Prospects of Crypto Currency in Financial and Energy Transactions in Japan

Lekha Mudrikah[1], Fina Amaliah Hidayanti[2]
STIE Jaya Negara Tamansiswa Malang, Indonesia[1,2]

Abstract

This study tries to measure the influence of internet users as the main indicator of the development of block chain technology, domestic consumption as a potential cryptocurrency user in the future, the use of electrical energy as a measure of current energy use for various purposes as an indicator of energy supporting the creation of block chains. As the locus of your research, you are researching Japan.This research examines data from 2000 until 2020 to be able to produce "autoregressive vectors" that may be used to evaluate the causal link between variables. Based on secondary data from the World Bank. We found that the use of the internet is something that cannot be separated from crypto currency as a digital currency. The positive causality relationship between internet users and domestic consumption shows good prospects for digital currencies in financial and energy transactions formed from consumption activities. The increase in internet use and the increase in consumption in Japan indicate the development of the digital economy in Japan. This illustrates that the digital economy in Japan is developing well and cryptocurrencies have good prospects in terms of economic transactions in trade originating from production activities and increased energy as a result of increased digital activity.

Keywords: Crypto Currency, Financial, Energy, Transactions, Japan
JEL Classification : F, F1, F10, F14, F43

Received: August 6,2023 Accepted: September 1,2023
DOI : 10.54204/TAJI/Vol1012023001

Background

Research in the field of digital technology and cryptocurrencies is mostly based on bitcoin (Sasongko, Widarni, & Bawono, 2021). However, cryptocurrency itself is still a mystery regarding its use in the banking sector. Research on each digital technology and cryptocurrency is still mostly concerned with blockchain technology, even though banking technology needs to be developed in the realm of digitalization and cryptocurrency development (Viphindrartin, Wilantari, Prabowo, & Sasongko, 2021).

The development of cryptocurrencies relies on the development of blockchain technology but how banking technology can be adapted to this technology is still a mystery (Dierksmeier & Seele, 2018 ; Guo, & Liang, 2016). Blockchain technology in its application in finance, while in cryptocurrencies has never been separated from internet users (Zhu & Zhou, 2016). The creation of bitcoin as a digital currency aims to minimize transaction costs, but in everyday use, the transaction costs of using bitcoin and other currencies are increasing. In the end, transaction fees are unavoidable (Levulytė & Šapkauskienė, 2021). The cost of fiat money that is commonly used in everyday life can be indicated by the interest rate (Abdullah Othman, Kawsar, Bin Hasan, & Binti Mahadi, 2021). While the cost for using cryptocurrency is the shipping fee that is deducted by the wallet provider and electricity costs as the cost of producing cryptocurrency (Dyhrberg, Foley, & Svec, 2018).

Cryptocurrency is a digital currency that is still being developed and has interesting potential in the future. Cryptocurrency still has many mysteries regarding its development and application in everyday life as a medium of exchange. Many things still need to be developed to be able to make cryptocurrency a medium of exchange side by side with fiat money that

already exists today. Cryptocurrency is still a digital commodity that is traded and it is still difficult to function as a currency as a medium of exchange (Kunal, Ramprakash, Xavier, & Arun, 2021).
This study tries to measure the influence of internet users as the main indicator of the development of blockchain technology, domestic consumption as a potential cryptocurrency user in the future, the use of electrical energy as a measure of current energy use for various purposes as an energy indicator that supports the creation of a blockchain. We determined the locus of our research is Japan because it is one of the biggest crypto markets today and influences the movement of world crypto prices. Okorie (2021), reports that Japan is one of the crypto-friendly countries and is one of the largest cryptocurrency markets in the world.

