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Research Article

Factors Influencing Digital Asset Market

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ABSTRACT

Research on the factors influencing the digital asset market mainly comprises two objectives: 1) to examine factors that determine the digital asset market by focusing on six dimensions such as politics, economy, society, technology, environment, and law, 2) to study the relationship between economic variables and the value of the digital asset market. This study applies both qualitative and quantitative analysis. Qualitative analysis using the PESTEL model is used to study factors determining the digital asset market, while quantitative analysis using the Granger Causality test is employed to examine the relationship between economic factors and digital asset market value. This study covers the period from 2017 to 2022. The results suggest that political, economic, social, technological, environmental, and law factors are related to the acceptance of cryptocurrencies. Furthermore, some macroeconomic variables, such as average world headline CPI and world food price have a significant effect on digital asset market capitalization and the market capitalization of Bitcoin. In addition, the market capitalization of major digital assets and Bitcoin also significantly impact the stock markets, particularly on the Dow Jones Industrial Average, S&P 500, and Nasdaq. Therefore, policymakers can mitigate potential contagion risk by implementing robust monitoring and surveillance mechanisms.

Keywords: Bitcoin, Cryptocurrency, Digital Assets, Granger Causality, PESTEL

Introduction

Nowadays, digital assets have become highly interesting investment assets among investors worldwide. One of the most popular digital assets is cryptocurrencies, such as Bitcoin, Ethereum (ETH), Dogecoin (DOGE), Ether, Litecoin, Ripple, Binance Coin (BNB), and Stellar (Morningstar, 2022; Blockchain Magazine, 2022). Currently, digital assets have also developed new forms of innovative assets such as NFT, DeFi, and GameFi. Online systems and Blockchain technology play important roles in making digital assets grow rapidly. An encrypted computer network will record various transactions without the need to go through intermediaries. Therefore, it allows investors to buy or sell digital assets 24 hours a day, 7 days a week. The global digital asset market used to have the highest market capitalization of approximately $2.86 trillion and has a turnover of more than $100 billion per day. (coinmarketcap.com, 2022)

For the global digital asset market, according to the Triple-a.io report, in 2021, the number of people holding cryptocurrencies is more than 300 million people worldwide, representing 3.9 percent of

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the total population. Most of the population holding cryptocurrencies are in Asia, accounting for approximately 160 million cryptocurrency holders or 57 percent of all cryptocurrency holders, followed by Europe, Africa, North America, and South America, respectively. The country with the largest number of crypto holders is India, which has approximately 100 million holders, followed by the United States, Russia, Nigeria, Brazil, and Pakistan. Digital asset investment in the ASEAN Economic Community (AEC) is also growing rapidly. The number of Cryptocurrencies' account owners shown in table 1 suggests that Singapore, Vietnam, and Thailand are the top 3 countries holding the most crypto-currency digital assets per population. At the same time, Indonesia has the highest number of account owners, followed by Vietnam. Philippines and Thailand, respectively. (Triple-a.io, 2022)

Table 1 Number of Crypto owners in AEC and percentage of the population in 2021

Ranking	Country	Number of Crypto owners	Percentage of the population
1	Singapore	549,903	9.40%
2	Vietnam	5,961,684	6.12%
3	Thailand	3,629,713	5.20%
4	Philippines	4,360,579	3.98%
5	Malaysia	1,019,405	3.15%
6	Indonesia	7,285,707	2.66%
7	Cambodia	225,368	1.35%
8	Myanmar	494,815	0.91%
9	Brunei	3,979	0.91%
n/a	Lao	n/a	n/a

source: Triple-a.io (2022)

Over the past decade, the digital asset market has been developing quickly, while the value of the market is growing steadily and rapidly. In addition, the number and variety of asset classes traded in the market are growing exponentially worldwide. However, the digital asset markets in different countries have different levels of development. Some countries have strong legislation and regulations to supervise the transaction and benefits of their citizens investing in the digital asset market, while others view the digital asset market as both an opportunity and a challenge (Alvarez et al., 2023; Kajchamaporn, 2021). Digital assets are viewed as a new investment channel to accumulate and increase wealth for people, especially for the new generation (Baur, Hong & Lee, 2018). Some countries view the digital asset market as a means of speculation and channels for money laundering due to the difficulty of being audited by government agencies (Kajchamaporn, 2021). Therefore, opportunities and challenges of digital assets in different countries may be driven by serval factors, such as political, economic, social, technological, environmental, and legal factors (Cong et al., 2024; Binance Report, 2021; Sovbetov, 2018). This research aims to investigate factors influencing the digital asset market using the PESTEL model and examine causality among economic factors and digital assets' value. This study will benefit digital asset investors and the public to understand the big picture of the digital asset market and help allocate their assets in a highly volatile market. Our findings will also support regulators and policymakers in addressing financial innovations effectively.

