

Introduction to Cryptocurrency and Blockchain - 2021 Update

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After three years of pain and disappointment, Bitcoin bulls are finally feeling some relief. New highs have been set, poorly timed capitulation trades have turned positive, and the world is looking to become more financially efficient in many ways. During the previous Bitcoin bull market of 2017, it was almost impossible to turn on a TV, open a newspaper, or log in to social media without being inundated with cryptocurrency discussion. This time, however, there has been significantly less euphoria and watercooler buzz. There hasn't been any CNBC segment directly explaining to viewers how to buy XRP. Crypto trading platforms haven't been adding 100,000+ new accounts a day. And companies no longer change their name to include "blockchain" expecting to get a 50% or higher pop in their stock price. So then why did Bitcoin rally from \$5,000 in March to nearly \$30,000 in December? While we plan to address that question and others in upcoming papers, let's quickly revisit the basics – What is Bitcoin and what are cryptocurrencies?

Figure 1:

	<u>Price</u>	<u>Market Cap</u>	<u>Change Since Original Publication</u>
 Bitcoin	\$34,394.40	\$641,785,786,991	393%
 Ethereum	\$1,133.68	\$129,426,135,323	193%
 Ripple	\$0.24	\$10,566,087,952	-53%
 Bitcoin Cash	\$663.50	\$8,076,018,650	-35%
 Litecoin	\$118.56	\$6,639,125,796	38%

Source: coinmarketcap.com. Data as of 1/6/2021

When asked, many people tend to have strong opinions about cryptocurrencies' value and utility. Some pundits view them as a replacement to the greenback, while others regard the coins as the biggest bubble in the history of financial transactions. There is a bit of irony here because when asked the direct question of "what is a cryptocurrency?" most people struggle to provide a coherent answer. How can an investor truly value something they do not understand? How can one rationally invest in something they cannot explain? Whether an investor is looking to make an initial investment, or a pessimist is attacking cryptocurrencies as a bubble, they both must understand the investment security or risk acting on assumptions and/or faulty information. By no means does this research intend to provide a numerical value or projection for any cryptocurrency. The goal is to provide an analysis of what cryptocurrencies are, their origin, and their current and possible future uses.

What is a cryptocurrency? A cryptocurrency is a digital currency that applies the use of cryptography as a means of security. Cryptography in this context is a technical term for using encryption (codes) to prove who controls what. Put the two together and you have a digital coin wholly owned by its carrier. There should be emphasis on the term "carrier" because cryptocurrencies can be lost just like physical currencies. In the same fashion as \$20 falling out of your pocket, losing the private keys to your crypto wallet means losing access to the funds – a crypto wallet is essentially a digital piggybank that is connected directly to the blockchain, saves your private keys, and can only be accessed by entering your personal passcode. Someone who neglects to copy the private keys to their wallet can be locked out of their funds if the wallet file becomes corrupted. To date, an estimated 3.7 million bitcoins have been lost¹.

An alternative view is thinking about cryptocurrencies as a digital form of cash. Cryptocurrencies and cash are owned by the holder and can be spent with no form of approval from a third party (i.e. a financial institution). For example, if McDonalds one day accepts cryptocurrencies as payment, a \$5 bill or \$5 worth of Bitcoin could be used to buy a Big Mac. The bill/coin would be transferred to the cashier as the Big Mac is delivered to the purchaser. The transaction is complete. Instead, suppose the customer used a debit card for this purchase. The customer swipes their card to pay and a request is sent from the point of sale to the customers' bank asking for payment. Even though the customer has a sufficient balance and has approved the purchase by swiping their card, it is still up to the financial institution to approve the fund transfer. Unfortunately though, as with many examples, this is an oversimplification. The IRS has issued notice 2014-21 stating that "If the fair market value of property received in exchange for virtual currency exceeds the taxpayer's adjusted basis of the virtual currency, the taxpayer has taxable gain." Relating that back to the example above, if you buy a

