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Does a Cryptocurrency Comply with Shariah? Empirical Evidence from ARCH-GARCH Economic Model

Riswanti Budi Sekaringsih[a, *] and Hasan Al-Banna[b,]

[a, b]*Lecturer at Faculty of Islamic Economics and Business, UIN Sunan Kalijaga Yogyakarta, Indonesia*

Abstract: The objective of this paper is to analyze the debate about cryptocurrency as money from an Islamic point of view. Money in Islam that is based on *urf* of custom has also some requirements, such as its stability. Some fatwas in Indonesia regarding the legitimacy of cryptocurrency must be evidenced with an empirical-based. The study used 25 cryptocurrency prices and related information. By employing ARCH and GARCH, the study revealed that cryptocurrency is hugely volatile and, thus, does not fulfill such criterion as money from an Islamic perspective, and is normally used for speculation. Hence, this study suggests that cryptocurrency is still reluctant to be used for a transaction.

Keywords: *Cryptocurrency, Money in Islam, Sharia Compliance, and Volatility.*

JEL Classification: *C58, E42, and E44.*

Introduction

The Islamic economy is one of the economic sectors that shows promising growth in the last decades. According to the Islamic Financial Services Industry (2017), the total assets in Islamic finance were around USD 1.89 trillion in 2016, with a growth rate of 15-20% per annum (Qoyum et al., 2021). Nowadays, since its first establishment in 1963, the Islamic financial industry, like its conventional counterparts, has become an important part of modern financial intermediaries (Ishak, et.al., 2021). Islamic finance has a critical role in promoting Islamic economic practice. Nevertheless, some Islamic economic experts opined that the U-turn phenomenon in Islamic economy was predominantly caused by the current practice of Islamic finance which tends to just imitate conventional finance. Islahi (2015) argues that Islamic economists have been too focused on Islamic finance. This argument was supported also by Kahf (2001), with his statement that Islamic finance has been "a beautiful illusion for the core of Islamic economics".

The above criticisms from some Islamic economic experts are true, although not totally correct. Fact, Islamic finance, currently is the most real evidence of the applicability of Islamic economy. It was caused by the historical perspective in which the rise of Islamic economy is due to the problem of conventional finance. In addition, Islamic finance, in reality, as said by Tahir (2017) is the project of some components, such as Ulama, Bankers, Economists, and also Investors whereby each has their own interest. Islamic finance has been attracting many countries to open Islamic finance either in industrial practice or academic affairs. Therefore, inculpate that Islamic finance as the root of the stagnation of Islamic economy is inaccurate and too rash.

In my opinion, Islamic finance in the current application is showing some problems, that are caused by imitation strategy in product development. Islamic finance product merely duplicates conventional product without any new genuine product developed based on the real value of Islam (Laldin & Furqani, 2016). Therefore, to develop the Islamic finance product it needs a comprehensive understanding of Islamic jurisprudence principles. One of the most important innovations in Islamic finance is cryptocurrency.

Money in Islamic is actually based on the *Urf* or custom. The money system in Islam which is based on Dinar and Dirham was actually also the pre-Islamic tradition. Money has long been a medium of exchange, a standard of payment, a unit of account, and a store of value. The *dinar* (gold) was the

*Corresponding author.

riswanti.sekaringsih@uin-suka.ac.id (R. B. Sekaringsih), hasan.bana@uin-suka.ac.id (H. Al-Banna).

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currency unit in the Byzantine empire, and the *dirham* (silver) was in the Persian empire before Islam (Rashid, 2002). A few decades after the conquest of these empires, the Islamic State began to mint the Islamic *dinar* and *dirham* (Nezhad, 2004). It means that there is no standard of money in Islam.

The cryptocurrency was developed to facilitate peer-to-peer transactions that operate independently from the central bank. Crypto-currency is not physical; it can be a coin but it is a digital coin. It also cannot be withdrawn. The owner can only transfer the funds to other parties. The application of cryptocurrency is an interesting issue of money and contributes to the financial market as it is based on a blockchain that is out of the current modern financial system of fiat money. Meanwhile, fiat money is produced by the central bank of each country; however, cryptocurrency is based on a borderless system as it is not limited to one country or territory. No authority controls the money mechanism of cryptocurrency. The value of cryptocurrency is based on blockchain creation to store the data. The calculation is based on the algorithm, which is complicated. The bigger the blockchain can create the data and system, the higher the fee of miners. This is the mechanism of how the value of cryptocurrency is created. Then, the supply and demand of users can also lead to either an increase or decrease in the value of cryptocurrency (Siswantoro et al., 2020).

Nowadays, there are many studies on the issue of cryptocurrency, but very limited focus on Islamic perspectives. Several studies of crypto based on hedging issues were conducted by Bouri et al. (2018); Das et al, (2019), Baumohl (2019), Kurka, (2019), and Al-Mamoun et al. (2020). The other paper discussed the key factors deriving digital currency returns and volatilities and their speculative nature (e.g., Bauer and Dimpfl, 2018, Nguyen et al, 2019; Corbet et al, 2018a; Andrew et al., 2019; Urquhart & Zhang, 2019; Pyo and Lee, 2019; Al-Yahyaee et al., 2019, Aysan et al., 2019, Gozgor et al., 2019). From the Islamic point of view, Siswantoro et al. (2020) argued that crypto was very volatile with speculation as the main characteristic, thus it cannot be used as money. While, Aloui et al., (2021) find that there is an Islamic Gold Based Crypto that has a different character from its conventional counterparts. Many Islamic organization body issue fatwa pertaining to this type of money. Some stated that crypto is non-shariah compliance, but others argue that crypto fulfills the criteria as money or asset based on Shariah criteria. Therefore, the objective of this study is to discuss the issue of *urf* in Islamic law, and also application in Islamic finance. Specifically, the study will focus on Cryptocurrency based on *urf*.

