

5-2020

## Cryptocurrencies: An Overview, Investment Investigation, Comparative Analysis, and Regulatory Proposals

Jacob Franzen  
jfranzen@unomaha.edu

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**Cryptocurrencies: An Overview, Investment Investigation, Comparative Analysis, and  
Regulatory Proposals**

Jacob T. Franzen

Honors Program, University of Nebraska Omaha

College of Business Administration, University of Nebraska Omaha

FNBK 4610: Portfolio Management

Mr. Clinton Rushing, CFA

May 4, 2020

**Author Note**

Special thanks are given to Mr. Clinton Rushing, CFA for his assistance in molding this writing into its final form and for sharing his valuable insight into the topic. Special thanks are also given to Destynie J.L. Sewell, J.D. MBA—without her help and guidance, this writing would not have been possible nor would my passion for the study of law have been fostered.

### Abstract

With cryptocurrencies moving out of obscurity and into the public eye, the initial purpose of this research paper is to provide the history of cryptocurrencies, to explain the complex workings in and around cryptocurrencies, investigate their investment potential, and to draw attention to their potential for misuse. To follow, the primary purpose is to create a platform on which to compare cryptocurrencies with more common mediums of exchange, analyze their current international regulatory climate, highlight their trends within influential nations, discuss their pending and future regulation, and provide personal proposals for additional regulation. Due to the complex nature of the subject, the data and information compiled contain reputable secondary research, data collected from popular cryptocurrency websites, as well as mainstream news reports of current happenings in the field. As of the writing of this paper, the direct regulation of cryptocurrencies is minimal in most nations; however, it is likely that the introduction of more oversight will occur in the near future. That being said, with the public opinion and government approval of cryptocurrencies as volatile as their values, there is much to be seen as to the degree in which cryptocurrencies will be integrated into both personal and commercial sectors over time and to what extent the regulatory oversight of them will be implemented throughout the world.

*Keywords:* cryptocurrency, Bitcoin, initial coin offering, regulation

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## **Cryptocurrencies: An Overview, Investment Investigation, Comparative Analysis, and Regulatory Proposals**

The medium through which value is transferred has evolved over the millennia—from staple goods to rough-stamped coins to paper money and now to digital payments, with many others in between. In our modern world, however, the most widely used medium of exchange is fiat currency. Fiat currencies are backed by the governing bodies that issue them and are the basis that modern economies operate within (e.g., U.S. dollar, euro, yen, etc.) (Chen, 2020). These fiat currencies do not have value in of themselves as a commodity, but have value due to the supply and demand of the currency and the stability of the issuing body (Chen, 2020). While these are the most common methods of transferring value, this is not to say that fiat currencies are the only means of payment, as various forms of alternative currencies have been, and still are, used to navigate the transactional processes. Broadly speaking, there are four different types of alternative currencies: currencies with intrinsic utility (e.g., precious-metal coins, snacks, and cigarettes), tokens (e.g., Canadian Tire Money), centralized digital currency (e.g., World of Warcraft Gold, Linden), and decentralized digital currency (e.g., Bitcoin, Litecoin, Ethereum, etc.) (Nian & Chuen, 2015). The final variety of alternative currency, decentralized digital currency, will be the focus of this research paper and will be referred to in its more commonly known term: cryptocurrency. The adoption of cryptocurrencies as investment vehicles, mediums of exchange, and funding alternatives has paved their way to becoming true disruptors of the current financial sector.

In order to establish the foundation on which cryptocurrencies have been building, the progression of major technological innovations and conceptualizations in the specific realm will be detailed to the point of the first cryptocurrency's emergence. The current cryptocurrency

market will then be summarized and analyzed, their investment potential will be investigated, followed by an overview of the current regulatory climate both within the United States and internationally, and closed with regulatory proposals for the future of cryptocurrencies. With cryptocurrencies' presence growing in multiple facets of society, both domestically and internationally, regulation is needed to protect their users and combat those who would attempt to take advantage of the technology.

### **History of Cryptocurrencies**

#### **Predecessors**

Prior to cryptocurrencies' emergence into the public eye and even their conceptualization, predecessors to the technology paved the way for the widespread adoption of what has become so popular in the minds of early adopters. These concepts and innovations varied in their functionality and methods; however, their intended and, in some cases, fully implemented uses had similar qualities to what defines of cryptocurrencies today.

#### ***Blind/Untraceable Payments Concept***

In 1983, Dr. David Chaum, with a PhD in Computer Science from UC Berkley, proposed what would become one of the most pivotal concepts behind the appeal of cryptocurrencies in *Blind Signatures for Untraceable Payments*, where improvements in control and auditability of payments are, while initially seeming conflicting, complemented with increased personal privacy (Chaum, 1983). Chaum argued that the record of one's transactions provided third parties with the ability to track the intimate details of one's life (e.g., location, political and religious spending, dining habits, etc.). His proposal detailed an automated payment system with three main properties: (a) third parties are unable to identify the payee, time of payment or amount of payment; (b) proof of payment can be provided, as well as the identity of

the payee under “exceptional circumstances;” and (c) payments media reported stolen can be prevented from being used (Chaum, 1983). To simplify the cryptic process, the payer forms a note with a random number assigned and forwards the note to their bank. The bank then “signs” the note, debits the payer’s account and returns the signed note to the payer. Next, the payer strips their personally identifiable information from the note, leaving only the bank’s, and provides it to the payee. Finally, the payee forwards the note to the bank, where the bank verifies that the note has not yet cleared, and the bank credits the account of the payee. It is through the stripping of the payer’s identifying code that anonymity is maintained, while the bank’s identifying code (signature) allows for processing of the payment. (Chaum, 1983) These principles of cryptography became the basis of what would later become cryptocurrencies and were applied in the technologies that followed.