Big Mac with \$5 worth of Bitcoin and your cost basis on that \$5 is \$2, you now have a taxable gain of \$3. A \$3 taxable gain is a trivial amount but consider both the increased hassle of tracking that gain/loss as well as the impact it would potentially have on larger purchases such as a house or car. This is just another headwind for Bitcoin to overcome if it plans to grow into a usable global currency. But theoretically a buyer could use what is known as a stable coin to make this purchase without worrying about capital gains. Stable coins are more complicated than needed for this paper but essentially the purpose of the coin is to stay pegged to \$1. So, without fluctuation in price there are no capital gains to worry about. Facebook made news in 2019 when they announced their intentions of launching their own stable coin, Diem (formerly Libra).

In the past, a debit card has provided a safe way to access funds without actually having to carry cash. However, one of the freedoms given up in this type of system is complete control over the funds. Historically, the safety and efficiency offered by the debit card outweighed the loss of control. In the late 90's when the internet started to transform into a means of doing business, forward thinkers began laying the ground work for a digital currency that could be directly transferred from person to person, alleviating the need for a debit card, and potentially the financial institutions altogether. But a monumental roadblock remained. How can one anonymous person trust another anonymous person without relying on a trusted third party? Bitcoin creator Satoshi Nakamoto¹ endeavored to solve this seemingly impossible problem and offered the world an answer.

The Blockchain

Satoshi combined several different ideas into one brilliant solution. The blockchain. A blockchain is another term for a distributed ledger. Despite how mundane a distributed ledger sounds, it is a revolutionary upgrade from the 500-year-old double-entry form of accounting. A blockchain is essentially a record of all previous transactions and balances that is continually refreshed by every computer on the network. Theoretically, the data on the blockchain is extremely trustworthy because there are thousands of copies of the data that stay synchronized and confirm each other's results. Moreover, there is no entity in charge of the ledger. For a traditional payment medium like Visa or PayPal, there is one company in charge of recording transactions and account balances. If PayPal decides to reverse a transaction, freeze your account for investigations, permanently block you from accessing your funds, or even seize your funds, they have that ability because they control the ledger. Malicious entities (e.g. hackers) could gain the same control over an institution's ledger.

An established blockchain² provides security from such attacks, since no actor has the ability to create false historical data (fraudulently debiting funds from one account to another). Once a transaction has been accepted by the network, it is permanent. The primary implication of a decentralized ledger is staggering; monetary transactions no longer require a financial intermediary. This disintermediation means cryptocurrencies could have the potential to compete with traditional financial institutions, especially in areas where the financial infrastructure is not very robust. When the prerequisite for securely sending money is merely a stable and reliable internet connection, large swaths of unbanked populations suddenly have access to previously unavailable financial tools. One of the most important of these tools is the ability to send any amount of money to anyone around the world on demand. As an example, migrant workers could send money home for fractions of a penny and allow their families to access those funds within minutes. This money transfer method is a massive improvement over the status quo; currently international remittances can take days and cost a significant portion of the money being sent.

Traditional payment processors continue to explore the potential benefits of blockchain technology but there are still many barriers preventing cryptocurrencies from being adopted across the globe. In addition to reliable internet, a less obvious requirement is a stable power grid. Populations plagued with frequent blackouts could struggle to participate simply because they cannot access the network required to send coins or spend those they receive. Some governments intermittently turn off the internet for political and/or military purposes. For now, an internet connection is a requirement for transactions or transfers of cryptocurrencies. For developed countries, natural disasters should be kept in mind. A large earthquake on the west coast or hurricane on the east coast has the potential to take out power for millions of people for an extended amount of time. Today, in times of disaster, there is at least the option to buy necessities with cash; but, if we move to a world dependent

1 Satoshi Nakamoto is thought to be a pseudonym for an individual or group of individuals wishing to remain anonymous.

2 By "established blockchain" we are referring to those that require a significant amount of computing power to validate blocks (e.g. Bitcoin, Ethereum). As the required computing power grows, it is less and less likely that a group or person could gain control of more than 50% of a network. Even for smaller blockchains, it is still extremely unlikely for them to be dishonestly altered, though it is technically possible.