The structure of this paper is as follows. Section 2 presents the theoretical foundation, while in Section 3, the study elaborates on the findings and analysis, and Section 4 outlines our conclusions and the implications.

Theoretical Foundation

Previous Research

There is some previous research that discussed cryptocurrency. Yousaf and Yarovaya (2022) Analysed spillovers between the Islamic gold-backed cryptocurrencies and equity markets during the COVID-19: A sectorial analysis. The result suggested that the COVID-19 crisis intensified the spillover effect between the selected Islamic assets. This research is show that investors could increase their allocations in Onegram gold-backed cryptocurrency to reduce the risk of the equity sector portfolio during the COVID-19 pandemic. Moreover, the hedging costs for all pairs have increased during the COVID-19 period in comparison to the pre-pandemic level.

Nelson (2018) investigated financial stability and monetary policy issues associated with digital currencies. The result was Many of the financial stability and monetary policy problems associated with digital currencies seem remote. Regarding monetary policy, no digital currency seems likely to come into sufficiently widespread use to complicate the central bank's ability to moderate the business cycle and control inflation.

Fegatelli (2022) examinates a central bank digital currency in a heterogeneous monetary union: Managing the effects on the bank lending channel by modeling the impact of CBDC issuance. The result shows This study investigates and clarifies the conditions under which a digital euro could be introduced on a large scale without leading to bank disintermediation or a credit crunch. First, the central bank would require proper mechanisms to manage the volume and the user cost of CBDC in circulation.

Second, the central bank should continue to facilitate access to its long-term lending facilities, to provide banks with a funding source alternative to client deposits at an equivalent cost.

Akcora et al. (2018) tested bitcoin risk modeling with blockchain graphs with the one approach to understanding how transactions relate to market price is to introduce the novel concept of k-chainlets. The result showed A key challenge for Bitcoin cryptocurrency holders is managing FX risk. We identify certain sub-graphs ('chainlets') which exhibit predictive influence on Bitcoin price and volatility and characterize the types of chainlets that signify extreme losses.

The previous research by Coskun et al. (2020) analyzed uncertainty and herding behavior: evidence from cryptocurrencies. The research methodology used the employing cross-sectional absolute deviation (CSAD) of returns, ordinary least squares (OLS), generalized autoregressive conditional heteroscedasticity (GARCH) methods, and Time-Varying Markov-Switching (TV-MS) model. The results of the TVMS model for the 3rd sub-period (2/28/2017−1/16/2018) imply the existence of a herding behavior in the low volatility regime, an anti-herding behavior occurred during the high volatility regime and the effect of uncertainty was significant on the anti-herding behavior. Finally, our results suggest that there was no significant asymmetric behavior during the "up and down" market periods.

Galletta et al. (2022) examine a bibliometric analysis of ESG performance in the banking industry: From the current status to future directions by using bibliometric analysis. The bibliometric analysis clearly illustrates the different stages in this field of study as well as the emerging lines of research that can be studied in greater depth.

Mills and Nower (2019) investigated preliminary findings on cryptocurrency trading among regular gamblers: A new risk for problem gambling by using Amazon's Mechanical Turk (MTurk). The present results suggest that trading cryptocurrencies may be appealing to gamblers that are exhibiting greater problem gambling severity. Future research should begin to include cryptocurrency trading in screening, assessment, and treatment protocols, particularly with regular gamblers.

Qureshi et al. (2020) analyzed the dynamic interdependence of cryptocurrency markets: An analysis across time and frequency by using continuous wavelet transformation (CWT), Cross wavelet transform (XWT) analysis. The results provide evidence of high levels of dependency from 2016 to 2018 at daily frequency scales. The cross wavelet transforms demonstrate Ripple and Ethereum to be trivial origins of market contagion. The results of wavelet coherence confirm the short-run and long-run market integration among some cryptocurrency pairs. However, the coherence is found to fluctuate at higher frequencies and be significantly stable at lower frequencies.

Mansouri (2022) examines financing sustainable entrepreneurship: ESG measurement, valuation, and performance by using data sources, variables, summary statistics, econometric approach. The results hold in a large sample of blockchain-based crowdfunding campaigns, also known as Initial Coin Offerings (ICOs) or token offerings. A key contribution is a machine-learning approach to assess startups' Environment, Society, and Governance (ESG) properties from textual data.

Albaity et al. (2022) investigated the cyclicality of bank credit growth: Conventional vs Islamic banks in the GCC by using database construction and measures of variables. The result found that Islamic banks are pro-cyclical and have higher credit growth compared to conventional banks. Indeed, the Profit and Loss Sharing (PLS) mechanism helps Islamic banks not to curb their credit growth during adverse economic conditions. Also, this research tested the role of the growth rate of market sentiment and found that positive market sentiment leads to higher bank credit growth.

