Rupiah. This would provide a controlled and stable alternative to existing cryptocurrencies, ensuring stability in the IDR exchange rate, and reducing reliance on external digital currencies.

Overall, this research contributed to the existing literature on the relationship between cryptocurrencies and the Indonesian Rupiah exchange rate. By identifying the short-term effects of various variables and emphasizing the need for regulatory measures, this research offered valuable insights for policymakers and researchers interested in understanding the influence of cryptocurrencies on national currencies. Further research is needed to explore the long-term dynamics and potential implications of cryptocurrencies on the IDR exchange rate beyond the period covered in this research.

CHAPTER VI
LIMITATIONS AND RECOMMENDATIONS

While this research provided valuable insights into the relationship between the Indonesian Rupiah exchange rate and cryptocurrencies, several limitations should be acknowledged. Firstly, the analysis was based on monthly data, which may not capture short-term fluctuations in the IDR exchange rate. Future research could consider using daily or weekly data for a more granular analysis.

Secondly, the research only focused on a specific time from 2018 to 2022. It would be beneficial to extend the analysis to a longer time frame to observe any potential changes in the relationship between cryptocurrencies and the IDR exchange rate. Furthermore, the research only examined the impact of a limited number of cryptocurrencies on the IDR exchange rate. Future research could explore the effects of a broader range of cryptocurrencies to provide a more comprehensive understanding of their influence.

Lastly, it is important to note that the findings of this research were specific to the Indonesian context and may not be generalizable to other countries or regions. Therefore, caution should be exercised when applying these results to other contexts.

Considering these limitations, it is recommended that future research further investigates the relationship between cryptocurrencies and the IDR exchange rate, taking into account the aforementioned limitations. Additionally, exploring the impact of other factors, such as economic indicators or government policies, on the IDR exchange rate could provide a more comprehensive understanding of its determinants.

Overall, despite these limitations, this research contributes to the existing literature on the relationship between cryptocurrencies and exchange rates, specifically in the context of the Indonesian Rupiah.

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