

# The Compatibility of Cryptocurrencies and Islamic Finance

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**Abstract**— In this article, I examine the compatibility of Bitcoin and other cryptocurrencies within the context of Islamic law. I begin with an introduction of Bitcoin and other cryptocurrencies. I then discuss the notion of money in Islamic history, with an emphasis on the importance of ethical financial dealings. I then argue that Bitcoin and other cryptocurrencies are highly compatible within Islamic finance, and in many cases, actually provide solutions to problems of government institution controlled currencies, arguing that Bitcoin and other cryptocurrencies are a better solution for several problems that early Islamic finance scholars were concerned with. Unlike traditional fiat, the supply of Bitcoin and many other digital currencies are fixed, thereby eliminating potential for gharar (deception), and also inflation. In addition, unlike fiat and precious metal coins, digital currencies such as Bitcoin cannot be altered, forged, or manipulated. Moreover, cryptocurrencies' peer-to-peer transactions remove the need for any banking institution, thereby eliminating any risk with a third party controlling one's money. I then conclude with a summary of the main points of the article, and examine future possibilities with regards to the role of cryptocurrencies.

**Keywords**--*Bitcoin; Cryptocurrencies; Islam; Shariah, Islamic Finance; Islamic Banking*

## I. INTRODUCTION (BITCOIN AND OTHER CRYPTOCURRENCIES<sup>1</sup>)

In 2008, an individual (or individuals) who went by the name of Satoshi Nakamoto (2008) published a paper entitled "Bitcoin, A Peer-to-Peer Electronic Cash System," that outlined the creation of this new digital currency, named Bitcoin (BTC or XBT). It is believed that this new currency was a reaction to the 2008 financial crisis, and subsequent government bailouts of banks.<sup>2</sup> As Geiger (2017) explains, "Bitcoin is an alternative to the current financial system. It removes authority from any single person or organization, and was created at least partially as a response to the 2008 financial crisis, where the poor [judgment] of a few led to layoffs, college graduates without job opportunities, and home

foreclosures internationally." Through a blockchain (an online ledger), transactions are all recorded, and through a proof of work system (done by currency miners), these transactions are all confirmed. Moreover, this blockchain also ensures that no double spending problem exists (Thompson, 2017). A new, decentralized cryptocurrency was born.

Bitcoin began as a digital currency to counter traditional methods of finance, and, despite ups and downs in price over the years, the cryptocurrency is beginning to see more and more mainstream adoption. More people are now viewing Bitcoin both as a means of exchange, and as a store of value. Some are even calling Bitcoin "digital gold" (Popper, 2016), with digital currencies becoming the new form of money (Antonopoulos, 2016). While some argue that digital and cryptocurrencies<sup>3</sup> are not real money, upon reflection, there is no intrinsic value to a lot of our existing money. As Thompson (2017) explains: "A bar of gold. A disk of iron. A chain of beads. A card of plastic. A slip of cotton-linen paper. These things are worthless. One cannot eat them, or drink them, or use them as a blanket. But they are valuable, too. Their value comes from the simplest thing. People believe they are money, and so they are." To be money, the said currency should be a store of value, have a unit of account, be a medium of exchange, and also serve as a standard of deferred payment (Bank of England, 2014, in Adam, 2017). There are also a number of other characteristics that many believe money should have. For example, some look to Aristotle's definition of money, measuring Bitcoin to these conditions. Aristotle argued that money should be durable, able to be transported, divisible, as well as having intrinsic value. In addition, digital currencies like Bitcoin also have a limited supply, which some believe lends further credibility to viewing them as money (Jenkinson, 2017). Again, as I shall argue, what we find is that not only do Bitcoin and other cryptocurrencies fit these aspects of money, but also that these currencies may do so better than traditional forms of money like fiat and even gold. So, what we are seeing today with digital currencies is an increase in acceptance into the real world. More individuals are indeed treating these currencies, as just that, currencies, and they are doing so while also becoming less and less willing to embrace 'traditional' fiat as currency.

<sup>1</sup> Full disclosure: The author does own Bitcoin, along with other cryptocurrencies.

<sup>2</sup> As the New Yorker (2013) notes, "When the experiment was launched and the first fifty [B]itcoins (the so-called genesis block) were mined, in January of 2009, he (or she, or they) included this line of text along with the data: "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks.""

<sup>3</sup> For a discussion on the differences between digital and cryptocurrencies, see Tar (2017).