Antonakakis et al. (2019) analyzed cryptocurrency market contagion: Market uncertainty, market complexity, and dynamic portfolios by using the TVP-FAVAR connectedness approach, DCC-GARCH t-Copula, Dynamic portfolio weights, 4. Dynamic hedge ratio. This result shows that could be explained based on increased market uncertainty that is associated with periods of highly volatile prices. In addition, despite the fact that Bitcoin still influences the cryptocurrency market substantially, we note that, recently, Ethereum has become the number one net-transmitting cryptocurrency.

Yarovaya et al. (2021) investigated the effects of a ''black swan" event (COVID-19) on herding behavior in cryptocurrency markets by using apply a volatility signature to test for overall volatility for different frequencies of Bitcoin close prices. The results suggest that COVID-19 does not amplify herding in cryptocurrency markets. In all markets studied, herding remains contingent on up or down markets days, but does not get stronger during COVID-19. These results are important for

cryptocurrency investors and regulators to enhance their understanding of cryptocurrency markets and the financial effects of the COVID-19 pandemic.

Alexakis et al. (2021) analyzed From dotcom to Covid-19: A convergence analysis of Islamic investments by using asymmetric dynamic conditional correlation (ADCC)-GARCH models, Modelling convergence. The results show strong convergence of Islamic and conventional investments. During crises, conventional convergence rates double, but Islamic ones are less affected. Our findings withstand a battery of robustness checks and are primarily useful to policymakers and investors.

Takahashi and Yamada (2021) investigated when the Japanese stock market meets COVID-19: Impact of ownership, China and US exposure, and ESG channels by an ordinary least squares (OLS) regression with standard errors clustered by industry. The result found that indirect ownership through the exchange-traded fund purchasing program by the Bank of Japan has a positive impact on abnormal returns. Foreign ownership is negatively associated with abnormal returns, whereas ownership by traditional business groups is positively associated with abnormal returns.

Alexakis et al. (2021) tested the price effects after one-day abnormal returns in developed and emerging markets: ESG versus traditional indices by including average analysis, parametrical tests (Student's t-tests and ANOVA analysis), non-parametrical tests (Mann-Whitney tests), a modified cumulative abnormal returns approach, regression analysis with dummy, variables, and the trading simulation approach. The results were mixed in the case of H1 and provide no evidence in favor of H2-H5. They also show no significant differences between ESG and conventional indices. The types of detected price effects are the same for the cases of ESG and conventional indices; their power is different in some cases.

was analyzed cryptocurrencies fulfill the functions of money by qualitative Analysis. The result said that only Bitcoin has the potential to serve as a store of value, due to its strict commitment to low supply growth, credibly backed by the network's distributed protocol and credible demonstration of the absence of any authority capable of altering the supply schedule. Other cryptocurrencies' centralized control, and use as tokens for specific applications make them unlikely to fulfill monetary functions.

Bouri et al. (2019) investigated herding behavior in cryptocurrencies by the cross-sectional absolute standard deviations (CSAD). The results said that the static model suggests no significant herding. However, the presence of structural breaks and nonlinearities in the data series suggests applying a static model is not appropriate. we find that herding tends to occur as uncertainty increases. Our findings induce useful insights related to portfolio and risk management, trading strategies, and market efficiency.

Aloui et al. (2021) tested Islamic gold-backed cryptocurrencies by multivariate GJR-GARCH under Dynamic conditional correlation (DDC). The result found that the geopolitical risk intensifies the dependency of GBC on gold returns and volatility. Our results are of great interest to policymakers, Islamic portfolio managers, and digital currency traders when undertaking their investment and hedging strategies during periods of high uncertainty and worsen geopolitical circumstances.

Papadamou et al. (2021) analyzed herding behavior and price convergence clubs in cryptocurrencies during bull and bear markets by investigating the existence of convergence in market values of digital currencies during extremely favorable or unfavorable market conditions. The result said that segmentation is higher during bear markets as clusters are formed around more numerous cryptocurrencies than during bull markets. Convergence is stronger during flourishing periods. Secondary herding is also realized among pairs of clubs. Our findings enable investors to better diversify their portfolios and ameliorate their risk-return trade-off during extreme events.

Siswantoro et al. (2020) investigated the requirements of cryptocurrency for money, an Islamic view by data of 23 cryptocurrency prices and related information. The result shows that cryptocurrency is hugely volatile and has limits to being called 'money,' as it is limited and used for speculation, which is prohibited in Islam. The research implies that Muslims would be reluctant to use cryptocurrency as money, as a currency of the transaction. Abubakar et al. (2019) analyzed cryptocurrency Framework Diagnostics from an Islamic Finance Perspective: A New Insight into Bitcoin System Transactions by qualitative analysis. The result said that Cryptocurrency is a digital currency in which encryption techniques that implement to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank. A transaction is a transfer of Bitcoin value that is broadcast to the network and collected into blocks.

Nugroho (2021) tested spillovers and bivariate portfolios of gold-backed cryptocurrencies and gold during the COVID-19 outbreak by the multivariate GJR-GARCH of under-corrected DCC applied to estimate the dynamic connectedness between Spillovers and bivariate portfolios 1057 gold-backed cryptocurrencies and gold. The result found that the outbreak of COVID-19 increases the dynamic connectedness of gold and gold-backed cryptocurrencies, which indicates a contagion effect. The results show that gold is the net volatility receiver during the COVID-19 pandemic. Moreover, a portfolio composed of gold and gold-backed cryptocurrency provides high profitability performance but zero hedge effectiveness under an optimal weights strategy.

