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The Impact of Cryptocurrency on Global Financial Markets

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Abstract: *Cryptocurrency is no longer an unfamiliar concept. With the development of the digital economy, cryptocurrencies have gradually replaced some functions of traditional currencies. This research aims to measure and evaluate the impact of cryptocurrencies on financial markets by considering their effects on exchange rates, gold prices, oil prices, and stock indices. Data for the analysis were collected on a weekly basis from 1 January 2014 to 28 February 2021. The multiple linear regression model was used to examine the relationships in the research model using the statistical analysis software SPSS 22. The research results indicate that cryptocurrencies have an impact on the financial market. Specifically, the research also identified the inverse effect of currency pairs on cryptocurrencies and the interaction between different cryptocurrencies. Consequently, financial market regulators, especially the agency responsible for monitoring the volatility of cryptocurrencies, exchange rates, gold prices, oil prices, and stock indices, have a basis for devising appropriate plans*

Keywords: Cryptocurrencies, Exchange Rates, Financial Markets, Financial Market Regulators, Gold Prices

I. INTRODUCTION

Cryptocurrency is no longer an unfamiliar concept. With numerous outstanding features, it serves as both a currency in commercial transactions and an investment channel. It facilitates currency agreements between countries, enhancing financial market performance and cross-border remittance services. However, cryptocurrencies alone are insufficient to meet policy goals. Presently, Vietnam has not yet recognised or protected transactions involving this currency. There are various cryptocurrencies worldwide, with Bitcoin and Ethereum being the most popular and widely known. Bitcoin and Ethereum are valuable cryptocurrencies that operate on blockchain technology, promoting a peer-to-peer trust mechanism based on majority node consensus. Another notable cryptocurrency is Libra, which was developed by Facebook with the mission of simplifying the monetary system and financial infrastructure. The Libra Association, based in Geneva, Switzerland, is a non-profit organization overseeing the development of Libra. It ensures the value of Libra through a real asset reserve fund and governs the blockchain's rules. Additionally, other well-known cryptocurrencies include XRP (developed by Ripple) and Litecoin. As of 3 March 2021, there were 4,476 types of cryptocurrencies with a total market capitalisation of $1,552 billion. The market values of 10 popular cryptocurrencies are presented in Table 1. The financial market is a large market that encompasses various areas such as money management, insurance, banking, gold, securities, and more. Financial markets provide a platform for buying and selling assets like bonds, stocks, foreign exchange, and derivatives. Businesses and investors can utilise the financial market to raise capital for business development and generate profits through investments. Based on the influences brought about by financial markets, financial regulators in each country develop strategies suitable for the growth conditions of their respective countries. In financial markets, one of the most discussed issues is the exchange rate, which is usually directly regulated by the central bank. However, there are privately-issued coins in the world, such as the US Liberty Dollar minted between 1878 and 1904, and more recently, the $1,000 bill in 1921. Additionally, the issuance of banknotes of the Hong Kong dollar is managed by Bank of China (Hong Kong) Limited, The Hongkong and Shanghai Banking Corporation Limited (HSBC), and Standard Chartered Bank Limited. In Vietnam, when referring to the financial market, many people immediately think of the stock market, derivatives, capital, insurance, gold, currencies, and commodities.

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No.	Cryptocurrencies	Signal	Current price (USD)	Total market cap (billion USD)
1	Bitcoin	BTC	50,876	949.41
2	Ethereum	ETH	1,591.8	183.10
3	Cardano	ADA	1.25272	40.17
4	Binance coin	BNB	249.63	38.89
5	Tether	USDT	1.001	35.90
6	Polkadot	DOT	38.43	35.20
7	XRP	XRP	0.45113	20.48
8	Litecoin	LTC	193.67	12.95
9	Chainlink	LINK	30.8	12.70
10	Bitcoin cash	BCH	539.27	10.10

Table 1- Market value of 10 popular cryptocurrencies

II. CRYPTOCURRENCIES

The concept of electronic money, or e-money, is understood in a wide range worldwide. The European Central Bank (ECB) describes a cryptocurrency as the monetary value stored on an electronic device commonly used to make payment transactions to other non-institutional entities. The Bank for International Settlements (BIS) defines electronic money as stored value or prepaid product, in which information about the amount or available value of the customer is stored on an electrical device. In short, cryptocurrency is a digital currency based on cryptographic principles. Cryptocurrencies possess three unique characteristics: they provide anonymity, are independent of a central authority, and provide protection from a double spend attack. Some argue that cryptocurrencies are a special form of information that has economic value unique to their owners. Cryptocurrencies can still serve as a kind of property right, making them assets. In Vietnam, the draft Decree amending Decree No. 10/VBHN-NHNN from 22/02/2019 on non-cash payments recognises and provides a clear definition of electronic money: "Cryptocurrency is the monetary value stored on electronic means paid by customers to banks, foreign bank branches, and payment intermediary providers for making payment transactions. Its corresponding value is guaranteed by the bank. This includes prepaid cards, electronic wallets, and mobile money".