### *eCash/DigiCash*

Fully implemented in 1990, Chaum’s concepts manifested themselves in the revolutionary *eCash* – a system owned by his company DigiCash, Inc. and made available to banks, though it did not allow for person-to-person transactions (Nian & Chuen, 2015). As his papers from nearly a decade earlier outlined, eCash contained protocols to prevent double-spending and used blind signatures to maintain its users’ privacy. Despite the system being available and implemented in banks in countries such as the United States, Finland, and the Netherlands, DigiCash, Inc. went bankrupt in 1998 and was acquired by eCash Technologies a year later, which eventually got bought out by InfoSpace in 2002 (Nian & Chuen, 2015). Despite its commercial demise, eCash paved the way for not only what has become “cryptocurrencies of today,” but also a multitude of digital and virtual currencies of varying functionality and complexity.



***E-Gold***

In 1996, a system of converting precious metals (such as gold, silver, platinum, and palladium) into electronic “counterparts” was introduced – known as E-gold (Gomzin, 2016). Founded by Gold & Silver Reserve, Inc., users could convert their precious metals into electronic versions of the metal in two ways: (a) physically sending their precious metals to the company where they would be held and the value of the respective metal would be credited to the user’s account or (b) user’s funds could be transferred to the company, after which the company would buy and hold the desired precious metal for the user. This direct tie to the market price of gold facilitated international payments due to independence from fiat currencies (Gomzin, 2016). Additionally, the payments were processed over an encrypted connection and provided the option for merchants to integrate the payment systems into their websites (Nian & Chuen, 2015).

Despite its innovations, Gold & Silver Reserve, Inc. and E-Gold failed to do their due diligence on its users when opening accounts and failed to fulfill requirements of suspicious transaction reporting (SAR) (Nian & Chuen, 2015). This resulted in a federal indictment on May 24, 2007, for the offenses of “conspiracy to launder monetary instruments...conspiracy to operate [an] unlicensed money transmitting business...operation of an unlicensed money transmitting business...[and] money transmission without a license...” (United States of America v. E-Gold, 2006). Included in the indictment was an estimated \$145,535,374.26 of E-Gold transferred between accounts involved with the illicit activity of its users (United States of America v. E-Gold, 2006). It was soon after sentencing was completed in the case that E-Gold closed its business, allowing others to learn from its mistakes.

### **Early Version**

Published October 31<sup>st</sup>, 2008, the monumental paper *Bitcoin: A Peer-to-Peer Electronic Cash System*, by the mysterious Satoshi Nakamoto, detailed the first true concept of a decentralized cryptocurrency. This paper described a system where private transactions could be executed without the need for a trusted third-party verifier and instead relied on a complex proof-of-work system (Nakamoto, 2008). To accomplish this, a public ledger of all transactions would be created and verified by miners' majority acceptance in a system known as blockchain, where blocks of information are grouped together in an ever-growing chain on a public ledger (Fortney, 2019). The first computer to solve the validation calculation would receive Bitcoin as a reward, thus incentivizing the prompt validation of transactions. Upon a certain number of coins entering circulation, the miners would instead be compensated solely through transaction fees in place of coin generation. Soon after the publication of the paper, Nakamoto released the software with the principles outlined in the paper and Bitcoin entered existence as the first true cryptocurrency in 2009 (Goelz, Willingham, & Le, 2018).

### **First Successful/Widespread Cryptocurrency**

Following the proposed guidelines of the paper released in 2008 (Nakamoto, 2008), the decentralized digital cryptocurrency was launched on January 3, 2009 (Davis, 2011). With the launch of Bitcoin, a new era of digital currencies began. Through mining, the system was designed to allow only twenty-one million bitcoins to ever be mined, in order to set a limit on the supply (CoinTelegraph, 2019). Once that limit is reached, only transaction fees will be used to compensate miners. With the Bitcoin protocol seeking to allow only one transaction block to be mined (processed) approximately every ten minutes, it accomplished this by automatically adjusting the difficulty of computations that needed to be solved in order to add the block to the

public ledger (CoinTelegraph, 2019). This process of receiving bitcoin for processing transactions quickly gained popularity and within a couple of years after its launch, imitators emerged into the new market.

## **Cryptocurrencies Today**

### **Acquiring/Purchasing Cryptocurrencies**

While there are several avenues through which cryptocurrencies can be obtained on the market, the process of the initial creation of individual cryptocurrencies varies between one another in only a few ways. These differences in the generation of coins or tokens change the way value is created in cryptocurrency markets, but more importantly, changes the parties that benefit from the creation of additional units.

### ***Mining***

Cryptocurrencies such as Bitcoin, Ethereum, and Litecoin generate coins through the process of mining. This has led to the development of computers to be used solely for the purpose of mining cryptocurrencies. The generation of coins in this manner means that without the validation of transactions, new coins would not be created, and the supply of the cryptocurrencies would not reach the algorithmic caps placed upon them by their developers. That being said, the mining process can be highly profitable, as the miners receive coins generated upon completion of blocks as well as those collected as fees from verifying transactions. As the complexity of the mining computations has increased, networks of miners have been created to more efficiently “mine” the coins (Fortney, 2019).