Low and Tan (2020) investigated cryptocurrency – Is It property? By qualitative analysis. The result shows that The intangible and highly movable nature of cryptocurrency places a premium on decisive asset recovery. The cases also suggest that injunctions remain a useful and effective debt recovery tool, especially when coupled with quick investigative action to trace cryptocurrency payments. However, the law remains unsettled as to the most appropriate cause of action for a claim in cryptocurrency or how debt in cryptocurrency can be subject to execution. These issues raise the fundamental question of the nature of cryptocurrency, whether it belongs to an existing category of property, or if it is sui generis.

Definition of 'Urf

'Urf is a noun that is derived from the Arabic word 'arafa (Bello, n.d.) or 'arifa (Laldin, 2013) which means to know as a conventional term. It literally means "that which is known" as opposed to "what is unknown". *'Urf* refers to customs and common practices of a given society whether good or bad. The word *"urf"* as a synonym of the word *"ma'ruf"* which is mentioned in the Qur'an. Technically, there is various definition of 'urf from Muslim Jurists (Laldin, 2006). It also means custom because custom is a standard practice that is widely or universally recognized as fitting and proper in a given society.

In Arabic, there are two terms for legal custom *'urf* and '*adah*. Literally and technically, these terms differ but in usage in society, they overlap each other. The scope of *'urf* is greater than that of *ādah* (Ghani, 2011). In addition, according to Laldin (2013), *'adah* is more general than *'urf,* because *urf* is used exclusively for the custom of an entire society, while *'adah* is used for both social custom and the personal habit of an individual.

Al-Zarqa defines *'urf* as what behavior of group people doing and saying or practicing that is acceptable by group members of society (Al-Zarqa, 1967). Another definition comes from Khallaf (1978) who argues that *'Urf* is "What is established by people from doing and saying". An interesting definition is stated by Badran (1984), with his argument on *Urf* as established and common in a group of people (*jumhur*) from their doing and saying, and it is also repeated consistently until it is accepted by a group of people and is, therefore, their reason accepts. He further quoted that not all that is established and common can be considered as *'urf,* but it is that which is established and common sayings or doings", or recurring practices that are acceptable to people of sound to the people with wise reason and sound behavior. According to Imām Rāghib al-Isfahānī: "Urf refers to knowing something because of its effect, and it is more general in scope than knowledge." In addition, Ibn Ābidīn states: "*Urf* or '*ādah* is a state which is firmly established in hearts and appeals one logically. Besides, pious natures embrace them. " Another definition is from Al-Ghazali who stated that *urf* Refers to what is accepted by society and is compatible with their way of thinking and is usually adopted by those who regard it (something) as having a good character. Al-Jurjani defines '*urf* as A person's act or belief that agrees with the power of reasoning and believes it is reasonable for them to accept it.

From the above definition it can be concluded that for '*urf* to constitute a valid basis for legal decisions, the group of people must practice it consistently. Accordingly, the practice of an individual is not *'urf* but rather is a person's habit *('adah fardiyyah).* 'Urf must also be acceptable and reasonable. Hence, practices that are devoid of benefits or involve disadvantages are not considered legal '*urf*. The above definitions also indicate that there are two main categories of *'urf*. The first one is the *qabul*). The above definitions indicate that for 'urf to constitute a valid basis doings of the group of people *('urf amali*) and the second is the sayings of the group of people('*urf lafdli*). *'Urf* and its derivative, *ma'ruf,* occur in the Qur'an, and it is the latter of the two, which occurs more frequently.

Finding and Discussions

Money in Islam

Money in Islamic history was started when the Islamic Government ruled (Siswantoro et al., 2020), specifically in 625 AD after the Prophet Muhammad PBUH govern in Medina. Before Islam in Arab, the dinar is the money used by society for any economic transaction. Dinar was actually copied from the Golden Money of the Byzantine Empire, while the Dirham was copied from Persian Empire. This type of money that copied by Muslims with the standard 4.25 g of 22-carat gold, and silver is 3 grams used for Dirham (Haneef and Barakat, 2002). Previously, money was made from camel skin, but it was prohibited, as it can significantly reduce the population of camel (Low & Tan, 2020).

Dinar and Dirham as money showed a very stable value from time to time, with a ratio around 1:10. However, because of the hoarding and speculation, the ratio then change to 1: 15 in the long periods (Rashid et al., 2002). In other words, they minted the dinar into gold because the dinar was made of gold, which was the intrinsic value of the dinar. This phenomenon was observed by Al Maqrizi. Then, the terminology known as bad money drove out good money by Gresham's law (Rosly and Barakat, 2002; Siswantoro et al., 2020).

From the Islamic perspective, money is exclusively used for exchange not for speculation or trading to gain profit purposely. Taking profit from money trading on purpose can be categorized as usury (riba) (Sanusi, 2002). On the other hand, referring to the phenomenon above, people would keep "good" money rather than use it for a transaction that is "bad" money (Nezhad, 2004).