(i) Bitcoin- Bitcoin is a cryptocurrency that operates on blockchain technology. It is primarily traded on online cryptocurrency exchanges. Unlike central banks that can arbitrarily adjust the supply of fiat currencies, the supply of Bitcoin is fixed and cannot be influenced by political decisions. Bitcoin is a form of digital currency not issued by a government or a financial institution, but created and operated on a peer-to-peer computer system. Being a digitally stored virtual currency, Bitcoin carries the risk of being hacked, stolen, having data altered, or experiencing trading suspensions. Bitcoin can prompt financial institutions to update or add existing technologies, adjust fee structures, and enhance services or expertise to track and understand government regulatory issues. Blockchain technology can be leveraged to bring better efficiency to the financial services sector, potentially saving consumers billions of dollars per year. Furthermore, the ability to value Bitcoin and related cryptocurrencies is becoming important for their establishment as legitimate financial assets.

(ii) Ethereum- Ethereum was introduced by founder Vitalik Buterin in late 2013, and the system was launched in 2015. It is the largest and most established decentralised software platform. As of January 2021, Ethereum has a market capitalisation of $138.3 billion, roughly 19% of the size of Bitcoin. Similar to the Bitcoin blockchain, an Ethereum blockchain is a platform that extends beyond facilitating a single digital currency. The main difference lies in Ethereum

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blocks, which not only contain block numbers and difficulty levels but also a list of recent transactions and states. Each transaction in the list creates a new state by applying the previous state.

(iii) Litecoin- After Bitcoin, Ethereum, and XRP, Litecoin is the fourth largest cryptocurrency by market capitalisation. Litecoin works similarly to Bitcoin, but transactions are processed much faster than Bitcoin. This makes Litecoin an attractive alternative coin for currency transactions. Since more Litecoin can be generated through mining, the price of each Litecoin is cheaper than Bitcoin, making transactions easier. If Bitcoin is often referred to as "gold," then Litecoin is seen as "silver." Litecoin has a lower value than Bitcoin but is easier to access and better suited for regular transactions. The creation and transfer of Litecoin are based on an open-source protocol and are not regulated by any central authority.

III. THE IMPACT OF CRYPTOCURRENCIES ON THE FINANCIAL MARKETS

The significant growth in the quantity and value of cryptocurrencies poses challenges for financial and banking systems, as well as the management of central bank monetary policies aimed at controlling macroeconomic variables such as inflation, interest rates, and exchange rates. Cryptocurrencies can influence the money supply in the market. When the total value of money changes relative to the total value of goods in the market, it affects product prices and consumption. Typically, governments take measures to adjust inflation by reducing output to stabilise prices or increasing prices to restore output. If citizens start using cryptocurrencies instead of the national currency, the demand for the national currency weakens, leading to its devaluation. Increased inflation of the national currency affects even those who do not accept cryptocurrencies. Cryptocurrencies can impact a country's interest rates. A change in the price of a cryptocurrency can affect a country's monetary policy in three main ways: (1) by influencing the central bank's role as the bank for banks, (2) by affecting the central bank's role as the government's bank, and (3) by impacting the central bank's credit control and guidance functions. In the face of threats in traditional cross-border payments, cryptocurrencies are seen as an option in the financial market. Additionally, the popularity and continuous development of gaming services have helped cryptocurrencies become closer to society through service providers, which brings many potential risks. The regulation of monetary policy for enabling technologies or personal identity influences cryptocurrency adoption and indirectly affects the quality of life. A global currency can also help individuals diversify risk if its returns have a low or negative correlation with other risks. However, cryptocurrencies also carry the risk of promoting illegal activities. The value of virtual currencies is primarily based on the demand for buying and selling the currency itself, posing risks related to high-tech crimes, money laundering, tax evasion, corruption, and financial market risks. Operational risks involve actions that undermine the technological infrastructure and security assumptions of cryptocurrencies. Another challenge arises from the fact that most Fintech providers operate through online platforms, requiring internet access for financial services. This has become the main business model for many providers. The crypto market experiences intense competition as new forms of digital currency emerge, allowing secure transactions over the internet, accessible to anyone with a phone or internet connection, and offering convenience and cost- effective services similar to email. As Bitcoin's value rises against the US dollar, it also gains value relative to other cryptocurrencies. Therefore, it is necessary for digital currency to monitor systems to mitigate the impact of cryptocurrencies on financial markets (Fig. 1).