### ***Initial Coin Offerings***

An alternative approach to the generation of coins, and with different motives, is through initial coin offerings (ICOs). ICOs were first created in 2013 by J.R. Willet, who launched

Mastercoin and initially received \$5 million for its coins—later rebranded to Omni in 2015 (Essaghoolian, 2019). In a condensed description, ICOs are created by startups as a means to raise capital for upcoming projects through crowdfunding on a distributed ledger technology (Debler, 2018). To raise this needed capital, the firms release information detailing the proposed ICOs. Investors who are interested in the firms after reading of the projects' details can exchange an issuer-designated cryptocurrency for the firms' offered tokens via a smart contract at an issuer-determined exchange rate (Essaghoolian, 2019). These ICOs, should they manage to avoid being classified as a securities offering, are exempt from nearly all of the requirements imposed on initial public offerings (IPOs): token holders do not get a vote in the actions of the firm or the project's direction, token holders do not receive liquidated assets if the firm or project goes under, no disclosures are required before issuing ICOs, and investment is not restricted to accredited investors (Essaghoolian, 2019). Those who invest in ICOs tend to be interested in ownership of the firm or project as well as the anticipation of selling their tokens for a profit should the value raise as a result of the project's success (Debler, 2018). Presently, however, ICOs are predominantly high-risk, speculative investments that provide the *potential* for high returns. These profits are far from guaranteed and possess equal (or more) potential for loss of investment.

### ***Crypto ATM***

Similar to fiat currency ATMs, cryptocurrency ATMs have emerged as a method of converting physical fiat cash into cryptocurrency at locations across the globe. These ATMs function by linking with the users' digital wallets, followed by the user inserting fiat currency into the machine, and then their digital wallet is credited with cryptocurrency minus the fees for the exchange. As of this writing, there are currently 7,200 Crypto ATMs throughout the world

(Coin ATM Radar, 2020). North America has the vast majority of these Crypto ATMs, with 5,769 (80.1%), Europe has 1,217 (16.9%), Asia has 122 (1.7%), and the remaining continents have a combined total of 92 (1.3%) Crypto ATMs (Coin ATM Radar, 2020). The United States accounts for 5,023 (69.76%) of the ATMs worldwide, with Canada trailing at 706 (9.8%), the United Kingdom with 283 (3.9%), and Austria with 133 (1.8%) (Coin ATM Radar, 2020). It is evident that the presence of these crypto ATMs is concentrated in North America, but what is not clear is why the rest of the world has not experienced similar adoption of this technology. This conversion method has its uses for individuals who wish to dabble in the cryptocurrency market, but it is not practical for the larger transactions that occur with cryptocurrencies.

### ***Cryptocurrency Exchanges***

As of this writing, there are two hundred sixty-three cryptocurrency exchanges across the world where a multitude of coins and tokens can be acquired (Coin.Market, 2020). Similar to stock exchanges, cryptocurrencies can be bought, sold, or traded for each other on open markets (Coin.Market, 2020). The largest exchange, Bitforex, processed \$5,542,156,971 in 2,668,849 trades on their exchange in the twenty-four-hour period of March 15, 2020 (Coin.Market, 2020). The classification and regulation of these exchanges vary depending on the country, but they are one of the easiest methods of acquiring and selling cryptocurrencies, especially in large quantities and values. This method is, and will likely remain, the most common and well-used method of transferring cryptocurrencies.

### **Current Cryptocurrency Market**

#### ***Market Capitalization and Market Share***

As can be seen from the data accessed on March 16<sup>th</sup>, 2020, at 9:45 pm CST, (see Table 1), while the number of tokens in existence far outnumber the number of coins, the vast majority

of the value of the cryptocurrency market is stored in coins (CoinMarketCap, 2020). To be more specific (see Table 2), the top ten largest cryptocurrencies control 84.70% (\$129,930,256,055) of the cryptocurrency market and the lion's share of the market's value is commanded by the first cryptocurrency, Bitcoin, with 61.57% (\$94,450,324,536) (CoinMarketCap, 2020). In the past few years, a flood of new cryptocurrencies has come into existence; though, the adoption of their platforms has not been consistent, as some have risen explosively in popularity while others have failed to attract investors or users.

### ***Volatility***

From CoinMarketCap's (2020) data analyzing Bitcoin's market data (see Figure 1), accessed March 16<sup>th</sup>, 2020, the pioneering cryptocurrency increased relatively steadily and remained roughly at or below \$1,000 per coin until the beginning of 2017. On January 1, 2017, Bitcoin closed at only \$972.95 per coin. At its peak that year on December 17, it was trading at \$20,089 per coin: a massive 1964.75% increase in value. The cryptocurrency did not continue to maintain the trading volume or the price: by February 5, 2018, Bitcoin's price had declined to \$6,884.98 per coin: a 65.73% loss in value (CoinMarketCap, 2020). These explosive changes in market value highlight the potential for gains and losses with the technology. Since then, Bitcoin has experienced tremendous volatility: a major slump in the winter of 2019, a massive rebound throughout the rest of the year, followed by a massive plummet in the early months of 2020—likely due to the worldwide market turmoil caused by COVID-19.