Crypto and the Future of Money from an Islamic Point of View

One of the most important aspects of Islamic jurisprudence is *Urf* or custom. *Urf* of custom has a significant position in Islamic law as an authorization for some shariah rulings that are widely applied, particularly in *muamalah* which basically has strong flexibility. It is very relevant in *muamalah* since basically covers the relationship between people. Hence, there is no standard practice of one person and another people, and even the custom of a particular people change over time. However, it must be noted that Islam recognizes custom *('urf)* as a valid basis for legal reasoning, as long as not contradict with shariah, and the sacred text is not violated (Laldin, et al., 2013).

The literal meaning of 'urf, according to Ibn al-Fāris (1313), is "*Arafa* (عرف) takes its origin from ain, rā, and fā. It is employed in two senses: (1) arrival of two things – one followed by the other attached and (2) peace and tranquility." Before the advent of Islam, old customs, usages, habits, and practices were the foundations of Arab society and civilization (Abdullah et al., 2021). Contained in these usages and practices were the remains of the religion of the Prophet Ibrahīm. Also, some effects from Christianity and Judaism found way into them. Another element was the customs of their geographical environment and contacts with the foreign nations (Ghani, 2011). Therefore, *Urf* (custom) is can be seen as a very ancient and significant source of Islamic law. The use of custom was also popular in the pre-Islamic Arabs, as had no written document of regulation. According to historical accounts, the Khulafa' al Rashidun are the people who retained and adopted many pre-Islamic social customs and traditions. For the Prophet himself had acknowledged the validity of some pre-Islamic customs that were compatible with the letter and spirit of the revelation (Ghani, 2011).

The Prophet (PBUH) recognized many of the pre-Islamic customs of the Arabs such as in family law, the Prophet approved one of several systems of marriage which were known to the Arabs before Islam (Mohamed, 1973); In penal law, the whole system or retaliation and the liability of the relatives of an offender (*al-'Aqilah*) for the payment of blood money or *diyah* was taken over from the practice of pre-Islamic Arabian society. Certain modifications were indeed made by the Qur'an and following certain precepts recorded as Prophetic practice. But the main idea and basic principles were current and in operation long before the advent of Islam (Mohamed, 1973). In business, Mudharabah is also pre Islamic Arabs transaction that is then approved by Islam.

A cryptocurrency is a virtual coin that is developed based on technology, as it does not have a physical form. The blockchain has a powerful rule as the transaction record. The technology blockchain can be seen as a public record or electronic ledger in which people who own the cryptocurrency will use it as a payment method rather than having a banking facility (Siswantoro et al., 2020).

The initiation of the creation of a new cryptocurrency generally begins as a company plans to launch a new product and joint time to find funds to develop it. Next, the company will typically create its own virtual currency and issue new coins or tokens created through the initial coin offering. Different labels have been used to describe the different types of tokens or coins being issued. The first cryptocurrency that existed in the world was Bitcoin. Bitcoin has no function or purpose other than as a medium of exchange and also as a store of value (Sami & Abdallah, 2021).

Table 1. List of Cryptocurrencies (*Data at 14 February 2022*)

No	Name	Price (Intraday)	Market Cap (in USD Billion)
1	Bitcoin USD	42,545.54	806.576
2	Ethereum USD	2,942.38	351.83
3	Tether USD	10.004	78.453
4	Binance Coin USD	401.97	66.371
5	USD Coin USD	10.003	52.433
6	XRP USD	0.803240	38.421
7	Cardano USD	10.473	35.182
8	HEX USD	0.198802	34.474
9	Solana USD	95.97	30.62
10	Terra USD	53.47.00	21.357
11	Avalanche USD	81.49.00	19.989
12	Dogecoin USD	0.146853	19.483
13	Polkadot USD	0,8	18.489
14	Binance USD USD	10.010	17.609
15	SHIBA INU USD	0.000031	16.788
16	Polygon USD	16.515	12.349
17	Crypto.com Coin USD	0.481559	12.166
18	TerraUSD USD	10.024	11.555
19	Wrapped Bitcoin USD	42,487.12	11.128
20	Dai USD	0.999565	10.236
21	Litecoin USD	126.26.00	8.792
22	Cosmos USD	26.65	7.632
23	Chainlink USD	0,69375	7.466
24	Uniswap USD	0,461111111	6.727
25	NEAR Protocol USD	10.57	6.719

Source: Yahoo Finance.

Cryptocurrency management is usually through a protocol that is defined by specifying how many coins can be created, how they are created, and how the integrity of the ledger is protected. This protocol aims to gain confidence to be on par with government regulations and laws that underpin fiat money, and its power to influence digital currencies and, therefore, their supply and demand. Typically, blockchain cryptocurrencies are regulated in such a way that it is difficult, or impossible, to change their operating protocol. When cryptocurrencies enter the circulation system, it will have to do with how cryptocurrencies can be purchased through exchanges; in addition, some people or companies accept it because the company allows them to choose to accept digital money; some retailers also accept cryptocurrency as payment for their goods and services (Siswantoro et al., 2020).

Table 1 shows the list of the 25 cryptocurrencies in the world with the biggest market capitalization. The table indicates that Bitcoin is the biggest Crypto in the world with a market size of around USD806.576 Billion in February 2020. Ethereum and Tether are followed as the biggest crypto player with a size of around USD351.83 billion and USD78.453 billion respectively.