Literature Review

The development of cryptocurrency as a medium of exchange is still difficult to imagine, but the development in that direction is getting bigger. Cryptocurrency in its development still has expensive transaction fees and has not been able to reach zero or near zero (Mercan, Erdin, & Akkaya, 2021). The use of cryptocurrency in transactions and trade is inseparable from internet technology. Internet technology is the basic technology from the creation of blockchain technology to being able to develop cryptocurrency as a digital commodity that is traded today (Panda & Giri, 2022). However, the current use of cryptocurrency is in the form of commodities and digital investment instruments and cannot be used as a daily transaction tool. However, in the metaverse, cryptocurrency has begun to be developed as a transaction tool in the metaverse world, including the metaverse game. This is getting closer to the original goal of creating cryptocurrency as an efficient medium of exchange as an alternative to fiat currency (Ilham, Sadalia, Irawati, & Sinta, 2022).
The use of blockchain technology in cryptocurrency continues to grow but has never been separated from internet users as miners and cryptocurrency users, including investors who buy and store them in wallets, this cannot be separated from the use of the internet. The blockchain technology that is currently developing has given birth to many cryptocurrencies (Al-Saqaf & Seidler, 2017). However, its use in everyday life is still difficult as a transaction tool. Nowadays cryptocurrencies are more likely to be commodities. Of course, this is very much different from the beginning of the creation of cryptocurrencies (Naeem, Farid, Balli, & Hussain Shahzad, 2021).
Crypto is a currency that is still a mystery at this time and further research is needed in the field of the digital economy (Bawono & Prestianawati, 2019 ; Mulaydinov, 2021 ; Bawono, 2021). Technological developments and economic growth based on the theory of sollow have a direct impact on productivity and ultimately have an impact on economic growth. However, the theory has a paradigm related to the technology used in the real sector (Widarni & Bawono, 2022 ; Zhou, Cai, Tan, Zhang, Du, & Song, 2021). However, block chain technology and crypto are different technologies in terms of the theory of sollow and it is very necessary to do research to see the impact and potential of the digital economy (Akter, Michael, Uddin, McCarthy, & Rahman, 2020 ; Schlecht, Schneider, & Buchwald, 2021).

Research Method

This research examines data from 2000 until 2020 to be able to produce "autoregressive vectors" that may be used to evaluate the causal link between variables. Based on secondary data from the World Bank, the following VAR model was used to investigate the causal link between internet users, consumption, and electricity usage in Japan. Here's the model :

$IU_t = \beta_0 + \beta_1 CS_t + \beta_2 EU_t + e_t$ eql 1

$CS_t = \beta_0 + \beta_1 IU_t + \beta_2 EU_t + e_t$ eql 2

$EU_t = \beta_0 + \beta_1 IU_t + \beta_2 CS_t + e_t$ eql 3

Description :
IU: Internet Users
CS : Consumption
EU : Electricity Usage
E : error term
t : time series
β : the magnitude of the effect of causality
eql: equation
This study uses vector calculations where each regression relationship will be brought together so that each variable will alternately become the dependent variable and the independent variable. The zero theory of Dickey-Fuller, taken from the PP test, and p=1 is the formula in Δyt = (ρ – 1)yt-1 + ut, in which Δ – for the first time different operators. This research used the following equation for the "unit root test":

$\Delta Y_1 = \alpha_0 + \beta_0 T + \beta_1 Y_{t-1} + \sum_{i-1}^{q} \quad \alpha_1 \Delta Y_{t-1} + e_t$

Description:
Y as the variable is being examined for unit root
T as the variable which indicates the “linear trend,” the “lag difference” means is $\Delta Yt-1$,
$\alpha 0$ are shown as “constant term,” with the
"t" as a "time trend" indicator.
The null and alternative hypotheses for the "unit root test" are as follows:
$H_{0:}$ α=0
H_1: α≠0

Result and Discussion

The ADF test evaluates the probability of autocorrelation in the error component if the series being evaluated is non-stationary. The following are the results of the unit root test:

Table 1. ADF's Unit Root Test on IU, CS, and EU data in Japan

Variable	Unit Root	Include in the examination Equation	Statistics for the ADF Test	5% Critical Value	Description
Internet Users (IU)	Level	Intercept	-1.603876	0.4613	
	First Diff	Intercept	-5.809191	0.0002	Stationer
Consumption (CS)	Level	Intercept	-1.838596	0.3523	
	First Diff	Intercept	-1.811369	0.3640	
	Second Diff	Intercept	-3.197277	0.0371	Stationer
Electricity Usage (EU)	First Diff	Intercept	-1.343151	0.5872	
	Second Diff	Intercept	-6.799602	0.0000	Stationer

The Internet Users (IU) data at the first difference, the data are stationary, Consumption (CS) and the Electricity Usage (EU) data at the second difference level is stationary. From here we can take the next step in determining vector analysis.
The lag duration sensitivity is required for both the VAR and the causality tests. It's vital to pick an appropriate optimal lag time before starting a VAR or causality test inquiry. The following are the findings of the lag test:

Table 2. Optimum lag test at Lag 0 to 4 IU, CS, and EU data in Japan

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-137.7965	NA	3137.136	16.56429	16.71133	16.57890
1	-89.67695	73.59454*	32.30807	11.96199	12.55014*	12.02046
2	-78.12129	13.59489	27.20811*	11.66133*	12.69059	11.76364*
3	-71.72023	5.271464	53.18747	11.96709	13.43746	12.11324
4	-68.50338	1.513812	267.8156	12.64746	14.55895	12.83746

Table 2 shows the findings of the Optimum Lag test. At Lag 0 to 4, the results show that the variable lengths of lag Internet Users (IU), Consumption (CS), and Electricity Usage (EU) data are at final prediction error (FPE), Akaike information criterion (AIC), Schwarz Criterion (SC), and Hanna-Quin (HQ) at Lag 2. Because the findings of the five components are identical, then lag 2 will be chosen.