### ***Transaction Fees***

Accessed from BitInfoCharts (see Figure 2) on March 16<sup>th</sup>, 2020, at 9:30 pm, the graph shows the average fee in U.S. dollars per processed Bitcoin transaction (BitInfoCharts, 2020). Due to the explosive rise in trading price in the winter of 2017/2018, the fees paid to prioritize

the processing of traders' orders rose similarly. These fees are not required, however, and are offered by users in order to incentivize miners to process their transactions first, which can be especially important when a minute's difference can result in massive differences in trading values. At its highest point in December of 2017, the average fee per transaction reached \$55.16. Prior to and since then, the average transaction processing fee paid to miners has been less than \$1.00 (BitInfoCharts, 2020). This highlights the volatility of another component of the cryptocurrency market and the potential for an uneven playing field in the prioritizing of transactions. Despite a similar rise in the value of Bitcoin in the summer of 2019 as the winter of 2017, the average transaction fee per transaction did not rise as drastically as it once did, which may demonstrate the decline in the Bitcoin craze. When the last Bitcoin is mined and that revenue source is depleted for miners, it will be important to see the kind of transaction fees that will be necessary for miners to continue to offer their transaction validation component of the Bitcoin system.

## **Uses**

### ***Purchasing***

As with any type of currency, its functionality depends on the acceptance, by both parties, of its ability to transfer value. However, the conducting of transactions from business-to-business, business-to-consumer, and consumer-to-consumer by utilizing cryptocurrencies has not been adopted on a widespread scale. This is a dilemma that many users of cryptocurrency currently face when attempting to use their cryptocurrency to purchase goods or services, as most merchants only accept fiat currencies. Some merchants have become early adopters and have begun accepting specific cryptocurrencies as payment. A few of the most recognizable companies are Overstock, Newegg, Expedia, Subway, PayPal, and Microsoft (Sloan, 2018).

Though certain cryptocurrencies are accepted as payment, this is not to say that the companies hold on to them once they are received. Instead, most of these companies are partnered with payment processors that exchange the cryptocurrencies for fiat currency once the initial transaction is complete (Merchant Advice Service, 2020) . These processes come with risks similar to common currency risk when operating internationally: by accepting cryptocurrencies as payment, the value of the cryptocurrency relative to their fiat currency may fluctuate (drop) before it can be converted—resulting in losses for the company.

### *Investing*

**Speculation vs. Investing.** Unlike other investments such as bonds or stocks, where many investors rely on coupon payments or dividends as compensation for purchasing the investment, cryptocurrencies do not inherently provide a return to the owner. It is through speculation, in the hopes that the value of the cryptocurrency they possess will rise above the purchase price and that they will be able to sell it at a gain, that they intend to receive a return. While past company performance can lead to speculation on its future performance and the creation of pro forma financial documents where potential profitability could then be weighed when making investment decisions, the future value of cryptocurrencies cannot be valued based off of previous “performance.” It is the overall uncertainty around cryptocurrencies’ future value that leads to the volatility in their value and, ultimately, the “return” that their investors can receive.

**Risks vs. Returns.** Being decentralized digital currencies, cryptocurrencies are widely known for their volatility and, subsequently, their exceptionally high investment risk. However, unlike risky investments on the bond or stock market that pay a large risk premium in excess of the risk-free rate to compensate investors for undertaking additional risk, cryptocurrencies



generally only generate returns if their value rises above the purchase price and they then are sold. This means that the while risky stocks and bonds can increase in value if successful, they also require higher rates of return than those with less risk; however, those who invest in cryptocurrencies are willing to rely solely on the hope that they will increase in value, without requiring any form of compensation for the risk.

In simplified terms, bonds pay their returns in the form of coupon payments on continuous, specified schedules that compensate those who hold the bonds for their lending of capital. This compensation method takes higher priority of payments than other financing methods, and thus generally receives lower rates of returns. On the other hand, stocks represent ownership (equity) in the corporation and the return for individuals' investments in the firm can be in the form of dividend payments. These dividend payments, being far from guaranteed and having the lowest level of priority for payment, are one way that investors can be compensated, often at a higher rate of return than bonds due to their increased risk. A method that is relevant to cryptocurrencies is the increase in the value of the holding of investors' equity in a firm. This increase of value, however, is only realized when the equity stake is sold. Due to the topics discussed in this section, I am considering cryptocurrencies highly-risky investments that are lacking in compensating high returns, and thus do not recommend them for general investment purposes or as suitable vehicles for storing value.

### **Recent Happenings within the Cryptocurrency Field**

#### **Innovations**

##### ***Cryptocurrency Debit Card***

On April 10, 2019, an online platform for the “buying, selling, transferring, and storing of digital currency,” known as Coinbase, announced the launch of Coinbase Card (Feroz, 2019).