When looking at money, “Throughout history, currency has taken one of two forms: physical assets, like gold or beads, and fiat currency, like government-backed paper and coins. Bitcoin and its brethren introduce a third category: digital currencies that run on a combination of game theory, economics, and cryptography—thus, *cryptocurrencies*” (Thompson, 2017). This innovation of Bitcoin and other digital currencies then sparked a wide range of cryptocurrencies that followed Bitcoin. While there are thousands of different digital currencies and tokens, some specific variations include coins with less fees and more scalability (such as Litecoin), privacy coins such as Monero, and projects like Ethereum that have established smart contracts (which can ensure that a contract’s obligations are met before coins are exchanged). Given the expanded functions of new digital and crypto currencies, any conversation about digital currencies can no longer just be limited to Bitcoin.

Many of these cryptocurrencies are classified as commodities. A commodity is a form of money that is also seen as having some form of intrinsic worth. So, in the past this has included shells or animals (Adam, 2017). Cryptocurrencies such as tokens can fit in this category since they not only can be traded, but they can also be used to build programs or apps onto a blockchain.<sup>4</sup> Yet, because of the very new nature of digital currencies, there exists little conversation about the compatibility between such currencies and Islamic law, let alone detailed discussions about specific classifications of digital currencies. Therefore, what we seek to do in this article is to briefly discuss the history of money in early Islam, examine issues with traditional fiat currency from Islamic perspectives, and then argue that these new digital currencies solve many of these fiat issues, making them preferred to “traditional” money when it comes to themes in Islamic finance and Islamic law in general.

## II. ISLAMIC FINANCE

One of the primary questions that Islamic scholars, financial analysts and bankers have asked within the conversation of Bitcoin and Islamic finance is whether Bitcoin

<sup>4</sup> Ethereum is one such example. Ethereum is a smart contract focused blockchain platform that allows for different applications to be built upon it, which provides actual intrinsic value to the currency. As Rosic (2016) points out, “Ethereum’s smart contracts use blockchain stored applications for contract negotiation and facilitation. The benefit of these contracts is that the blockchain provides a decentralized way to verify and enforce them. The decentralized aspect makes it incredibly difficult for fraud or censorship. Ethereum’s smart contracts aim to provide greater security than traditional contracts and bring down the associated costs. The smart contract applications are powered by ether, Ethereum’s blockchain based cryptocurrency. Ether, as well as other crypto-assets, are held in the Ethereum Wallet, which allows you to create and use smart contracts.”

(and, given their new arrival, to a lesser extent, other cryptocurrencies) are compatible within the regulations of Islamic finance. In order to better answer this question, in terms of methodology, we must first look at what various Islamic scholars have said about the issue of money (and more specifically, paper money), as well as precious metals as a form of currency, and their compatibility with the Quran and also the life and sayings of Muhammad (the Hadith) (Choudhury, 2014). When discussing Islamic law (and Islamic finance), it is important to remember that all of Islamic law has a long history, with various interpretations of different elements within this category of *Shariah* (Islamic law). This can be seen when discussing law in general, the role of Islam in government, human rights (Shah, 2006), etc... However, there is often a misconception that there exists a unified, agreed upon understanding of Islamic law; the reality is far from this. Throughout the centuries, Islamic scholars debated matters such as money, interest, loans, charity contributions, etc... Even to this day, a variety of opinions exist on such issues. Without a religious hierarchy throughout much of the faith, along with the allowance for *ijtihad* (personal interpretation), several schools of thought have emerged out of the Islamic tradition, each with their own interpretations of law and Islamic finance.

In order to examine the relevance and compatibility of digital currencies and Islam, it would be useful to begin by looking at the role of money in early Islamic history, as well as how paper money has been viewed by Islamic scholars. By outlining positives and also critiques of “traditional” forms of money, we can then use this bar to compare it with digital currencies. Again, today, paper money is often viewed as a “given” in terms of finance. While fiat is currently the most widely used form of money, we have to remember that this was not always the case; the advent of paper as a form of currency is a relatively newer phenomenon in the history of money. Prior to that, things such as gold, silver, or goods served as mediums of exchange between people.

Examining the early Islamic holy text of the Quran, there are no specific guidelines on what money must look like (Adam, 2017). During the time of Muhammad in Mecca (in the late 500s and early 600s), common forms of money included raw materials, as well as coins from the Byzantine era. During the early Islamic empires—beginning during the 18 *Hejira*, the government issued its own Dirhams (silver), whereas it was later, during Muawiya’s rule that gold coins began to be minted and used. It was until the time of ‘Abd al-Malik Ibn Marwan that Byzantine coins were still used. During these periods, “coins were treated like raw metal: people continued to weigh rather than count them. Another reason that weighing remained the most important way of measuring the value of money was that wear and tear afflicted coins so that they would lose weight over time...In general, coins were still objects of trade with respect to their silver or gold content rather than simply an exchange medium, and were weighed rather than counted” (Siegfried, 2001). It was during Malik Ibn Marwan’s rule that “a regulatory control

over the circulation of money came into existence through the establishment of a network of mint houses to issue coins which replaced the foreign currency” (Ahmed, 1989: 39).