Research Objectives

1. To investigate factors that determine the digital asset market by emphasizing six dimensions: politics, economy, society, technology, environment, and law.

2. To explore the relationship between economic variables and the value of the digital asset market.

Research Methodology

This paper applied both qualitative and quantitative analysis to examine the determination of factors influencing the global digital asset market.

According to the first objective, we used qualitative analysis to examine factors that determine the digital market over the past 6 years from 2017 to 2022. This paper employed The PESTEL developed by Francis Aguilar, which concentrates on six dimensions: Politic (P), Economic (E), Social (S), Technology (T), Environment (E), and Law (L). The PESTEL analysis is a strategic tool to evaluate the external macro-environmental factors that affect an organization, industry or market (Narayanan and Fahey, 2001; Song, Sun and Jin, 2017). We utilized documentary analysis to examine the impact of each dimension on the digital asset market. Data and information were collected from published documents, including research papers, online analysis articles, investor materials related to cryptocurrencies, and government agency reports and publications.

According to the second objective, we used quantitative analysis by employing the Ordinary Bivariate Granger Causality Test to investigate causality among economic factors and the value of digital assets. The global socioeconomics economic factors which mainly concentrated on economic data of developed countries (G20) include world growth GDP or GDP of G20 (GDPG_W), average G20 world headline CPI (CPI_W), average G20 nominal (real) interest rate (INT_W(R)), gold price (GOLDP), global energy price index (ENERGYP), and global food price index (FOODP) (Cong et al., 2024; Polizu et al., 2023). US Treasury Bill (TBILLY_US), US Treasury Bond (TBONDY_US) and major securities market indices such as the Dow Jones Industrial Average (DJIA), S&P500 (SP500), NASDAQ, Financial Times Stock Exchange (FTSE) were as proxies for the financial factors (Dyhrberg, 2016). We also studied the impact on the digital assets' value by focusing on both the market capitalization of digital assets and the market capitalization of bitcoin, representing the broader market and a key individual asset. The market capitalization of digital asset was the total value of major digital assets calculated from the combined value of five digital assets: Bitcoin, Ethereum, Dogecoin, XRP, and Binance.

These macroeconomics data were obtained from the World Bank, the International Financial Statistics (IFS) from the IMF, and the market capitalization data were retrieved from digital trading websites. The Ordinary Bivariate Granger Causality Test was used to examine causal relations among variables. This method helps determining if macroeconomic economic factors and financial factors are useful in predicting the value of digital asset market, or vice versa. Grid Search Procedure was used to identify optimum lag(s) at 95 percent confidence interval. The model was analyzed using monthly data and quarterly data from January 2017 to June 2022, providing both medium-frequency and low-frequency perspectives. The Ordinary Bivariate Granger Causality Test model is presented as follows.

Unrestricted model

$$Y_t = \beta_0 + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{i=1}^{p} \gamma_i X_{t-i} + \upsilon_t$$

Y_t = Potential effect (the market capitalization of digital assets and the market capitalization of bitcoin) , X_t = potential cause (macroeconomic factors and financial factors) , p = the number of lags

γ_i = the impact of past values of X_t on Y_t , υ_t = the error term

Restricted model

$$Y_t = \beta_0 + \sum_{i=1}^{p} \alpha_i Y_{t-i} + \varepsilon_t$$

α_i = the coefficients , ε_t = the error term

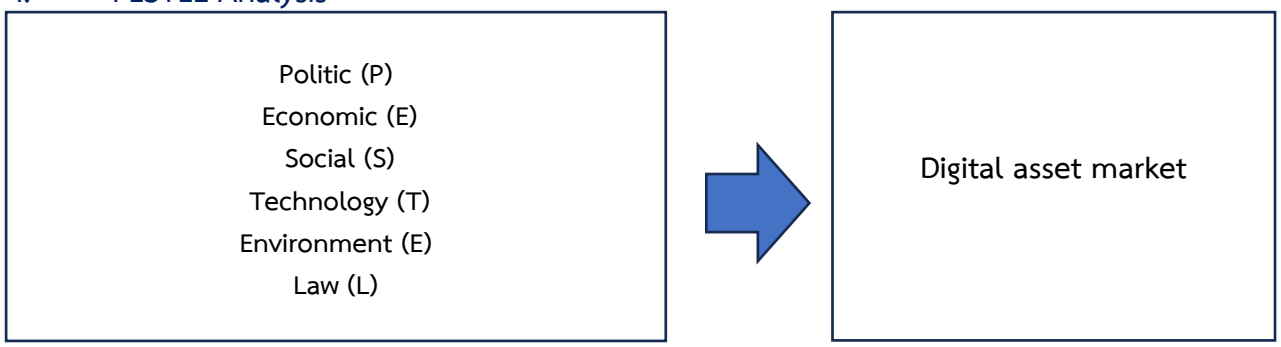
Hypothesis testing

H_o : X_t does not Granger-cause Y_t ($\gamma_1 = \gamma_2 = \gamma_3$=.....=$\gamma_p = 0$)