While not the first of its kind, the card allows users to instantly pay using cryptocurrencies at any location accepting Visa and even make cash withdrawals from ATMs (Feroz, 2019). It works by converting the users' cryptocurrencies from their Coinbase digital wallets to their respective fiat currency at the current exchange rate and then using the fiat currency to complete the transaction (Feroz, 2019). It advertises the ability for the user to change which cryptocurrency they want to use to pay within seconds—allowing for effortless management of the user's digital wallet and card via Coinbase's mobile application (Coinbase Card, 2019). Perhaps the biggest drawback of the Coinbase Card is a Crypto Liquidation Fee—where a fee of 2.49% of the transaction is assessed for the converting of the cryptocurrency into the fiat currency (Coinbase Card FAQ, 2020). This card was initially available only in the United Kingdom; however, it has since been expanded to include Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom, with plans to continue international expansion (Coinbase Card FAQ, 2020). The card platform increases the feasibility of using cryptocurrencies in markets where cryptocurrencies are not directly accepted as payment. Currently, nine of the most popular cryptocurrencies—Bitcoin, Ethereum, Litecoin, Bitcoin Cash, XRP, BAT, REP, ZRX, and XLM—can be used as payment on their mobile wallet on up to £10,000 / 10.000 € in daily spending (Coinbase Card FAQ, 2020). While it does not directly further the intent of cryptocurrencies to be used as the sole payment, it might increase the overall use of cryptocurrencies, which might, in turn, lead to the expansion of POS systems that accept cryptocurrencies directly.

***Institutional Cryptocurrency Custodians***

In September 2018, BitGo received approval from the South Dakota Division of Banking to operate as BitGo Trust Company and became the first company to receive regulatory approval to become a custodian of investors' cryptocurrencies (Kimberly, 2018). They advertise that they are the "leader in security, compliance, and custodial solutions for blockchain-based currencies," and are the largest Bitcoin processors with \$15 billion in transactions processed each month (BitGo, 2019). They also advertise their BitGo Business Wallet as the "only institutional-grade, multi-signature, multi-coin transactional wallet" (BitGo, 2019). One of the most important features for attracting sought-after institutional cryptocurrency investors is the ability to store digital assets offline in an environment that is secure, without the risks of hacking that are present in online wallets (BitGo, 2019). This innovation could pave the way for more institutional investors to get involved in the cryptocurrency industry.

***Cryptocurrency Compliance Platform Patents***

Though originally filed in September of 2016, Coinbase, Inc. received a handful of patents in late 2019 from the U.S. Patent and Trademark Office relating to a self-learning cryptocurrency compliance platform. Patents #10482479, #10510034, and #10510079 provide a model for identifying noncompliant cryptocurrency accounts and closing them (Justia, 2020). The system uses data points from each account (e.g., age, level of due diligence performed, account balance, volume of transactions, geographical location, number of devices, previous compliance reviews, how identity has been verified, largest transaction amount, number of changes made to personal details) and assigns them a compliance score from which the AI platform determines how to handle the account (Justia, 2020). This system could become an important step in the compliance with current and future regulation of cryptocurrencies both in the U.S. and abroad.

**Potential for Illegal/Unethical Use**  
***Market Manipulations***

With the cryptic and volatile nature of cryptocurrencies, illegal and unethical use of the technology has risen through already common practices being used for fiat currencies as well as the emergence of entirely new methods developed for cryptocurrencies. These activities can prove difficult to detect due to the nature of cryptocurrencies but are even more difficult to stop or prevent. As a reoccurring issue on the economic stage for the last few centuries, pump-and-dump schemes have now evolved and found their way into the emerging cryptocurrency industry. According to Kamps and Kleinberg (2018), there are two variations of these schemes, each involving three stages:

1. (a) acquire the commodity over time, (b) spread misinformation about the commodity to raise its market price, (c) sell off the commodity to generate a profit;
2. (a) buy a large amount of the commodity at once, (b) wait for the market to react and adjust to a higher price, (c) sell off the commodity to generate a profit

Penny stocks are a common modern target for pump-and-dump schemes, where access and verification of information is more difficult, leading to easier and more effective spreading of misinformation about the subject penny stock. However, these schemes are under the oversight of the Securities and Exchange Commission (SEC) and are prohibited by the Securities Exchange Act of 1934 (Cornell Law School, 2019). Most recently, a new variation of the scheme has emerged where internet-based public groups have formed in chat rooms to organize the scams using low market cap, low circulation cryptocurrencies (Kamps & Kleinberg, 2018).

These groups function as follows:

1. Group leaders decide on the cryptocurrency to be targeted.
2. Group leaders purchase the currency at the low price.

3. Group leaders sell the insider information to members who desire to buy it early.
4. Group leaders announce to the group the target cryptocurrency
5. Members rush to purchase the currency before other members' purchases raise the price.
6. Group members spread misinformation to raise the price further
7. Group quickly sells off the cryptocurrency to investors who are attempting to buy the "next big crypto investment" (Kamps & Kleinberg, 2018).

Contrary to the traditional scam where it took days or weeks from start to finish, these modern crypto pump-and-dump last only minutes to hours before the price stabilizes once again (Kamps & Kleinberg, 2018). Due to the unregulated nature of most cryptocurrency exchanges, this practice is not always illegal, but even when it is deemed illegal, enforcement by the overseeing body is difficult (Kamps & Kleinberg, 2018). In this unethical practice, though currently legal in most nations, it is the investors who fail to do their due diligence that end up suffering from the market manipulations.