This notion of currency continued to be structured on the gold and silver content of a coin (Ahmed, 1989), and in fact, the exchange rate between gold and silver was something that scholars of Islam have argued within the *fiqh* tradition (Siegfried, 2001). Things like copper (without the valued metal content of gold or silver) were often viewed in the category of *al-istilah* (token money), whereas gold and silver coins were seen as *thaman khilqatan* (real money).” The different schools of Islamic thought have wrestled with the questions about how to treat gold and silver currencies (Siegfried, 2001). Yet, as Siegfried (2001) writes, “...the introduction of paper money changes the situation fundamentally. As soon as paper money assumes the prominent role in economic transactions, a new legal concept has to be developed, which incorporates this new form of money.” And because “no currency is based on the gold standard...other concepts from classical Islamic legal thought have to be employed to embed paper money in the theories of *fiqh*” (327).

The idea of gold and silver as money has not been heavily contested in general (or specifically in Islamic) history. In fact, some, such as Al Ghazali, viewed these precious metals as money God specifically created to be used (Adam, 2017). However, in the 20<sup>th</sup> century, we began to see a great shift away from silver and gold (and the gold standard) and more towards paper money. Because of this change, Islamic scholars—to this day--continue to debate as to whether paper money is an acceptable form of exchange. While a number of scholars have suggested an acceptability of paper money within Islamic law<sup>5</sup>, others have argued that fiat money, in its current state are “haram” or prohibited in the faith. For example, Anwar & Haque (1993) write:

“Fiat money is an innovation whereby governments extract resources from the people. Issuance of fiat money itself is contrary to the principles of Islamic justice as it entitles the issuing authority to “steal” commodities belonging to the people. The Qur’an has clearly prohibited such transactions declaring them unjust [al-Baqarah: 188]. Besides, the Qur’anic principle of mutual consent [al-Nisaa: 29] in transactions is also violated as the people are coerced to relinquish part of their properties against fiat money which has no intrinsic value. Therefore, fiat money cannot be considered at par with commodity money or paper money fully backed by commodities in discussing the question of *riba*” (962).

Other Islamic scholars have been even more critical of paper money. One of the most direct critiques of paper money from an Islamic perspective in recent years comes from three Asatizah (scholars) of Al-Munawwar (2013). Muhammad

<sup>5</sup> For the different ways that Islamic scholars have argued for the justification of paper money within Islamic jurisprudence, see Siegfried (2001).

Noor Bin Muhammad Deros, Amiruddin Bin Muhammad Zain, and Muhammad Faisal Bin Muhammad Ayub wrote a text entitled “The Dazzling Proof for the Return of Our Pure Money: The Judgment on Fiat Currency.” In this text, among other things, they argue that fiat is unacceptable since it is not a store of value<sup>6</sup>, it itself has no value, and it is inflationary. They are also critical of fractional reserve banking<sup>7</sup>, and say that “since banking took control of the money supply of a country and as a result, the price of goods and services are deliberately forced to be raised and as an inevitable result, the value of the money in our possession (purchasing power) keeps falling.” What is also interesting to note is that in pre-Islam (and early Islamic society in Arabia), “[t]here was no government control over the circulation of money, except that the second Caliph minted some *dirhams* on the existing design at a very limited scale and these coins were in use along with the foreign coins.”

While there are a few articles on Islamic finance and Bitcoin, the literature on the topic is still in its infancy. Moreover, few societies in general (whether Islamic or not) have fully embraced digital currencies; at the time of this writing, these currencies are still in the early stages of adoption. However, we are seeing much more attention to digital currencies, even within the Islamic context. To give just one example of the developing intersection, in May 2017 marked the beginning of an Islamic digital currency called OneGram (Das, 2017; Maierbrugger, 2017). With regards to the currency, “OneGram sees each coin backed by one gram at launch at its launch, with OneGram’s developers pointing to the resiliency of gold over fiat money. Every OneGram transaction generates a small fee, which is reinvested to buy more gold to increase the gold reserves backing the token. The developers plan is to add more gold if or when transaction volumes increase with profits to be shared among all

<sup>6</sup> This concept of wealth (*Māl*) as being stored has been an important point of conversation in Islamic circles pertaining to classifications of money (Adam, 2017). Bitcoin and crypto currencies seem to succeed much better than gold or fiat in terms of storing the currencies (since they can be done digitally, and accessed anywhere in the world with the private keys).