Table 3. VAR Model Analysis

	CS	EU	IU
CS	-0.211417	-0.652568	-1.298290
	(0.72914)	(1.14899)	(1.11103)
	[-0.28996]	[-0.56795]	[-1.16854]
EU	0.312522	0.447201	0.028952
	(0.23484)	(0.37006)	(0.35784)
	[1.33081]	[1.20845]	[0.08091]
IU	0.367011	0.208171	0.685806
	(0.29799)	(0.46957)	(0.45406)
	[1.23164]	[0.44332]	[1.51039]
C	-52.77260	-19.43052	-10.96671
	(18.0315)	(28.4145)	(27.4758)
	[-2.92669]	[-0.68383]	[-0.39914]
R-squared	0.768453	0.890461	0.993316
Adj. R-squared	0.507962	0.767230	0.985796
Sum sq. resids	12.25598	30.43426	28.45670
S.E. equation	1.237739	1.950457	1.886024
F-statistic	2.950022	7.225944	132.0916
Log likelihood	-22.08167	-30.26767	-29.66300
Akaike AIC	3.564630	4.474185	4.407000
Schwarz SC	4.059281	4.968836	4.901651
Mean dependent	4.530413	94.22500	18.05253
S.D. dependent	1.764533	4.042713	15.82479

The relationship between Electricity Usage (EU) and Electricity Usage (EU) itself is significantly positive, with something like a coefficient of 0.447201 and a t-statistic of 1.20845. The relationship between Electricity Usage (EU) and Consumption (CS) is significantly positive with a coefficient of 0.312522 and a t-statistic of 1.33081, meaning that the higher the Electricity Usage (EU), the higher the Consumption (CS). Likewise, the relationship between Consumption (CS) and Internet Users (IU) is significantly negative, with a coefficient of --1.298290 and a t-statistic of -1.16854, meaning that the lower the Consumption (CS), the higher the Internet Users (IU). The relationship between Consumption (CS) and Electricity Usage (EU) is significantly negative, as evidenced by the coefficient -0.652568 and the t-statistic -0.56795. This shows that an increase in Electricity Usage will increase the Consumption, a decrease in consumption in this study will also increase Internet Users.

Table 4. Granger Causality test

Null Hypothesis:	Obs	F-	Prob.

		Statistic	
EU does not Granger Cause CS	18	0.63096	0.6101
CS does not Granger Cause EU		0.05707	0.9812
IU does not Granger Cause CS	18	2.88927	0.0836
CS does not Granger Cause IU		0.60212	0.6270
IU does not Granger Cause EU	18	0.57967	0.6404
EU does not Granger Cause IU		0.12262	0.9448

Table 4 shows the findings of the Granger causality test study. The findings reveal that there is no single causal link between variables, as shown by the fact that none of them has a probability of less than 5%.When consumption acts as an independent variable, it suppresses consumption itself due to a decrease in the level of satisfaction from consumption activities continuously. The use of energy significantly encourages domestic consumption and the use of the internet which of course requires energy. Internet use significantly boosts domestic consumption and energy use. This indicates that the digital economy has an impact on increasing domestic consumption and energy use. The use of the internet is something that cannot be separated from crypto currency as a digital currency. The positive causality relationship between internet users and domestic consumption indicates a good prospect for digital currencies in financial and energy transactions formed from consumption activities.

Conclusion

The use of the internet is something that cannot be separated from crypto currency as a digital currency. The positive causality relationship between internet users and domestic consumption shows good prospects for digital currencies in financial and energy transactions formed from consumption activities. The increase in internet use and the increase in consumption in Japan indicate the development of the digital economy in Japan. Crypto money is a digital currency that is used legally in Japan in terms of digital transactions. This illustrates that the digital economy in Japan is developing well and cryptocurrencies have good prospects in terms of economic transactions in trade originating from production activities and increased energy as a result of increased digital activity. This indicates that mining activities that consume electrical energy are increasing due to an increase in crypto currency financial transactions.