on cryptocurrencies before we untether from the internet³, people will not be able to buy the items they need when they need them the most. And last but certainly not least, there is always the possibility of over regulation by governments. An outright ban on cryptocurrencies is highly unlikely and practically impossible to enforce, but they could smother any efficiency crypto might provide by requiring an inordinate amount of transactional reporting in the name of “Know Your Customer” (KYC) and “Anti-Money Laundering” regulations.

Current and Possible Future Uses

Apart from speculative trading, this money-sending ability is the primary use for cryptocurrencies. Today, billions of dollars are sent back and forth on the Bitcoin network dailyⁱⁱ in the form of international remittances, daily purchases, and online transactions, all happening without a centralized coordinator. The peer-to-peer nature of blockchain and cryptocurrencies means that the coin’s owner has full control to spend their money without any oversight. Rather than relying on another party to send and receive money, cryptocurrencies put the control back in the user’s hands. One potentially negative aspect of this control, and of the blockchain, is that transaction history and financial information is available to almost anyone. Privacy coins aim to solve this transparency issue by concealing transaction amounts and account balances. However, these types of coins’ inherent privacy brings to light potential concerns: money laundering and other illicit uses. The entire idea of a “dark web” would be infeasible without cryptocurrencies as they are the primary means of payment. In addition to the underground internet activity catalyzed by cryptocurrencies, many criminals have seen cryptocurrencies as an ideal avenue for money laundering. Therefore, current financial institutions have their work cut out for them, monitoring new customer’s source of funds (in industry terms this is known as the Bank Secrecy Act and Anti-Money Laundering requirements, or BSA/AML requirements). Current Secretary Treasurer Steven Mnuchin has stated publicly that banks who hold cryptocurrencies for clients in the form of “wallets” will still be held responsible for following the rules and regulations requiring them to confirm customer identities. As discussed in the section above, these issues are not insignificant; government regulatory crackdowns pose an existential threat to cryptocurrencies’ future. If there is any question as to the legality of accepting cryptocurrencies as a form of payment, businesses will not adopt the practice. This reality has left this up and coming asset class in limbo, as it waits for government agencies to determine, and agree upon, what it actually is and how to regulate it.

In addition to facilitating means of exchange, cryptocurrencies have the ability to function as a store of value. If financial institutions or national currencies are deemed unreliable or untrustworthy, people can turn to cryptocurrencies to take control of their finances. In fact, a rapidly growing number of Venezuelans have depended on cryptocurrencies to protect them from the continued hyperinflation of the Bolivar . Apart from protecting one’s purchasing power from the Bolivarⁱⁱⁱ or other downwardly spiraling currencies, cryptocurrencies potentially allow a secure storage of wealth in countries with banks of questionable integrity. Fortunately, the risk of a banking collapse in present-day United States is negligible, but in other countries, such fear is justified. In addition to banks becoming insolvent, there is now precedent for governments to reach into your bank account and take what they need (Cyprus, 2013^{iv}) in what is now being referred to as a “bail-in”. Because cryptocurrencies do not have centrally controlled ledgers, it’s impossible for a similar action to be carried out with a blockchain.

While cryptocurrencies were created to function as a currency, and could potentially function as a form of a safe haven investment like gold, currently they are predominately used as speculative commodities. Because the price and volatility swings make great headlines and promote investor euphoria, there have been a flood of retail investors trying to participate in the next run up or get in early on the next flavor of the day. While volatility can be wind in the sails for day trading, it can also cause incredible anxiety for buy and hold investors. At any given time, Bitcoin could be trading up or down 5%, for no discernible reason. Imagine if the S&P 500 moved plus or minus 5% throughout the day, 7 days a week, 24 hours a day? Would a 75/25 stock/bond asset allocation be as appealing? Again, in this example we are categorizing the coins like equities that come with expected volatility, but remember the original purpose of the coins was to be currencies. When classifying them as currencies, the volatility picture can be downright frightening. So much so that Vitalik Buterin, co-founder of Ethereum, felt compelled to tweet “Reminder: cryptocurrencies are still a new and hyper-volatile asset class, and could drop to near-zero at any time. Don’t put in more money than you can afford to lose. If you’re trying to figure out where to store your life savings, traditional assets are still your safest bet.^v” Even