<sup>7</sup> A number of scholars have suggested that in approved Islamic finance, operational banks should have sufficient currency to back all accounts held at said bank. This way, the bank customer knows that their money is not only always safe, but that they can also access this money whenever they please. But while banks rarely have full runs on accounts, this of course has happened in the past (i.e. 1929 US stock market crash, or more recently, in Cyprus<sup>7</sup> and also Greece<sup>7</sup>). This itself is a problem. In Islamic finance, there is a belief among many scholars that assets must actually be owned. However, with fractional-reserve banking, “only a fraction of bank deposits are backed by actual cash on hand and are available for withdrawal. This is done to expand the economy by freeing up capital that can be loaned out to other parties” (Investopedia, 2017). However, Martin (in Dhaliwal, 2017) argues that

“As a payment network, Bitcoin is halal. In fact, Bitcoin goes beyond what more conventional closed banking networks offer. Unlike conventional bank networks which use private ledgers where there’s no guarantee that the originator actually owns the underlying assets, Bitcoin guarantees with mathematical certainty that the originator of the transfer owns the underlying assets. Conventional banks operate using the principle of fractional reserve, which is prohibited in Islam.”

OneGram investors” (Das, 2017). The Board of OneGram includes scholars of Islamic law and finance, who serve to ensure that the coin complies with Islamic finance (Aitken, 2017). While the future of this currency is unknown, it is evident that there is at least some interest in finding ways to incorporate blockchain technology and digital currencies within ideas of Islamic finance.

### III. FORGERY

Another issue that early Islamic leaders had to deal with pertaining to money was the forgery of coins. For Islamic scholars, ideally currency would be unable to be forged, since counterfeit currency is of course deceptive, and puts an individual at risk for acquiring said currency. Looking at historical conversations pertaining to counterfeit currencies, as Siegfried (2001) explains: “...since not only counterfeiters but also rulers frequently melted the coins to change their alloy, the share of precious metal in a coin reduced over time. Money with a low content of gold or silver, *maghshush* money, was continually used, forcing the legal scholars to deal with the question whether these coins were acceptable.” (321). Thus, even currency made of gold was not without its problems.

Today, there are still serious risks pertaining to gold fraud. As Redman (2017) writes: “Over the years, many have claimed that gold is scarce and is hard to counterfeit. However, there have been cases that have proven gold is not as scarce as we think and the soft metal is often substituted with phony imitations.” For example, in 2017 “in Edmonton Canada, local law enforcement officials issued a warning to the public about a potential fake gold bar scam. Various merchants in Edmonton purchased fake bars last year, that investigators reported to be “professionally packaged and authentic.” “We tested the product for authenticity and quickly determined these gold bars were nothing more than copper bars plated in gold,” explained EPS Criminal Investigation Officer Robert Wellon” (Redman, 2017). Also in 2017, “investigators in China revealed an ongoing investigation in which they discovered a fake gold operation stemming from the Boyuan Mining Company. The knockoff gold bricks allegedly scammed investors and financial institutions out of 11 billion CNY. Moreover, the gold was used to secure mortgages and pledge loans from the People’s Bank of China and Shanxi Province Rural Credit Cooperatives. Using gold as collateral for loans and real estate deals is common in China. Suspects used 62 percent tungsten in the forged bars, but the outer shells were solid gold” (Redman, 2017).

Then, there is another related matter, which is the issue of counterfeit money. For example, in 2012, “...as much as \$220 million in counterfeit cash [was] circulating in the U.S. ...” (Zeveloff, 2012). In the 2015 fiscal year, the U.S. Secret Service “seized about \$146 million in fake bills” (Wilber, 2016). Part of the problem is the amount of profit that can be made by counterfeiting coins. As Worstall (2016) explains “Printing a banknote is a vastly profitable enterprise. The US Federal Reserve tells us that it costs 20 US cents to

produce a \$100 bill. Something they then sell for \$100 of course. [This] [could well be the most profitable enterprise on the planet...”

Bitcoin offers a solution to such a problem. Again, not only is there a set supply of Bitcoin, but also, the Bitcoin itself cannot be altered or manipulated. In every transaction, everyone knows that exact amount of Bitcoin that they are either sending or receiving. There are no questions about the authenticity of the Bitcoin (or cryptocurrency). Since everything is done mathematically, it is not possible to create “fake” Bitcoins since “[t]he network will not accept a forged Bitcoin and will reject anyone trying to double-spend any unit in this capped supply” (Redman, 2017).