### ***Money Laundering***

In order to use the proceeds from illicit activities in legitimate financial systems, the origins must first be disguised, or cleaned, in order to avoid suspicion. This process is known as money laundering and is a three-stage process consisting of placement, layering, and integration (Choo, 2015). In this paper, money laundering will be described and analyzed in the context of cryptocurrencies. In the first stage, placement, the proceeds from the illicit activities are initially used to purchase nonmonetary instruments (e.g., art, precious metals, or other valuable items). Then they are deposited into financial institutions by blending with the funds of a legitimate business, or by other ways of disguising its origins. With the introduction of cryptocurrencies, the money can be funneled directly into the digital realm (Choo, 2015). Once the funds have

been converted into a cryptocurrency, the process of layering begins. By channeling the funds through purchases with cryptocurrencies and/or converting between multiple cryptocurrencies it would be nearly impossible to determine the origin of the funds should a third party attempt to do so (Choo, 2015). In the case of cryptocurrencies, this is especially difficult due to the anonymity provided to the users. Even though the public ledger contains all transactions, personally identifiable information in a transaction is not available to third parties. This makes attempting to trace illicit funds through cryptocurrencies more difficult than the purchase of high-value commodities that have a more distinct trail. In some circumstances, the final movement of the funds is through front companies that allow the funds to appear to be obtained through legitimate business (Choo, 2015). This is the final stage of the money laundering process where the funds are now indistinguishable from those of legal sources and can be integrated into the financial system (Choo, 2015). The use of cryptocurrencies as an approach to the placement and layering stages of the money laundering process results in a system that is much lower risk to the launders and requires fewer steps than the traditional methods of placement and layering. This, unfortunately, results in a “better” way for criminal organizations to launder dirty money.

### ***Tax Noncompliance***

Due to the anonymity of the users involved in cryptocurrency transactions, nations that would seek to recognize cryptocurrencies as a legitimate currency and attempt to enforce sales tax are unable to do so. Instead many nations have opted for classifying cryptocurrencies as an asset and the taxing of them as such—with the gains from the transfer of those assets being taxable (Bal, 2015). That being said, there are still two predominant issues with the enforcement of nations’ respective tax policies on cryptocurrencies: unawareness of tax liability and deliberate noncompliance (Bal, 2015). The specific tax structure of the nations around the globe

do not impact this claim; instead, these issues arise regardless of the tax structure. In the former issue, users may not be aware that the transfer of cryptocurrencies for goods or services is taxable, or may even believe that their specific use falls outside of the tax policy due to inaccurate information told to them, found online, or misinterpretation of the written tax policy (Bal, 2015). This issue could be largely remedied through information campaigns and “clear guidance on the tax treatment of digital currency” (Bal, 2015). The latter issue, deliberate noncompliance, is a more complex challenge to overcome as user anonymity causes tax authorities to rely on users themselves to report their taxable incomes (Bal, 2015). After all, with transactions on the public ledger masking not only the identities of the users but also their locations, individual tax authorities are unable to determine how much they are owed in taxes from cryptocurrencies, let alone who is liable for paying it to them. These users, who willfully defy tax codes, are fully aware of their minimal chance of being caught, which perpetuates their activities and opens the door to others with similar mindsets to engage in the same practice. Overall, the issue of tax noncompliance will continue to remain a problem with limited means of enforcement and will only grow in severity as cryptocurrencies’ user base and trade volumes increase.

### ***Initial Coin Offerings***

The risks associated with Initial Coin Offerings (ICOs) have led a handful of countries to place outright bans on the practice within their borders. Due to the crowdfunding nature of ICOs, where cryptocurrencies with established value are exchanged for the issuers’ token with no such value, the purchaser bears the risks of the token never appreciating, the issuer failing to complete the project, or outright fraudulent tactics to dupe investors into purchasing the tokens and then disappearing with their payment. Several countries have classified these ICOs in such a way as to

regulate them under their current codes; though, the potential for fraudulent activity remains high.

## **Comparative Analysis**

### ***Gold vs. Crypto***

When comparing gold versus cryptocurrencies, they each have their own set of advantages and disadvantages. The most apparent is the tangibility of gold and the intangibility of cryptocurrencies. These qualities alone provide for interesting appeal, as physically possessing gold provides the time-honored sense of security, while storing value in decentralized electronic coding may be more unsettling. However, the encryption systems of prominent cryptocurrencies may provide more practical security of one's "money" than would the physical stockpiling of gold, which could feasibly be stolen with greater ease. Outside of its ability to store value and to be used as currency, gold has the advantage of differentiated utility in its ability to be used in other products (e.g., electronics, jewelry, medicine, etc.) while the relative utility of cryptocurrencies remains only in their ability to be transferred between users in exchange for goods or services. With cryptocurrencies only existing for roughly a decade, it has yet to be seen if their values will become more stable and experience less volatility, while gold has been used for thousands of years and has generally appreciated in value over time. Both mediums of holding and exchanging value have the advantage of privacy, where gold can be traded in transactions without a "paper trail" and, while the transactions are recorded on a public ledger, cryptocurrencies maintain privacy through the uses of public and private identification numbers. An advantage to cryptocurrencies in this technological era is that they are perhaps now more widely accepted as payment than would be gold and can be used to more practically purchase items or services of higher values.