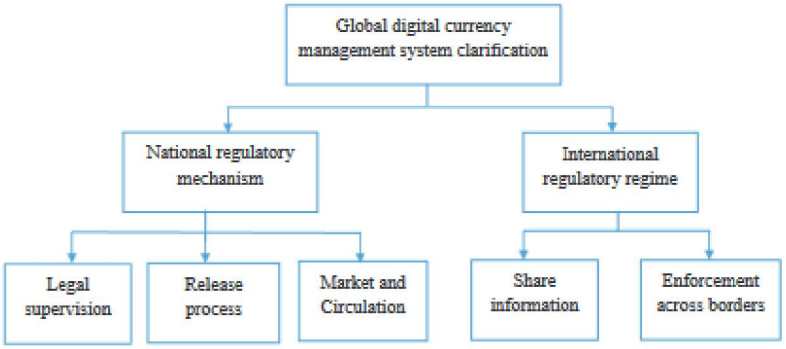

Figure 1- Digital currency monitoring system

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IV. RESEARCH DATA

Data for this study was collected from 1 January 2014 to 28 February 2021. Currency pair data in this study is determined on the last day of each week. The research data was sourced from the Investing website (https://www.investing.com/). For detailed information about the research data, please refer to the provided source. The variables in the research model are presented in Table 2. There are several standard oil prices, such as crude oil and Brent crude. For this study, the Brent Oil Futures index was chosen over Crude Oil WTI Futures, as WTI is the primary global benchmark for pricing and actually has better quality than Brent. Additionally, the chosen currencies include the Australian Dollar, Euro, British Pound, Canadian Dollar, Yen, and Vietnamese Dong. These currencies were selected due to their popularity, with the exception of the Vietnamese Dong, which is the author's native currency. The author conducted data synthesis using Microsoft Excel software. The relevant variables were included in Pearson correlation analysis to determine the linear relationship between them. Regression analysis was then employed, given the confirmation of a linear relationship through correlation analysis. The Pearson correlation coefficient (r) has a value ranging from -1 to +1. The absolute value of r approaches 1 when the two variables are strongly correlated, while a value of r = 0 indicates no linear relationship between the variables. Through testing, the author will determine the correlation level between the variables and assess compatibility using ANOVA analysis. If the significance value (Sig.)>0.05, there is no difference in variance, and if Sig.<0.05, there is a significant difference in variance. The multiple linear regression model will be used to examine the relationships in the research model through SPSS 22 statistical software. Moreover, the study will determine the influence of factors through beta coefficients, where a larger beta coefficient indicates a higher degree of influence compared to other factors in the research model.

Variable name	Variable details	Signal
Cryptocurrencies	Bitcoin	BIT
	Ethereum	ETH
	Litecoin	LTC
Exchange rate	Australian Dollar	AUD
	Euro	EUR
	GBP	GBP
	Canadian Dollar	CAD
	Yen	JPY
	Vietnamese Dong	VND
Gold price	Gold price	GOLD
Oil price	Oil prices	OIL
Stock index	Stock index of the S&P 500	SP500

Table 2- Variables of the model

V. CONCLUSION

The research results demonstrate that cryptocurrencies have an impact on financial markets. The study also reveals the opposite effect of exchange rates on cryptocurrencies, depending on the currency pair. Moreover, there is an interplay between cryptocurrencies Bitcoin, Ethereum, and Litecoin. Financial market regulators, particularly agencies responsible for monitoring cryptocurrency volatility, exchange rates, gold prices, oil prices, and stock indices, now have a basis for developing appropriate plans. Although cryptocurrencies are not yet recognized as legal transactions and investments in Vietnam, global trends suggest that Vietnam will have access to cryptocurrencies in the future. With measures to encourage non-cash payments, the State Bank has given some opinions on the matter by submitting Decree No. 80/2016/ND-CP on amending and supplementing a number of articles, Decree No.101/2012/ND-CP on non-cash payments, and Decree No. 96/2014/ND-CP on administrative sanctions to the Government for promulgation. With the Bank's efforts to amend relevant decrees and regulations, there is increasing momentum towards cryptocurrency

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adoption. However, strict control and tailored monetary policies in the financial market should be considered based on more specific and in-depth studies. The relationship between commodity prices such as gold, oil, and stock indices and exchange rate indices can influence the decisions of crypto investors in financial markets. Therefore, there should be measures to enhance financial education and communication to help individuals understand the nature of virtual assets, especially cryptocurrencies. This will enable investors to make informed decisions and avoid falling victim to scams. This study assessed the impact of cryptocurrencies on financial markets through 374 weeks of data collected between 1 January 2014 and 28 February 2021. Given the rapidly changing nature of the cryptocurrency market, there may have been subsequent developments that could affect the results. Increasing the sample size in future studies would also lead to more accurate findings. Additionally, the impact assessment only focused on four variables: exchange rates, gold prices, oil prices, and the

S&P 500 index. There are numerous other factors that cryptocurrencies may affect in the financial market, such as capital flows, the size of the stock market, bank credit, economic growth, inflation, and prices of other commodities like silver, copper, and agricultural products. Future studies could explore these factors to further develop research models. Furthermore, this study only considered three cryptocurrencies: Bitcoin, Ethereum, and Litecoin. Many other cryptocurrencies were not included, such as Cardano, Binance Coin, Tether, Polkadot, XRP, Chainlink, and Bitcoin Cash, and they may have different effects. Therefore, further research is needed to assess the impact of cryptocurrencies comprehensively.

In conclusion, the study indicates that cryptocurrencies have an impact on financial markets. The study also reveals the interplay between cryptocurrencies and exchange rates. This provides a basis for financial market regulators to develop appropriate strategies. Despite the limitations, this study contributes to the research community and serves as a baseline for future studies in this area.

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