So, when looking at the creation of Bitcoin compared to fiat, there are a number of advantages Bitcoin offers. As Evans (2015) argues,

Contrast the creation of [Bitcoin] with the creation of fiat:

- [Bitcoin] is free of riba, whereas fiat is lent into existence in exchange for riba.
- The face value of the goodwill backing [Bitcoin] is, by definition, exactly equal to the value of the XBT in circulation, whereas the face value of loans backing fiat is, by definition, greater than the value of the fiat in circulation, due to present value discounting; the excess value represents the issuing bank's equity, thereby granting it a perpetual advantage over fiat holders.
- New units of [Bitcoin] come into circulation in exchange for the expending of real resources to maintain the integrity of the Bitcoin system, whereas new units of fiat come into circulation at the will of individuals who borrow them into existence, whenever they deem it desirable to do so.
- The quantity of [Bitcoin] in circulation increases at a predictable and decelerating rate until it reaches its ultimate cap of 21 million units in circulation—each divisible to the 1/100
- [Bitcoin] is backed by the expectation that it will enable transactions for real goods and services that hitherto have been prohibitively expensive or even impossible, whereas fiat is backed by debt denominated in itself with a face value greater than the total amount of fiat in circulation.

### IV. RISK (*GHARAR*) AND INFLATION

In Islamic finance, the term *gharar* means “risk,” or “excessive uncertainty” (Redman, 2015). Islamic scholars have argued that any forms of payment used must be free from *gharar*. So, any types of transactions that bring about risk should to be avoided. Some Islamic scholars have viewed paper money—due to inflation—as fitting within this category

of possible exploitation, whereas Bitcoin (and cryptocurrency) passes this condition. With paper money, there is always a risk that the money is counterfeit. With Bitcoin, there is no risk as it pertains to counterfeit coins; the digitalization on the blockchain keeps an accurate bookkeeping for the amount sent in a transaction. With governments continuing to print money without end (or without pegging the currency to a precious metal such as gold), this leads to a decrease in the overall value of the currency. If a government gets too out of hand with overprinting money, this could lead to high inflation, which could result in little to no trust (or value) for the said currency. In Islamic finance, inflation is thus seen as a problem, and thus, maintaining value is of the utmost importance. As Chapra (1996) writes, “Stability in the value of money should be accorded high priority in the Islamic frame of reference because of the unequivocal stress of Islam on honesty and fairness in all human dealings and because of the negative impact of inflation on socio-economic justice and general welfare.” Thus, to Chapra, “inflation is in conflict with Islamic values” (31).

In fact, one of the major problems that Bitcoin and other cryptocurrency enthusiasts point out with government controlled fiat (paper money) is that this paper money can continue to be printed, at little cost, by a state. This in turn however will lead to inflation, given the continued addition of more and more paper money into the monetary system, thereby weakening the value of said currency. We can see why this is so problematic when looking at the case of a loan. Say for example that there are two individuals, person A and person B. Person A wants to borrow 5000 dollars from person B, and will pay the person back after one year. For the sake of simplicity, we shall say that there is no interest placed on the loan. Now, given inflation of say two percent, when the person pays back the loan, those 5,000 dollars is actually worth 4900 dollars.

Now, a counterargument that some might be tempted to make is as follows: Given the volatile nature of Bitcoin and other cryptocurrency prices, couldn't usury exist in the same fashion? If you believe the cryptocurrency will go down, then, could you borrow the digital currency, and then pay back the amount when it could be worth less than what one borrowed it for? In theory, this is correct, but the difference is that price fluctuations for the digital currency are not due to government inflation, but rather, trading in the currency by investors. With fiat, you have the trading of the currency for investment, but also the potential for government inflation of the currency. It is for this reason that some Islamic scholars have advocated gold reserves for fiat to prevent inflation and also excessive risk (Siegfried, 2001). However, the issue of inflation is not a problem for max-supply digital currencies. Max supply digital currencies are deflationary currencies; the total amount of coins/tokens is predetermined, and thus, no additional coins (outside of the specified maximum supply) can be created. Moreover, digital currencies are mined, and there is an expensive mining cost for digital currencies.