Although there is no standard of money in Islam, as dinar and dirham are actually not from Islam, based on '*Urf* or the Custom of the society, the main issue of cryptocurrency is from its speculation aspect. Shariah either in Quran or Sunnah strictly condemns *Gharar* and *Maysir*. Hence, discussing the issue of cryptocurrency cannot detach from the issue of speculation. The cryptocurrency that may be based on *'Urf* could become money, but its nature and its current practice maybe have a problem of speculation.

Figure 1. The Trend of Bitcoin Price

Some Islamic economic experts said that discussing speculation is not only about the issue itself but also its impact on the whole economic system. It is very important, as the macro objective of Islam in the economy is to ensure that money can circulate normally in society, thus having a positive impact on development. Figure 1 revealed the trend of Bitcoin from 2019 to February 2022. It can be seen that Bitcoin's value fluctuated from 2019 to 2022, especially from 2021-2022 whereby the price increased significantly. The fluctuation of Bitcoin is also indicated by the technical analysis as described in Figure 2.

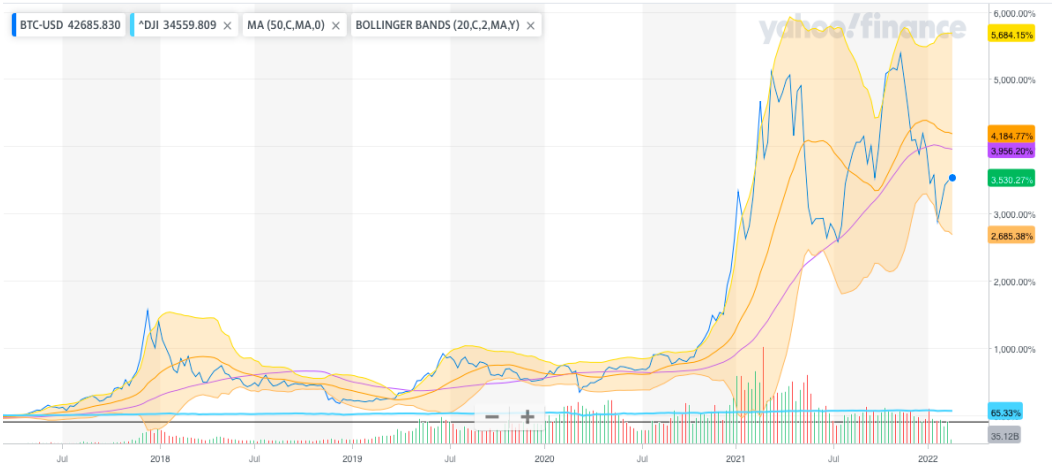

Figure 2. Technical Analysis of Bitcoin

From the above graph, the study reveals that '*Urf* can be applied as legitimacy to approve Cryptocurrency as Islamic. It can be seen both from the history of money in Islam, and also the basic principle of *Urf*, whereby Cryptocurrency fulfills the criteria to comply with shariah if we use *Urf* as the basis. First, cryptocurrency has no contradiction with Qur'an and Sunnah, since money is a custom area. Hence, there is no specific Islamic law that regulates this issue. Second, cryptocurrency is also practiced by some people in the world, and it is predicted will become money in the future (Abubakar et al., 2019).

Nevertheless, to be accepted as money, especially from an Islamic perspective, there is some specific characteristic of money, thus can bring *maslahah* either macro *maslahah* or micro *maslahah*. However, to act as money, several conditions must be met by crypto money, namely: accepted (where money must be accepted by the community, which in today's context is by legal tender), divisible (that is, money must be divisible into units). smaller ones), homogeneous (the same type even though divided into small units), durable (money must last a long time), mobile (money must be easy to move), rare (money must be something rare), and stable value (money must have a stable value).

From these conditions, the question is, does cryptocurrency meet the criteria for money? In our view, from the seven criteria, crypto money is quite problematic from the aspect of a stable value (having a

stable value). Learning from the case of Bitcoin alone, as of 2021, the value of cryptocurrencies shows very high volatility. In early January the price of Bitcoin was in the range of Rp. 266 million, rose to Rp. 720 million in March, then corrected in July to the range of Rp. 520 million. Even in November, the price was 900 million, now the value has dropped to Rp. 696 million. This shows that crypto money does not meet the criteria of being good money. Forcing cryptocurrencies as a means of payment without modification will actually create an even worse bubble economy in the future.

From the ARIMA and ARCH-GARCH testing as described in Table 3, Table 4, Table 5, and Table 6, the study revealed that High Volatility is exist in Cryptocurrency. It indicates that the potential of Crypto to be used as money needs to be discussed seriously. Especially, if we see from the volatility, crypto still needs to be modified especially in terms of its stability as a medium of exchange and store of value.