References

Abdullah Othman, A. H., Kawsar, N. H., Bin Hasan, A., & Binti Mahadi, N. F. (2021). Determining the Appropriate Investment Strategy and Identify the Leading Monetary System before and during the Covid-19 Pandemic Crisis: A Case Study of Crypto-Currency, Gold Standard, and Fiat Money. Journal of Information Technology Management, 13(2), 25-50.

Akter, S., Michael, K., Uddin, M. R., McCarthy, G., & Rahman, M. (2020). Transforming business using digital innovations: The application of AI, blockchain, cloud and data analytics. Annals of Operations Research, 1-33.

Al-Saqaf, W., & Seidler, N. (2017). Blockchain technology for social impact: opportunities and challenges ahead. Journal of Cyber Policy, 2(3), 338-354.

Bawono,S.(2021).Transformation Of Money Based On Historical Studies.INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH,9(12),109-113.

Bawono, S., & Prestianawati, S. A. (2019). RETHINKING OF FINANCE STABILITY:: GOLD, FIAT MONEY AND ANTI-CRYPTO MONEY POLICY PUZZLE IMPACT IN STABILITY OF INTERNAL VALUE. JBFEM, 2(1), 15-22.

Dierksmeier, C., & Seele, P. (2018). Cryptocurrencies and business ethics. Journal of Business Ethics, 152(1), 1-14.

Dyhrberg, A. H., Foley, S., & Svec, J. (2018). How investible is Bitcoin? Analyzing the liquidity and transaction costs of Bitcoin markets. Economics Letters, 171, 140-143.

Guo, Y., & Liang, C. (2016). Blockchain application and outlook in the banking industry. Financial innovation, 2(1), 1-12.

Ilham, R. N., Sadalia, I., Irawati, N., & Sinta, I. (2022). Risk And Return Model of Digital Cryptocurrency Asset Investment In Japan. Al Qalam: Jurnal Ilmiah Keagamaan dan Kemasyarakatan, 16(1), 357-376.

Kunal, K., Ramprakash, C. M. A. K. R., Xavier, M. J., & Arun, C. J. (2021). A comprehensive study of Blockchain based Cryptocurrency as a Medium of Exchange. International Journal of Future Generation Communication and Networking, 14(1), 4907-4912.

Levulytė, L., & Šapkauskienė, A. (2021). Cryptocurrency in context of fiat money functions. The Quarterly Review of Economics and Finance, 82, 44-54.

Mercan, S., Erdin, E., & Akkaya, K. (2021). Improving transaction success rate in cryptocurrency payment channel networks. Computer Communications, 166, 196-207.

Mulaydinov, F. (2021). Digital Economy Is A Guarantee Of Government And Society Development. Ilkogretim Online, 20(3), 1474-1479.

Naeem, M. A., Farid, S., Balli, F., & Hussain Shahzad, S. J. (2021). Hedging the downside risk of commodities through cryptocurrencies. Applied Economics Letters, 28(2), 153-160.

Okorie, D. I. (2021). A network analysis of electricity demand and the cryptocurrency markets. International Journal of Finance & Economics, 26(2), 3093-3108.

Panda, B. S., & Giri, C. K. (2022). Transformative Blockchain Knacks for Bitcoin Cryptocurrency and Its Impacts. The Role of IoT and Blockchain: Techniques and Applications, 1(1), 237-252.

Sasongko, B., Widarni, E. L., & Bawono, S. (2021). MONETARY OUTLOOK: INTERNAL VALUE OF MONEY STABILITY COMPARISON IN USA. JBFEM, 4(1), 9-18.

Schlecht, L., Schneider, S., & Buchwald, A. (2021). The prospective value creation potential of Blockchain in business models: A delphi study. Technological Forecasting and Social Change, 166(1), 1-12.

Viphindrartin, S., Wilantari, R. N., Prabowo, B. H., & Sasongko, B. (2021). Transformation of Money. Munich : BookRix.

Widarni, E. L., & Bawono, S. (2022). Technology Investment, Consumption, and Economic Growth in Poverty Eradication Efforts in Indonesia. In Modeling Economic Growth in Contemporary Indonesia (pp. 217-223). Emerald Publishing Limited.

Zhou, X., Cai, Z., Tan, K. H., Zhang, L., Du, J., & Song, M. (2021). Technological innovation and structural change for economic development in China as an emerging market. Technological Forecasting and Social Change, 167 (1), 1-12.

Zhu, H., & Zhou, Z. Z. (2016). Analysis and outlook of applications of blockchain technology to equity crowdfunding in China. Financial innovation, 2(1), 1-11.