Fiat's flaws are quite apparent, and open up greater possibilities of *riba* or usury. As Ahmed (1989) writes, "...[t]here is a likelihood of an inverse emergence of *riba*, if the loss of depreciation is not fully compensated" (43). So, unless there was some form of compensation, Islamic scholars were worried about someone being taken advantage of by loaning out money that would decrease in value because of inflation. Cryptocurrencies, in theory, do not have this problem. Since the supply is fixed for many digital currencies, once price stabilization on cryptocurrencies is in place, then there is no fear that supply will continue to rise. This same cannot be said for fiat, or even gold (since we do not know just how much gold actually exists in the world), and this absolutely cannot be said for paper money, which continues to get printed with very little regard to concerns about inflation. As Matthew Joseph Martin, founder of Blossom Financial (in Dhaliwal, 2017) argues, "Bitcoin is more halal than any currency in wide circulation today but probably still falls short of the strict and narrow definition of money in Islam. Modern sovereign currencies are based on debt with usury - this is strictly prohibited in Islam. Therefore, all modern money is not halal. Bitcoin, on the other hand, is not based on debt - it's based on a proof of work - and this is at least not haram (impermissible)." Again, digital currencies solve this problem. With a recognized form of digital currency, say Bitcoin, there is never any uncertainty as to the overall supply of the coin. Coins could be lost (and it is said that millions have been lost or thrown away), but no more than the capped amount (in the case of Bitcoin, at the very most, only 21 million) will ever exist. No individual or government can ever do anything to change this. This poses a very attractive solution to that of governments inflating currencies, and a solution that I believe is much more just and fair, and thus, more aligned with Islamic principles of finance.

Some, such as Chapra (1996), suggest that the Islamic Central Bank, for example, can serve a positive role here by ensuring no sort of monetary inflation. He argues that this bank "should estimate the demand for money at full employment within the framework of stable prices and other socioeconomic goals of Islam and try to regulate the supply of money accordingly. Hence the variable in terms of which monetary policy should be formulated should be the desired stock of money and not the rate of interest. The objective should be to ensure that inflation does not arise, and the citizens' interests are always the only priority. While this idea is great in theory, sadly, there still exists a leap of faith that the bank will actually follow these prescriptions, namely, do what is best for the people, ensuring that inflation does not arise. But we cannot assume that banks and governments implement political and financial policies that best serve the interests of the people. Time and time again we see governments continuing to print money, and pushing economic and financial policies that benefit them, or particular groups of constituents, and often at the expense of what may be good for society as a whole. Digital currencies solve this problem. By removing the need for a central bank, or the government as the

controller of money, peer-to-peer transactions based on a constantly fixed supply will ensure that no policy mistakes (or corruption activities) will be able to inflate the currency. By removing self-interested politicians and bankers, we are left with a decentralized currency that is solely in the hands of the people.

In fact, those, like Chapra (1996) (writing many years before the birth of digital currencies) recognized the need (and also difficulties) of states to do what is right. He wrote that

“While the above strategy does recognize the importance of regulating the stock of money in the successful management of the economy, it does not necessarily imply a simple monetarist approach or any commitment to its ideological overtones. There is no presumption that market forces left to themselves will be able to generate sustained non-inflationary growth, remove unemployment, reduce external imbalances and help realize the other desired goals if the growth of money supply is appropriately regulated. It should, in fact, be emphasized that for a full realization of the Islamic goals, it will not only be indispensable to reform the economy and the society along Islamic lines but it will also be necessary for the state to play a positive role. All state policies, including fiscal, monetary and income policies, would have to converge in the same direction...” (36).

So, he offers ways in which we can ensure that the problems of inflation do not arise. He speaks against fiscal deficits, as well as credit from commercial banks, and also balance of payments surplus (Chapra, 1996). However, there is an expectation that the state and the central bank use the resources for the benefit of the Islamic community. Again, this is a problematic assumption; many digital currency enthusiasts argue that it is exactly because banks and governments do not make decisions best suited for the people that a decentralized digital currency is necessary.

## V. ISLAM AND ANTI-AUTHORITARIAN PRINCIPLES

One of the other attractive features of digital currencies such as Bitcoin is its decentralization, and also independence from any central government and/or bank. Given the history of government and bank exploitation of money, there is a great demand for currencies that are outside of the control of these entities. Thus, “[t]he weakness in existing currencies stems from lack of faith in institutions—particularly central banks, which are often in league with commercial and investment banks. When a government bails out a failed bank or insurance company—in essence, by printing money—the net effect is that the currency as a whole is debased, in favor of a few and at the literal expense of everyone else, which amounts to a fair description of today’s global financial system. Hence the sudden appeal of [B]itcoins, which appear, for the moment, at least, to be immune to the machinations of inept or crooked bankers and politicians” (New Yorker, 2013). Time and time again,

irresponsible government and bank decisions have led to serious problems for citizens of a country as it relates to their money. Again, oversupply leads to inflation, which devalues the wealth one has. Moreover, in cases where there are concerns about the solvency of the state, it is rather easy for the government to place restrictions on citizen behavior pertaining to accessing their money.