H_1 : X_t does Granger-cause Y_t (at least one $\gamma_1 \neq 0$)

The Conceptual Framework

I. PESTEL Analysis



II. The Ordinary Bivariate Granger Causality Test

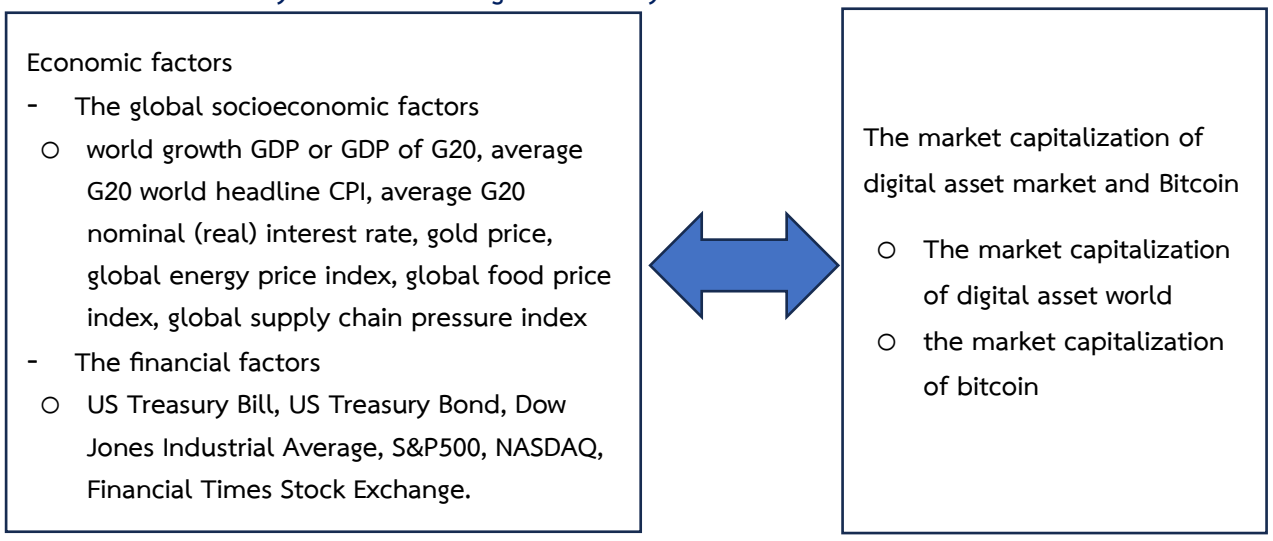


Figure 1 Conceptual framework

Source: designed by the authors

Research Results

1. The impact of macro-environmental factors on the digital asset market

This paper applied PESTEL analysis to investigate the effects of macro-environmental factors on the digital asset market. PESTEL analysis is a strategic framework or tool used to analyze and monitor the external environment of a business at the macro level. It can be broken down into opportunities and risks based on six key factors: political, economic, social, technological, environmental, and legal. The results are as follows.

1.1 Political factors: Political events or government operations have a significant impact on cryptocurrencies. The government's support or opposition will influence the cryptocurrency industry. Cryptocurrencies are considered cryptographic financial systems that provide security in conducting transactions without regulating cryptocurrencies; therefore, the decentralized nature of cryptocurrencies can threaten governments. This leads to financial crime risks from using cryptocurrencies for money laundering, which may undermine the circulation of money, including confidence in the global financial system. As a result, opposition from the government, including strict supervision on the use of digital currency to avoid various illegal activities such as drug trafficking, human trafficking, ransom demands, or Ponzi scheme (Kajchamaporn, 2021). Moreover, sometimes supervision can enhance the cryptocurrency market for adoption. Regulations of legitimate digital currency will give users the confidence to invest. On the other hand, government intervention seems to contradict the original purpose of a decentralized digital currency, which could weaken investors' confidence in the cryptocurrency market.

Cryptocurrencies have been linked to political instability. For example, people who have no confidence in government officials or governments will purchase cryptocurrencies such as Bitcoin as a safe asset against the risk of losing their purchasing power. Moreover, due to political instability, the financial system may be vulnerable to financial instability, which may decrease the value of that country's currency. As a result, citizens or investors may turn to digital assets for diversification, and lead to the growth of the cryptocurrency market.