3 Another potential solution is a low Earth orbit constellation of broadband providing satellites (currently being tested by Starlink, another Elon Musk venture). This still won’t help businesses regain power, but it has the potential to provide internet to peoples’ cellphones; with which they can transfer coins in exchange for necessities in a peer-to-peer format.

the industry leaders are calling for a more cautionary investment style in this burgeoning asset class. Based on these factors, Regions currently does not invest in, nor recommend investing in, cryptocurrencies from an asset allocation perspective.

Outside of financial applications, cryptocurrencies also have the ability to provide legal documentation and facilitate contractual obligations using blockchain technology. Any type of information that needs to be secure, reliable, time dated, and publicly verified can potentially benefit from a distributed ledger. Not limited to, but of particular interest to traditional banking institutions, some alternative projects seek to solve the complexity of regulatory auditing and litigation, quality control issues, mergers and acquisitions' due diligence, and document authentication. One potential use for blockchain is increased transparency and security in elections. Being an incorruptible ledger, an established blockchain could be used to protect individual's identities while at the same time publicly and accurately recording votes vital for democracy.

Conclusion

In the not too distant future, the cryptocurrency and blockchain industry has the potential to witness a major paradigm shift. Imagine if you never had to worry about your identity being stolen due to a corporate hack. Or no longer had to worry about your employees being robbed at gunpoint while they work the cash register. How amazing would it be to have the ability to securely vote in your state, local, and national elections from anywhere in the world from your phone? Each of these "what ifs" might sound far-fetched, but in reality the technology is quickly approaching. Any function that can benefit from the efficiencies offered through blockchain technology will start to move in that direction. But how will society get there? Answered simply, by better understanding the technology, more trust in the "system", and most importantly by the industry rebranding itself from a "speculators' commodity" to a usable currency and technology. As with any new and exciting technology, there comes a crowd of bleeding edge entrepreneurs jockeying for the first major foothold in the industry. If validation for the early adopters' beliefs is still lacking, then validation will only be achieved through adoption and realization of the theorized benefits.

i 60% of Bitcoin is Held Long Term as Digital Gold. What About the Rest? (n.d.). Retrieved January 05, 2021, from <https://blog.chainalysis.com/reports/bitcoin-market-data-exchanges-trading>

ii <https://blockchain.info/charts/estimated-transaction-volume-usd?daysAverageString=7×pan=30days&showDataPoints=true>

iii Martínez, Á. (2018). Bitcoin ante el colapso económico: ¿por qué la criptomoneda está en auge en Venezuela? . Noticias de Mundo. El Confidencial. Retrieved 15 February 2018, from https://www.elconfidencial.com/mundo/2017-08-31/miles-de-venezolanos-apuestan-por-el-bitcoin-para-sobrevivir-al-colapso-economico_1433988/

iv O'Brien, M. (2018). Everything You Need to Know About the Cyprus Bank Disaster. The Atlantic. Retrieved 15 February 2018, from <https://www.theatlantic.com/business/archive/2013/03/everything-you-need-to-know-about-the-cyprus-bank-disaster/274096/>

v Buterin, Vitalik (VitalikButerin). "Reminder: cryptocurrencies are still a new and hyper-volatile asset class, and could drop to near-zero at any time. Don't put in more money than you can afford to lose. If you're trying to figure out where to store your life savings, traditional assets are still your safes bet." 17 February 2018, 6:25 a.m. Tweet.

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