With cryptocurrency, the power of control is fully in the hands of the individual. With “larger” amounts of money, storing them with gold begins to be a very difficult task (having gold bars at home is not only difficult to hide, but gold is also challenging to transport). With paper money, similar things can be said. Furthermore, storing money in a bank always leaves one to secede some power and trust into the banking system; you expect that your money will be there, and you also hope that you can get access to your money when you please. But with cryptocurrencies, any such concerns are avoided. Since the currency is digital, storing large amounts no longer becomes an issue. Moreover, since you have your own private keys, nobody else on the planet can access your money. This cannot be said for bank storage. As Martin points out, “[o]ne nice aspect of [B]itcoin is that it ensures ownership of underlying assets with 100% mathematical certainty” (Redman, 2015). The issue of bankers’ control over money was a serious concern to Nakamoto (2009), who wrote:

“[Bitcoin is] completely decentralized, with no central server or trusted parties, because everything is based on crypto proof instead of trust. The root problem with conventional currency is all the trust that’s required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust. Banks must be trusted to hold our money and transfer it electronically, but they lend it out in waves of credit bubbles with barely a fraction in reserve. We have to trust them with our privacy, trust them not to let identity thieves drain our accounts... With e-currency based on cryptographic proof, without the need to trust a third party middleman, money can be secure and transactions effortless” (in New Yorker, 2013).

So, despite critiques from a number of voices in the banking industry about Bitcoin and other digital currencies, when one looks at the behavior of the banking industry, one comes to a realization that it is not Bitcoin that should be on the defensive about its use, but rather, some current banking practices.

## VI. CONCLUSION

In this paper, I discussed the problems with paper currency as it pertains to Islamic finance. Inflation, unlimited supply, government abuse, as well as forgery make fiat currency less than an ideal currency for Islamic finance and banking. Counter to this, Bitcoin and other digital currencies seem to be much more aligned with principles of justice and social fairness, characteristics valued in Islamic jurisprudence.

Bitcoin's capped supply (its inability to be inflated), the ease of transport, and decentralized nature are all positive aspects to the currency, in essence giving power to the people, and not governments or banks. Moreover, Bitcoins and other digital currencies cannot be double-spent. Moreover, Bitcoin cannot be forged, something that continues to plague coins and paper money.

As mentioned in the footnote above regarding Ethereum, there are still other ways that currencies and crypto tokens will provide benefits to society in a way that "traditional" currencies cannot do. One such way is the use cases for crypto currencies. For example, more and more cryptocurrencies are being used for smart contracts. Whereas paper money does not provide any specific value in and of itself, these digital currencies like Ethereum that allow for smart contracts allows more trust in everyday transactions, which provides additional value for the crypto currency. As we can then see, this is yet another advantage of digital currencies to paper money, something that would thus be in line with conditions specified within elements of Islamic finance.

Another place for the use of cryptocurrencies and blockchain technology is with regards to social development based projects. As Martin (in Dhaliwal, 2017) writes, "I think the immediate opportunities lie in micro - microfinance and micro-takeful, for example. I also see huge potential in the use of smart contracts for cross-border crowdfunding and also Islamic modes of financing, such as *mudaraba/musharakah* (profit sharing) and *muraba*. I think there's also an interesting angle for micro-takeful (sharia-compliant insurance) to use crypto". Groups such as Blossom Financial have been relying on Bitcoin and other blockchain technology for micro-lending and profit sharing structures (Blossom Financial, 2017). You are beginning to see "[m]ajor aid agencies, nonprofits and startup companies...working to extend blockchain systems across the developing world to help poor people around the world get easier access to banks for loans or to protect their savings" (Kshetri, 2017).

This itself is a large problem with current banks and financial institutions. As Andreas Antonopoulos (2017b) argues, the current system "...does enormous harm...part of the reason that billions of people have no participation in the world economy, are financially excluded, is directly related to the fact that a closed financial system, where authority is given to few, to decide who is good, and who is evil, to decide who should have access to money and who should not, and which starts with a fundamental idea of identity being a requirement for every endpoint of every transaction is a system that will always exclude billions. In the age of the Internet, we have come no further in terms of financial inclusion, and in fact, we are now backtracking. Entire countries, entire continents are disconnected from the world economy in order to satisfy the moralistic, bourgeois idea that we are safer if we allow bureaucrats to decide who has access to money, and who doesn't" (Antonopoulos, 2017b). Since so many poorer individuals have no access to banks, cryptocurrencies and

blockchain technology are providing them the ability to have power and protection over their own wealth, without relying on banks or the state. This is therefore a new, empowering system of finance that is highly compatible with Islamic finance and Islam's message of justice for all people.