1.2 Economic factor: During economic or financial crises and currencies are fragile, cryptocurrency is often used as an alternative asset protection against economic weakness. Some evidence shows that the economic crisis can drive the growth of the cryptocurrency market. For example, hyperinflation in Venezuela led cryptocurrencies to become more popular. The severe depreciation of the Venezuelan bolivar made people turn to Bitcoin. In addition, Cong et al. (2024) found that higher inflation expectations are associated with adopting cryptocurrencies by new investors. Cryptocurrencies are able to play a role in hedging against inflation. In addition, for people who want to move capital out of the country during a crisis, cryptocurrencies are an alternative way to transfer wealth abroad. Furthermore, interconnectedness between monetary policy and cryptocurrencies' prices is complex. Karau (2023) found that US monetary tightening announcements tended to decrease Bitcoin prices, indicating Bitcoin's role as a speculative asset. Higher interest rates make traditional investments, such as bonds, more attractive, while leaving high-risk assets like Cryptocurrency less appealing. However, US monetary tightening spillovers may have a positive effect on Bitcoin price, particularly in countries with capital controls. US monetary tightening attracts investors to move their capital out of emerging market countries, and Bitcoin can be used as a tool to bypass capital control. Therefore, this increased demand

for Bitcoin can drive its price up. In summary, rising inflation was a major cause of the adoption of cryptocurrencies during the economic crisis. Moreover, economic problems, together with political instability and failed government management may lead Bitcoin to become a true currency and serve to collect value instead of flat money.

1.3 Social factor: Social factors also play an important role in the growth of the cryptocurrency market. According to the Binance Report (2021), more than 50 percent of cryptocurrency owners considered cryptocurrency a source of income, while 48 percent viewed collecting cryptocurrencies as a hobby. In addition, people aged 18 to 34 were more familiar with Bitcoin compared to those over 65, as this generation coincided with the development of the internet. Young people are more likely to take risks, so these people choose to invest in the cryptocurrency market, where prices are highly fluctuating. Demographic factors have a strong influence on financial markets and contribute greatly to digital currency.

Moreover, people living in developing countries with weak financial infrastructure, such as El Salvador, are more likely to use cryptocurrencies as a medium of exchange (Alvarez et al., 2023). Furthermore, in 2020 more than 15,000 companies worldwide, such as Microsoft, Amazon, and PayPal, accepted bitcoin. For example, PayPal has announced that its customers can use their coins to buy online products from the 26 million merchants accepting it (BBC, 2020). An increasing number of Bitcoin ATMs (Bitcoin ATMs) are being installed in the United States, which is expected to have more than 36,000 Bitcoin ATMs by 2022 (Flynn, 2022). Easier and more convenient access to digital assets contributes to today's digital currency growth.

However, the idea of using digital currency as a medium of exchange or as an investment asset is still suspected by many people. According to a Central American University survey, only 4.8 percent of 1,281 people understanded Bitcoin. Additionally, 68 percent disagreed with Bitcoin as legitimate money. Moody's credit rating agency had downgraded El Salvador's credit rating from B3 to Caa1 due to a decline in the sovereign’s repayment capacity and an increase in risks due to exposure to Bitcoin (Moody’s, 2021; Rubin, 2021). Many countries, such as China and Thailand, do not allow digital currency to be used as a medium of exchange, causing many companies to still not accept the use of digital coins in transactions. Although there is an increasing number of online transactions, low transaction costs, and easier and faster access to the transactions (NeighbotwebSJ, 2018), Bitcoin and other cryptocurrencies are concerned as an asset used for speculation rather than as a medium of exchange (Baur, Hong & Lee, 2018).

1.4 Technological factor: Using modern technology and blockchain systems allows recorded transactions to be transparent and immutable, increasing efficiency in business processes, enhancing security, and creating trust for stakeholders. In addition, blockchain technology can reduce the cost of eliminating intermediaries and ensure that transactions are completed quickly and accurately. Moreover, blockchain helps to prevent cyber theft and is very secure because it is encrypted (Sovbetov, 2018). Each record has a link that creates a chain of transaction data. Furthermore, Microsoft, Overstock, Whole Foods, and online retailers have heavily invested in Blockchain technology (Lisa, 2022). MarketsandMarket.com (2021) has forecast that the size of the global blockchain market is expected to grow from $253 million in 2020 to $3,272 million in 2026, at a 67.3 percent growth rate. The increase in the use and accessibility of blockchain technology significantly drives the number of cryptocurrencies in the market.