Table 2. Descriptive Statistics of Top 13 Cryptocurrencies

Variable	Obs	Mean	Std. Dev.	Min	Max
Bitcoin	2.557,00	11.900.000.000,00	16.300.000.000,00	210.000.000,00	67.600.000.000,00
r Bitcoin	2.556,00	0,00	0,04	-0,37	0,25
Ethereum	1.559,00	984.000.000,00	1.210.000.000,00	84.300.000,00	4.810.000.000,00
r Ethereum	1.558,00	0,00	0,05	-0,42	0,26
Binancecoin	1.559,00	113.000.000,00	182.000.000,00	1.510.360,00	676.000.000,00
r Binancecoin	1.558,00	0,01	0,06	-0,42	0,70
Hex	791,00	0,08	0,12	0,00	0,49
r Hex	790,00	0,02	0,27	-0,93	6,73
Avax	511,00	38.000.000,00	34.300.000,00	2.906.161,00	135.000.000,00
r Avax	510,00	0,01	0,09	-0,36	0,75
Doge	1.559,00	0,05	0,11	0,00	0,68
r Doge	1.558,00	0,01	0,12	-0,40	3,56
Dot	526,00	22.600.000,00	13.700.000,00	2.875.028,00	53.900.000,00
r Dot	521,00	0,01	0,08	-0,38	0,56
Shiba	549,00	0,00	0,00	0,00	0,00
r Shiba	304,00	0,03	0,31	-0,50	4,33
Cro	1.158,00	0,13	0,14	0,01	0,90
r Cro	1.157,00	0,01	0,08	-0,39	1,38
WBTC	1.096,00	23.500.000.000,00	19.100.000.000,00	3.630.000.000,00	67.500.000.000,00
r WBTC	1.095,00	0,00	0,04	-0,38	0,28
LTC	2.708,00	66.200.000,00	70.800.000,00	1.157.010,00	386.000.000,00
r LTC	2.707,00	0,00	0,06	-0,40	0,67
Atom	1.069,00	11.100.000,00	10.900.000,00	1.649.203,00	44.500.000,00
r Atom	1.068,00	0,00	0,07	-0,45	0,32
Uni	516,00	18.700.000,00	10.500.000,00	1.930.119,00	43.200.000,00
r Uni	515,00	0,01	0,09	-0,33	0,99

r stand for return.

In addition, Islam has never specifically regulated the types and forms of money. Money is the territory of muamalah adhering to the principle "in muamalah, everything is allowed, unless there is an argument that forbids it". This means that crypto money can be turned into money, as long as it does not conflict with 4 main principles, namely, free from usury, *maysir* (gambling), *gharar* (obscurity/uncertainty), and halal goods. However, in classical literature, for example, Al-Ghazali in the Book of *Ihya Ulumiddin* explains that money is like a mirror that reflects things. This means that money must have a stable value (Qoyum, 2018).

Table 3. ARIMA Result

	Return Bitcoin	Return Ethereum	Return Binancecoin	Return Hex	Return Avax	Return Doge	Return Dot
	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)
Constant	0.00278***	0.00278**	0.00533*	0.02398	0.00906**	0.00702	0.00706**
	[0.00075]	[0.00128]	[0.00296]	[0.01814]	[0.00446]	[0.00535]	[0.00359]
AR (1)	-0.89722***	-0.80750***	0.95708***	-0.61238***	-0.29120	-0.66067***	-0.77691***
	[0.09339]	[0.11125]	[0.02408]	[0.11721]	[8.20966]	[0.09425]	[0.21296]
MA (1)	0.87964***	0.76339***	-0.93261***	0.42743***	0.28643	0.74119***	0.72917***
	[0.09964]	[0.12187]	[0.02824]	[0.12365]	[8.22057]	[0.08333]	[0.22929]
Sigma	0.03833***	0.05142***	0.06402***	0.26430***	0.08844***	0.11868***	0.07779***
	[0.00025]	[0.00048]	[0.00043]	[0.00129]	[0.00126]	[0.00024]	[0.00119]
LM test for ARCH[1]	46.829***	16.670***	150.093***	0.931	0.986	0.01	3.940**
N	2556	1558	1558	790	510	1558	521
Akaike's	-9411.01510	-4818.01569	-4134.86546	147.52575	-1018.70472	-2211.85763	-1174.37851
Bayesian	-9387.63030	-4796.61105	-4113.46082	166.21388	-1001.76708	-2190.45300	-1157.35551

Standard errors in brackets
* p<0.1, ** p<0.05, *** p<0.01
[1]Chi square for LM test for autoregressive conditional heteroskedasticity (ARCH) with no ARCH effect as null hypothesis

Table 4. ARIMA Result

	Return Shiba	Return Cro	Return Wbtc	Return Ltc	Return Atom	Return Uni
	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)	ARIMA(1, 0, 1)
Constant	0.03398	0.00544*	0.00311***	0.00282**	0.00401**	0.00554
	[0.04485]	[0.00302]	[0.00117]	[0.00119]	[0.00199]	[0.00443]
AR (1)	0.70029**	-0.78493*	-0.47065***	-0.24468	0.19924	-0.76803***
	[0.33349]	[0.47242]	[0.14028]	[1.98639]	[0.26207]	[0.11375]
MA (1)	-0.63744*	0.79616*	0.35791**	0.25105	-0.28589	0.66739***
	[0.36335]	[0.46005]	[0.14873]	[1.98397]	[0.25522]	[0.14192]
Sigma	0.30525***	0.07850***	0.04096***	0.05798***	0.07263***	0.08809***
	[0.00319]	[0.00031]	[0.00036]	[0.00028]	[0.00087]	[0.00097]
LM test for ARCH[1]	0.062	0.322	4.399**	48.017***	4.439**	0.010
N	304	1157	1095	2707	1068	515
Akaike's	149.25850	-2596.82424	-3882.16916	-7726.79886	-2562.67553	-1032.76806
Bayesian	164.12661	-2576.60990	-3862.17513	-7703.18447	-2542.78136	-1015.79139