I imagine that Islamic finance scholars will continue to discuss points around digital currencies, especially as digital currencies (which are still in their infancy) grow in popularity and usage, as well as the investment aspect of cryptocurrencies. With the opening of futures trading on Bitcoin in December of 2017, there will also most certainly be questions on whether futures contracts are compatible with Islamic law, since, as Aitken (2017) notes, "In most cases trading gold futures contracts is forbidden by Islamic law as gold futures contracts are not backed by physical gold and one can end up paying or receiving interest on your trading account. The upshot is that most people who wanted to buy gold as an investment have purchased gold in its physical form through for example coins or [jewelry]." Now, it must be important to note that futures trading is done through existing financial institutions, and has no direct relation on the underlying element of digital currencies; it is a way for institutions to become investors. So while the conversation about this practice should be had, critiques of futures trading should have no bearing on one's opinion of digital currencies, because they are not one and the same. The same can be said for crypto trading. For example, on January 1<sup>st</sup>, 2018, Shawki Allam, who is the Grand Mufti of Egypt, issued a *fatwa* (Islamic ruling) said that because of the risk in trading, participating in crypto currency investing is prohibited. Allam also criticized Bitcoin's potential use for activities such as money laundering (Zhao, 2018).

Something else that might lead scholars to challenge digital currencies such as Bitcoin is not related to the underlying digital currency use, but rather, the harmful effects of mining. One of the concerns is that Bitcoin has "a high eco-footprint," having a negative effect on the environment (Bergstra, 2015: 13) In the case of Bitcoin, the digital currency (and many other digital currencies) run on a "proof of work" system to verify transactions, "As [B]itcoin grows, the math problems computers must solve to make more [B]itcoin (a process called "mining") get more and more difficult— a wrinkle designed to control the currency's supply. Today, each [B]itcoin transaction requires the same amount of energy used to power nine homes in the U.S. for one day. And miners are constantly installing more and faster computers. Already, the aggregate computing power of the [B]itcoin network is nearly 100,000 times larger than the world's 500 fastest supercomputers combined" (Holthaus, 2017). Moreover, "The total energy use of this web of hardware is huge — an estimated 31 terawatt-hours per year. More than 150 individual countries in the world consume less energy annually. And that power-hungry network is currently increasing its energy use every day by about 450 gigawatt-hours, roughly the same amount of electricity the entire country of Haiti uses in a year" (Holthaus, 2017).

However, there are arguments that also challenge this idea that Bitcoin mining is troubling for the environment the way critics suggest. For example, Antonopoulos (2017a) argues, “the energy consumption in mining...is misrepresented very often in two ways. One is that mining itself is one of the few industries that is completely geographically independent, meaning that it doesn't matter where you are if you are mining as long as you have inexpensive electricity. So what that allows you to do is choose the location of your mining system based entirely on the local cost of electricity, which means that mining is doing arbitrage.” Thus, they are simply going where energy is least expensive. He goes on to say that cheap energy often exists in an area because “it does not match the demand at that location” So, by building power plants for the near and long term future, they are often built thinking about future needs. But, for the short term, this leads to a disparity between demand and supply. Because it is often difficult to shut off this energy (in the case of wind, for example), Antonopoulos (2017a) argues that through mining, you can “turn that energy into an alternate store of value” and reduce the time to pay off your investment. Second of all, he also argues that Bitcoin is targeted because it is more “obvious,” but that many other sources of finance also have energy issues that often get overlooked. For example, behind credit cards are data centers that use mass amounts of energy. As Antonopoulos (2017) argues when we every use of a credit card, we don't think about the energy data centers use, or offices, banks, cars transporting money, trucks, etc...

Nevertheless, this doesn't mean that we still cannot think about ways of making cryptocurrencies compatible with ensuring a clean environment. Newer cryptocurrencies can consider the advantages of operating on a “proof of stake” system (where people stake their coins as a form of confirming transactions) and its potential effect as a more environmentally friendly option. Or, there could be reform within the proof of work system.<sup>8</sup> Or, with mining rewards reduced over time, this itself could lead to declines in energy usage (Antonopoulos, 2017a). But despite these concerns, Bitcoin and other cryptocurrencies continue to revolutionize the way we think about currencies and money. Moreover, from an Islamic perspective, cryptocurrencies offer characteristics that far supersede traditional currencies, attributes that are fully in line with Islamic value of social justice, values that counter corrupt governments and predatory financial institutions. As such currencies become more and more popular throughout the world, we can expect increased attention and conversation on the role that they play in Islamic banking and finance.

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