1.5 Environmental factor: Nowadays, digital currencies have become a major issue in terms of its impact on the environment. Because creating or mining digital coins requires much energy, according to a Cheng (2018) article on CNBC.com, Bitcoin creation goes through a mining process, which is very energy intensive. It requires computational power to solve complex mathematical equations. Coin mining is carried out over a network that has agreed to record transactions via the blockchain. Bitcoin is rewarded by miners, so when cryptocurrencies become popular due to the increasing value of Bitcoin and other currencies. It tends to consume quite a lot of hardware and software power, which means high power consumption when mining coins. Therefore, bitcoin's energy consumption tends to increase with Bitcoin's price.

In addition to a large amount of energy consumption, the carbon footprint is also caused by mining and affecting climate change. Digiconomist (2022) states that mining 1 Bitcoin creates a carbon footprint of 841.47 kg CO2, equivalent to the carbon footprint of 140,246 hours of watching YouTube. In addition, mining 1 Bitcoin is equivalent to the average energy consumption of a US household of 51.71 days. Moreover, the carbon footprint of Bitcoin mining in one day is comparable to the carbon footprint of Oman (77.27 Mt. CO2) in total or equivalent to the average daily energy consumption of Ukraine. The mining of cryptocurrencies generates the cost of energy consumption, carbon dioxide emissions, and electronic waste. Environmental concerns have led some companies, such as Tesla, to abandon using digital currency as a medium to purchase Tesla cars. Furthermore, in China, cryptocurrency mining is illegal due to substantial energy consumption. As a result, the digital currency mining base is moved to other countries such as the United States. and Kazakhstan, which borders China (CNBC, 2022).

1.6 Legal factor: Since cryptocurrencies are involved in illicit transactions, governments must get involved. For example, BBC News (2021) reported that the amount of Bitcoin exceeded $ 1 billion linked to the black market in the online world where everything is illegally sold, such as drugs, stolen credit cards, and hired murder. Various criminal organizations have an enormous demand for capital, so Bitcoin or other cryptocurrencies seem to be used to transfer funds. Laws, rules, and regulations are needed to prevent using cryptocurrencies for money laundering, tax evasion, and transactions not authorized by the government. In Thailand, the laws related to cryptocurrency regulation are not implemented as a comprehensive ban. Rather, it is used to control the issuance and use of digital assets or coins to protect investors from the instability of the cryptocurrency market. According to The Asian Post (2018), Thai government announced regulations on digital currency and digital coin issuance (ICO) that issuers of digital coins are required to clarify the source of funds used for their crypto investments. Due to the unclear whether cryptocurrencies are money, assets, or commodities, different definitions make a difference in terms of the status of organizations that oversee or issue regulations. However, Burke (2014) argues that the effects of the law or supervision on the cryptocurrency market may not be as great as the effect of economic crisis. The economic crisis has had a huge impact on cryptocurrency trading since cryptocurrencies are used to move funds from economically troubled countries.

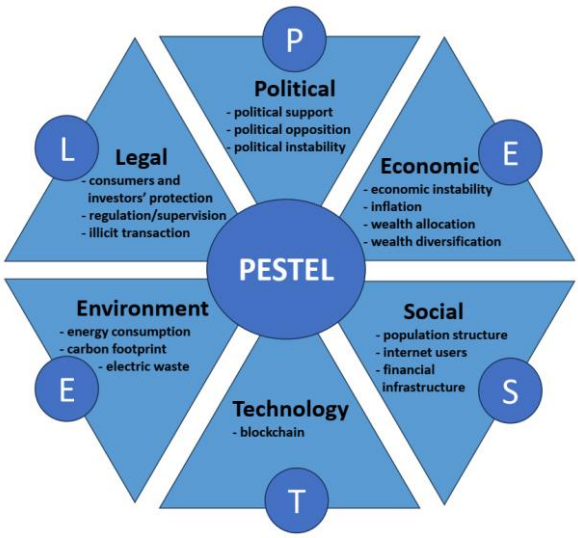


Figure 2 summary of PESTEL analysis on the digital asset market.
Source: designed by the author

2. The relationship between economic factors and the value of digital asset market

According to the Ordinary Bivariate Granger Causality Test between world economic factors and the market for digital assets, including digital asset market capitalization (DAV) (Table 2) and the Bitcoin market capitalization (BITCOINV) (Table 3), the results indicate the average world headline CPI (CPI_W) and world food price (FOODP) have a significant impact on digital asset market capitalization and the market capitalization of Bitcoin (CPI_W→DAV,BITCOINV) (FOODP→DAV, BITCOINV). In addition, the price of gold causes the movement of the digital asset market and Bitcoin's capitalization (GOLDP→DAV, BITCOINV). Based on the financial factors, the rate of return on the US treasury also influences the total value of digital assets and Bitcoin (TBILLY_US→DAV, BITCOINV). Furthermore, according to the stock market, FTSE 100 seems to have an impact on the digital asset market and Bitcoin's capitalization (FTSE → DAV, BITCOINV).