*U.S. Dollar vs. Crypto*

With Bitcoin being the most prevalent cryptocurrency as of this writing, it will be used as the comparative benchmark relative to the U.S. dollar. The first comparison is the creation of new tender. Once all of the bitcoins have been mined, the algorithms' protocols will not allow any additional bitcoins to be created. Essentially, with Bitcoin's supply being finite, it would not then experience inflation beyond that point; contrary to the dollar, which can be continuously printed by the Federal Reserve. However, the Federal Reserve employs changes in monetary policy to steady inflation via adjustments in interest rates. Another factor for comparison is the high volatility of cryptocurrencies' value, while the dollar remains relatively stable. In terms of liquidity, the well-known cryptocurrencies are comparable to the dollar, but like some of the smaller nations of this world, the smaller cryptocurrencies may struggle with liquidity. In terms of oversight, unlike the dollar, the cryptocurrencies' uses are completely dependent on what the market itself will allow, which leaves them vulnerable to manipulations and fraud without paths for restitution.

Perhaps the most advantageous quality of cryptocurrencies relative to the dollar is their anonymity when used in transactions. While paying cash accomplishes essentially the same result, the digital platform allows for larger and safer transactions than could feasibly be accomplished with cash payments. When using payments such as debit, credit, checks, or wire transfers with fiat currencies such as the dollar, a trail of the money is created that some would prefer not to be accessible by third parties, including banking institutions. Another advantage is the effect the decentralized nature of cryptocurrencies has when paying internationally. For example, should a seller in Japan operate using cryptocurrency systems and the buyer operate similarly in the United States, no exchange of their fiat currencies would be needed, and the

seller could be paid directly with the cryptocurrency. In other words, a stable cryptocurrency would allow for decreased costs associated with conversion and the elimination of currency risk in international transactions. In their current state, however, cryptocurrencies are generally too risky to feasibly be used in complex transactions and fiat currencies are still needed to complete these transactions unless, or until, frameworks can be created to lessen the risks associated with cryptocurrencies.

### *Securities vs. Crypto*

Throughout most of the world, the current regulation of cryptocurrencies, if at all, focuses on taxes, anti-money laundering, and anti-terrorism. This limited regulation leaves users of cryptocurrencies vulnerable to fraud, market manipulations, unethical issuer or user practices, and ultimately the potential for substantial financial losses without disclosure of such. In contrast, the regulation of securities and oversight by governing bodies facilitates a fair market for users and accountability regarding their tax liability. Depending on the cryptocurrency, some give the right of ownership in future projects or ownership in the company without voting rights, but others are strictly designed for peer-to-peer transactions. Securities, on the other hand, provide stakes in companies, some with voting rights and others without, and many have stipulations for earnings generated by investment in the companies. With a debt or equity security, the likelihood of receiving a return varies on the type of security and specific company; however, unlike cryptocurrencies, some form of compensation is generally expected. Similarly, if the companies in which the equity is held goes out of business, the securities' holders have rights and opportunities, although limited, to the repayment of their investments, but no such processes exist for cryptocurrencies – further adding to their risk. In terms of privacy, cryptocurrencies are far superior when compared to securities. Disclosures vary depending on

the security and the type of investor, while cryptocurrencies have no requirements on the content of the disclosures or even the requirement to provide disclosures at all. Furthermore, the issuance and holding of some securities are restricted to certain kinds of investors, while cryptocurrencies are available to all investors, regardless of investment experience.

### *Crypto vs. Crypto*

Of the numerous cryptocurrencies that have emerged on the market, their differences in functionality and purpose are the most obvious. In an Initial Coin Offering (ICO) the intent is to raise funds by issuance of tokens, while crypto coins generally have predominantly, in the short term, been used in speculative investing and in the long term, intend to be used as a replacement of fiat currency. In terms of privacy, it will be seen to what extent governments get involved in ICOs as they lean towards classifying them as securities offerings, though general crypto coins will likely remain highly anonymous due to governments' lack of jurisdiction over them. Easily ascertainable, both kinds of cryptocurrencies are intangible and their liquidity varies upon the adoption rate of the specific coin or token. The method of obtaining cryptocurrencies on the market and participating in ICOs is similar to buying stocks on the open market and participating in IPOs, respectively. Issuance of many of the common crypto coins is accomplished through mining and the newly generated coins are then sold by the miners at the market rate, while ICOs are offered directly to investors at a set price by the issuers. The value of all cryptocurrencies is volatile, and their current regulation is limited. In the future, as the adoption of cryptocurrencies increases, there remains the potential for the volatility to decrease and the regulation of them to increase.

## **Cryptocurrency Regulations Worldwide**

### ***Current Regulation***

In a report issued by the Law Library of Congress of the United States in June of 2018, 130 countries were studied on their current legal stances regarding cryptocurrencies. Of the one hundred-thirty countries, nine of them have absolute bans on cryptocurrencies: Algeria, Bolivia, Egypt, Iraq, Morocco, Nepal, Pakistan, United Arab Emirates, and Vietnam; and 15 countries have implicit bans: Bahrain, Bangladesh, China, Columbia, Dominican Republic, Indonesia, Iran, Kuwait, Lesotho, Lithuania, Macau, Oman, Qatar, Saudi Arabia, and Taiwan (The Law Library of Congress, 2018). Instead of implementing bans, 17 countries have applied their tax laws to cryptocurrencies, located primarily in developed countries across Europe. Additionally, 40 countries have implemented anti-money laundering and anti-terrorism financing laws, and five countries have implemented both types of laws (Australia, Canada, Denmark, Japan, and Switzerland) (European Commission, 2020; The Law Library of Congress, 2018). The report identified “government-issued notices about the pitfalls of investing in the cryptocurrency markets” as being one of the most common actions countries took in combatting the risk involving cryptocurrencies. Becoming further involved, five countries and the eight members of the Eastern Caribbean Currency Union (ECCB) have or have begun issuing their own national/regional cryptocurrencies (The Law Library of Congress, 2018).