Standard errors in brackets
* p<0.1, ** p<0.05, *** p<0.01
[1]Chi square for LM test for autoregressive conditional heteroskedasticity (ARCH) with no ARCH effect as null hypothesis

Table 5. ARCH-GARCH Result

	Return Bitcoin	Return Ethereum	Return Binancecoin	Return Hex	Return Avax	Return Doge	Return Dot
	GARCH(1, 1)	GARCH(1, 1)	GARCH(1, 1)	GARCH(1, 1)	GARCH(1, 1)	GARCH(1, 1)	GARCH(1, 1)
Constant	0.00250***	0.00236*	0.00283**	0.01171***	0.00239	0.00016	0.00608*
	[0.00067]	[0.00126]	[0.00118]	[0.00379]	[0.00490]	[0.00032]	[0.00311]
AR (1)	-0.92660***	-0.77990***	-0.83992***	0.59247**	0.97831***	-0.04028	0.59128
	[0.08008]	[0.29843]	[0.16137]	[0.27424]	[0.09480]	[0.03604]	[6.65321]
MA (1)	0.91288***	0.75626**	0.81482***	-0.49938	-0.97493***	-0.35458***	-0.58752
	[0.08820]	[0.31230]	[0.17431]	[0.30395]	[0.10252]	[0.02081]	[6.67791]
ARCH (1)	0.11210***	0.06910***	0.12715***	0.50556***	0.16524***	3.19724***	0.07795***
	[0.00725]	[0.00754]	[0.00914]	[0.02872]	[0.02295]	[0.05825]	[0.01498]
GARCH (1)	0.85582***	0.87694***	0.85686***	0.51454***	0.81015***	0.03331***	0.86346***
	[0.00902]	[0.01523]	[0.00884]	[0.01962]	[0.02480]	[0.00618]	[0.02334]
Constant	0.00006***	0.00015***	0.00009***	0.00182***	0.00030***	0.00119***	0.00029***
	[0.00000]	[0.00003]	[0.00001]	[0.00017]	[0.00009]	[0.00003]	[0.00008]
N	2556	1558	1558	790	510	1558	521
Akaike's	-9835.89951	-4929.45404	-4726.53680	-1235.98777	-1122.59660	-3789.18206	-1238.86205
Bayesian	-9800.82232	-4897.34709	-4694.42985	-1207.95557	-1097.19014	-3757.07512	-1213.32755

Standard errors in brackets
* p<0.1 ** p<0.05 *** p<0.01

Table 6. ARCH-GARCH Result

	Return Shiba GARCH(1, 1)	Return Cro GARCH(1, 1)	Return Wbtc GARCH(1, 1)	Return Ltc GARCH(1, 1)	Return Atom GARCH(1, 1)	Return Uni GARCH(1, 1)
Constant	-0.00286	0.00225**	0.00306***	0.00126	0.00378**	0.00480
	[0.00534]	[0.00088]	[0.00118]	[0.00162]	[0.00189]	[0.00339]
AR (1)	0.78002***	0.09709	-0.09280	0.98647***	0.22670	0.10554
	[0.13053]	[0.21926]	[0.56942]	[0.01813]	[0.43764]	[0.86132]
MA (1)	-0.86997***	-0.26277	0.03033	-0.98131***	-0.29327	-0.16217
	[0.07430]	[0.20246]	[0.56717]	[0.02121]	[0.42977]	[0.85069]
ARCH (1)	0.72578***	0.34698***	0.07406***	0.06381***	0.10270***	0.09221***
	[0.08101]	[0.02509]	[0.01139]	[0.00480]	[0.01193]	[0.02400]
GARCH (1)	0.59220***	0.72332***	0.84873***	0.88474***	0.85778***	0.78781***
	[0.01074]	[0.01764]	[0.02378]	[0.00761]	[0.01640]	[0.05435]
Constant	0.00175***	0.00015***	0.00013***	0.00017***	0.00023***	0.00073***
	[0.00014]	[0.00003]	[0.00002]	[0.00001]	[0.00005]	[0.00023]
N	304	1157	1095	2707	1068	515
Akaike's	-266.57585	-3280.76209	-3983.37681	-8162.97227	-2669.16012	-1069.32383
Bayesian	-244.27369	-3250.44058	-3953.38575	-8127.55070	-2639.31887	-1043.85883

Standard errors in brackets
* p<0.1 ** p<0.05 *** p<0.01

Conclusion

The objective of this study is to discuss the basic concept of *Urf* in Islamic law, and its potential to be used as the basis to measure the permissibility of Cryptocurrency. From *Urf* Point of View, the study concludes that Cryptocurrency has the potential to be used as money in the future. It minimum caused by two things, namely, first, Islamic Money, is custom, hence, the possibility of Crypto is high. Second, crypto also fulfills some criteria to be accepted if we use some criteria for acceptable *Urf*. Nevertheless, the study also finds, by calculating and conducting using statistical testing, Cryptocurrency has very high volatility. In this case, some Finance experts argue that it is caused by high speculation practices conducted by the speculator in the Market. Therefore, to be applied as money, the volatility issue must be erased.

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