On the other hand, the digital asset market also has a significant effect on various economic variables. For instance, the market capitalization of main digital assets and Bitcoin has an influence on the average growth rate of GDP and average interest rate in developed countries (G20) (DAV, BITCOINV→ GDPG_W) (DAV, BITCOINV→ RINT_W). Lastly, the digital asset market and Bitcoin have a significant impact on the US stock market, such as Dow Jones Industrial Average, S&P 500, and Nasdaq (DAV, BITCOINV→ DJIA) (DAV, BITCOINV→ SP500) (DAV, BITCOINV→ NASDAQ)

Table 2 Granger causality between world economic factors and the digital asset market capitalization

	Monthly Data				Quarterly Data			
Null Hypothesis	Lags	F Statistics	P Value		Lags	F Statistics	P Value	
CPI_W does not Granger Cause DAV	1	13.64569	0.00047	***	1	23.63459	0.00013	***
DAV does not Granger Cause CPI_W	1	2.29593	0.1348		1	0.98295	0.33461	
GDPG_W does not Granger Cause DAV	2	1.45761	0.24105		1	0.24493	0.62665	
DAV does not Granger Cause GDPG_W	1	5.46901	0.0226	**	1	3.4735	0.07876	*
INT_W does not Granger Cause DAV	6	1.7603	0.12804		1	0.28232	0.60168	

Table 2 Granger causality between world economic factors and the digital asset market capitalization (continue)

	Monthly Data				Quarterly Data			
Null Hypothesis	Lags	F Statistics	P Value		Lags	F Statistics	P Value	
DAV does not Granger Cause INT_W	6	0.45356	0.83879		1	2.98612	0.1011	
RINT_W does not Granger Cause DAV	1	0.00009	0.99243		1	0.44342	0.51392	
DAV does not Granger Cause RINT_W	11	1.90526	0.07651	*	1	9.99377	0.0054	***
GOLDP does not Granger Cause DAV	1	5.24452	0.02543	**	1	5.65641	0.02867	**
DAV does not Granger Cause GOLDP	3	1.60801	0.19777		1	0.70827	0.41106	
ENERGYP does not Granger Cause DAV	7	0.92365	0.49775		1	0.64285	0.43314	
DAV does not Granger Cause ENERGYP	1	1.36356	0.24739		1	3.53172	0.0765	**
FOODP does not Granger Cause DAV	12	3.36575	0.00368	***	1	0.57649	0.45752	
DAV does not Granger Cause FOODP	12	1.62329	0.13964		1	1.34898	0.26063	
SCP does not Granger Cause DAV	11	5.4508	0.00008	***	1	0.96086	0.33996	
DAV does not Granger Cause SCP	1	8.55555	0.00481	***	1	9.08958	0.00744	***
TBILLY_US does not Granger Cause DAV	11	3.70925	0.0018	***	1	0.20672	0.65478	
DAV does not Granger Cause TBILLY_US	11	0.82364	0.61795		1	5.4196	0.03177	**
TBONDY_US does not Granger Cause DAV	4	1.77421	0.14778		1	3.58911	0.07434	*
DAV does not Granger Cause TBONDY_US	4	0.0737	0.98985		1	0.00822	0.92877	
NASDAQ does not Granger Cause DAV	3	0.34465	0.79313		1	0.65426	0.42916	
DAV does not Granger Cause NASDAQ	4	2.93542	0.02889	**	1	8.93944	0.007856	***
SP500 does not Granger Cause DAV	2	1.65852	0.19917		1	0.13827	0.71435	
DAV does not Granger Cause SP500	3	4.78132	0.0049	***	1	11.42117	0.00334	***
DJIA does not Granger Cause DAV	2	1.61614	0.20733		1	0.07573	0.7863	
DAV does not Granger Cause DJIA	4	2.3719	0.06394	*	1	6.87363	0.01729	**
FTSE does not Granger Cause DAV	4	2.26634	0.0742	*	1	4.99876	0.03827	**
DAV does not Granger Cause FTSE	4	0.5429	0.7049		1	0.06586	0.80038	
GOLDV does not Granger Cause DAV	10	1.8164	0.09399	*	1	0.13349	0.7191	
DAV does not Granger Cause GOLDV	10	2.50828	0.02164	**	1	4.37499	0.05092	*

Note: *, **, *** indicated P< 0.1, P< 0.05 and P<0.01 respectively

DAV = digital asset market capitalization
CPI_W = world headline CPI
GDPG_W = world growth GDP
INT_W = world nominal interest rate
RINT_W = world real interest rate
GOLDP = gold price
ENERGYP = global energy price index
FOODP = global food price index
SCP = global supply chain pressure index
TBILLY_US = US Treasury Bill
TBONDY_US = US Treasury Bond
NASDAQ = NASDAQ composite index

SP500 = S&P 500 index
DJIA = Dow Jones Industrial Average index
FTSE = FTSE 100 index
GOLDV = Gold Value.

Table 3 Granger causality between world economic factors and the market capitalization of Bitcoin

	Monthly				Quarterly			
Null Hypothesis	Lags	F Statistics	P Value		Lags	F- Statistics	P Value	
CPI_W does not Granger Cause BITCOINV	8	3.20696	0.0064	***	1	25.58459	0.00008	***
BITCOINV does not Granger Cause CPI_W	1	2.85726	0.09598	*	1	1.20828	0.28616	
GDPG_W does not Granger Cause BITCOINV	11	1.68311	0.12277		1	0.001	0.97513	
BITCOINV does not Granger Cause GDPG_W	1	4.58307	0.03623	*	1	4.63158	0.04521	**
INT_W does not Granger Cause BITCOINV	12	1.81481	0.093	*	1	0.03173	0.86062	
BITCOINV does not Granger Cause INT_W	12	0.72254	0.71822		1	5.55352	0.02997	**
RINT_W does not Granger Cause BITCOINV	5	1.02894	0.41091		1	0.40389	0.53308	
BITCOINV does not Granger Cause RINT_W	12	2.06577	0.05433	*	1	10.40647	0.00469	***
GOLDP does not Granger Cause BITCOINV	10	2.39884	0.0273	**	1	5.45876	0.03123	**
BITCOINV does not Granger Cause GOLDP	7	2.13675	0.05923	*	1	2.09913	0.16458	
ENERGYP does not Granger Cause BITCOINV	9	1.24208	0.29956		1	0.51405	0.48259	
BITCOINV does not Granger Cause ENERGYP	1	0.89733	0.34718		1	2.97928	0.10146	
FOODP does not Granger Cause BITCOINV	10	2.28452	0.03481	**	1	0.48181	0.49646	
BITCOINV does not Granger Cause FOODP	12	1.70787	0.11678		1	2.2537	0.15063	
SCP does not Granger Cause BITCOINV	1	0.20162	0.65498		1	0.99289	0.33224	
BITCOINV does not Granger Cause SCP	11	1.3339	0.25167		1	7.9634	0.01129	**
TBILLY_US does not Granger Cause BITCOINV	12	4.52614	0.00043	***	1	0.03966	0.84438	
BITCOINV does not Granger Cause TBILLY_US	3	1.79768	0.15812		1	8.22767	0.01022	**
TBONDY_US does not Granger Cause BITCOINV	12	2.94889	0.00848	***	1	3.08182	0.09618	*
BITCOINV does not Granger Cause TBONDY_US	3	0.1088	0.95461		1	0.39269	0.53875	
NASDAQ does not Granger Cause BITCOINV	1	2.09531	0.15279		1	0.41771	0.52624	
BITCOINV does not Granger Cause NASDAQ	2	5.04923	0.00946	***	1	8.34882	0.00977	***
SP500 does not Granger Cause BITCOINV	1	1.2737	0.26342		1	0.15115	0.702	
BITCOINV does not Granger Cause SP500	4	2.99787	0.02647	**	1	9.52564	0.00637	***
DJIA does not Granger Cause BITCOINV	1	1.4189	0.23813		1	0.12143	0.73153	
BITCOINV does not Granger Cause DJIA	3	2.84387	0.04579	**	1	6.00175	0.02475	**
FTSE does not Granger Cause BITCOINV	10	2.2065	0.04109	**	1	4.04324	0.05957	*
BITCOINV does not Granger Cause FTSE	3	0.81879	0.48895		1	0.00011	0.99184	
GOLDV does not Granger Cause BITCOINV	12	1.21083	0.32224		1	0.146	0.70686	
BITCOINV does not Granger Cause GOLDV	1	3.29347	0.07439	*	1	3.60579	0.07373	*

Note: *, **,*** indicated P< 0.1, P< 0.05 and P<0.01 respectively

BITCOINV= Bitcoin market capitalization
CPI_W = world headline CPI
GDPG_W = world growth GDP

INT_W= world nominal interest rate
RINT_W = world real interest rate
GOLDP= gold price
ENERGYP= global energy price index
FOODP= global food price index
SCP= global supply chain pressure index
TBILLY_US= US Treasury Bill
TBONDY_US= US Treasury Bond
NASDAQ= NASDAQ composite index
SP500 = S&P 500 index
DJIA = Dow Jones Industrial Average index
FTSE = FTSE 100 index
GOLDV= Gold Value.

Discussions

The findings indicate that consumer price index and food price are related to the value of digital assets (CPI_W→DAV, BITCOINV) (FOODP→DAV, BITCOINV) . The result seems to be consistent to Cong et al. (2024), which identifies high inflation rates as a driving factor for adopting cryptocurrencies in emerging market like India. Similar to gold, the limited supply of Cryptocurrencies, such as Bitcoin, can hedge against rising prices and declining purchasing power. However, Polizu et al. (2023) argue that there is no conclusive answer on Crypto assets' hedging capabilities with respect to inflation due to their highly volatile and their limited acceptance as a form of payment. The result also suggests that the U.S. Treasury bill (T-bill), a short-term U.S. government debt obligation, significantly affect the market capitalization of digital asset (TBILLY_US→DAV, BITCOINV). As T-bill yields increases, the opportunity cost of holding digital assets rises, leading to a decline in demand for digital assets. As a result, this negatively impacts the value of digital assets. Furthermore, FTSE index also causes the movement of the value of digital asset, consistent with Dyhrberg (2016), who suggests that Bitcoin can serve as a hedge against stocks in the Financial Times Stock Exchange Index (FTSE). This implies that digital assets may help investors to diversify risk in their portfolio.

The finding also suggests that the market capitalization of digital assets can influence economic growth, particularly in developed countries (DAV, BITCOINV→ GDPG_W). The digital asset market has gained massive popularity worldwide, driven by the freedom of investment, convenience, and security offered by Blockchain technology. This trend has the potential to drive a significant surge in global investment, contributing to enhanced world economic growth (Patterson, 2023). Additionally, digital assets also have a significant impact on the stock markets, particularly on the Down Jones Industrial average, S&P 500 and the Nasdaq stock market, aligning with the finding of Wang (2020).

Originality and Body of Knowledge

The causal relationships between economic factors and the valuation of the digital asset market remain a source of skepticism for many investors. Some argue that the digital asset market is an investment model using Blockchain technology, which operates in a decentralized manner and uses a global computer network to verify encrypted data between them, so the digital asset market is less affected by

economic factors. While a group of investors believed that the digital asset market is just one type of investment involving new technology, economic factors remain an important factor affecting the valuation of the digital asset market. However, according to this study, we found that economic factors such as world consumer price index, the interest rate of US treasury bills, and the stock market significantly affect digital asset market capitalization and the market capitalization of Bitcoin. Moreover, the result also suggests that the digital asset market influences some economic factors such as world GDP and the stock markets.

Conclusions

This research aims to examine the factors influencing the digital asset market and the relationship between macroeconomic variables and the market capitalization of digital assets. The evidence shows that political instability and the loss of confidence in the purchasing power of domestic currencies will stimulate the use of cryptocurrencies as alternative assets. Moreover, younger investors and easier access to advanced technology will make cryptocurrencies more popular. However, due to illegal transactions and environmental concerns, many countries seem reluctant to use digital currencies as a medium of exchange. According to the study of the relationship between macroeconomic variables and market capitalization of digital assets, the results suggest that some macroeconomic variables, such as average world headline CPI and world food price, have a significant effect on digital asset market capitalization and the market capitalization of Bitcoin. In addition, the capitalization of major digital assets and Bitcoin also impact the stock markets, particularly on the Dow Jones Industrial Average, S&P 500, and Nasdaq.

Recommendations

1. Policymaking Recommendations

1.1 Digital assets can sometimes be exploited as tools for laundering proceeds from illegal activities and corruption. Therefore, it is essential for policymakers to establish and enforce robust regulatory and legislative frameworks, strengthen the capabilities of law enforcement agencies, and educate the public about the risks associated with the use and investment in digital assets. These measures are crucial for effectively monitoring digital asset transactions.

1.2 Digital assets can be used as a medium of exchange in some countries or as alternative financial instruments to diversify risk or even create wealth. However, digital assets, such as bitcoin, often have a volatile market value due to speculation. Excessive speculation may cause price bubble and burst leading to significant losses for investors. Consequently, digital asset, like cryptocurrencies, seem to be more of a risk asset rather than safe-haven asset. Therefore, Investors should invest in digital assets with caution, avoid invest all funds into digital assets, and diversify their portfolio to reduce risks.

1.3 The close interconnectedness between digital asset markets and traditional financial markets may lead to contagion risk. Therefore, policymakers should implement robust monitoring and surveillance mechanisms to detect and access potential risks and vulnerabilities in both digital asset markets and traditional financial markets.

2. Recommendations for Future Research

To further this research, a detailed examination of the short- and long-term relationships between traditional financial assets and cryptocurrencies would be highly beneficial for both investors and policymakers. Such a study would provide valuable insights into the role of cryptocurrencies, determining whether they function primarily as speculative (risk) assets or as diversifying (safe-haven) assets.

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