### ***Major Actors***

**France.** In an attempt to position itself as a leader in the crypto-market and to establish Paris as the center for a flourishing cryptocurrency haven, France has made progress to make the country more crypto-friendly by approving a financial sector law geared towards attracting both cryptocurrency issuers and traders (Reuters, 2019). French Finance Minister, Bruno Le Maire,

was quoted as saying, “I will propose to my European partners that we set up a single regulatory framework on crypto-assets inspired by the French experience...Our model is the right one” (Reuters, 2019). The French model is one that provides formal recognition to cryptocurrencies in exchange for the taxing of profits generated through them as well as requiring them to obtain certification to operate within France. The certification process will attempt to weed out bad actors by requiring verification of the issuers’ ICOs or cryptocurrency, as well as inspecting the business plans and anti-money laundering rules issuers have in place (Reuters, 2019). France’s goal became reality, and The Action Plan for Business Growth and Transformation law was adopted on April 11, 2019, by the French Parliament, and thus positioned France as a first-mover towards overarching regulation in the European Union (Helms, 2019).

**European Union.** “On July 5, 2016, the European Commission presented a legislative proposal to amend the Fourth Anti-Money Laundering Directive (AMLD). It suggested, *inter alia*, bringing custodian wallet providers and virtual currency exchange platforms within the scope of the AMLD, meaning they would be obligated to fulfill due diligence requirements and have in place policies and procedures to detect, prevent, and report money laundering and terrorist financing” (The Law Library of Congress, 2018).

The proposal was approved on January 29, 2018, through the interinstitutional negotiations of the European Parliament (The Law Library of Congress, 2018). On February 12, 2018, The European Supervisory Authorities (ESAs), a joint committee of European Banking Authority, European Securities and Markets Authority, and the European Insurance and Occupational Pensions Authority, issued a statement stating, “[virtual currencies] are highly risky and unregulated products and are unsuitable as investment, savings or retirement planning products” (European Supervisory Authorities, 2018). The ESAs open opposition to the use of

cryptocurrencies as investment products of consumers is warranted, due to the well-documented nature of the currencies' volatility. The joint committee further adds that “[virtual currencies] are subject to extreme price volatility...there is a high risk [consumers] will lose a large amount, or even all, of the money invested... and [virtual currencies] do not benefit from any protection associated with [EU] regulated financial services” (European Supervisory Authorities, 2018).

This means that should European Union consumers invest money into a cryptocurrency and the currency was to be stolen or lose all of its value, no EU law or service would remedy their situation. On April 19, 2018, the European Parliament adopted the amendment in session and concluded that three days after it was published in the Official Journal of the European Union, the amended Fourth Anti-Money Laundering Directive would be in effect (The Law Library of Congress, 2018).

Further developments in the European Union's oversight of cryptocurrencies have taken the form of the European Commission's Fifth Anti-Money Laundering Directive on June 19, 2018, which amended the previously mentioned Fourth Directive. The amendments, from the European Commission (2020) are as follows:

- “enhance transparency by setting up publicly available registers for companies, trusts and other legal arrangements;
- enhance the powers of EU Financial Intelligence Units, and provide them with access to broad information for the carrying out of their tasks;
- limit the anonymity related to virtual currencies and wallet providers, but also for pre-paid cards;
- broaden the criteria for the assessment of high-risk third countries and improve the safeguards for financial transactions to and from such countries;

- set up central bank account registries or retrieval systems in all Member States;
- improve the cooperation and enhance of information between anti-money laundering supervisors between them and between them and prudential supervisors and the European Central Bank.”

The Commission gave the EU Member States until January 10, 2020, to fully comply with the requirements: essentially requiring crypto-service providers to abide by the same regulatory requirements as banks (e.g., registering with financial authorities, identifying customers, reporting suspicious activity, etc.) (European Commission, 2020) Though the Directive helps better combat money laundering, it drastically changes the nature of cryptocurrencies’ place in the EU and dissolves the privacy and anonymity that many users value in the technology.

**China.** With China being one of the biggest markets for cryptocurrencies, it follows that it would also be subject to its share of the illicit activities. In 2017, 90% of the ICOs originating in China were “highly suspect as being associated with illegal fundraising or fraud while only 1% of funds raised... [were] used for the development of blockchain projects” (Deng, Huang, & Wu, 2018). Because of the risks relating to ICOs, seven government regulatory bodies jointly issued a notice that placed an outright ban on the operation of ICOs with the Notification Concerning the Undertaking of Clean-up and Rectification Work for ICO, known as Notification No. 99, on September 4, 2017 (Deng, Huang, & Wu, 2018). The ICOs were classified in China as a form of illegal public fundraising, resulting in the shutdown of current ICOs and the banning of all future ICOs within its borders (Deng, Huang, & Wu, 2018). While the ICOs did not directly raise money, they raised Bitcoin and Ethereum, which were classified as “public financing without approval” (The Law Library of Congress, 2018). Furthermore, Chinese financial institutions are also prohibited from providing services relating to cryptocurrency

transactions (The Law Library of Congress, 2018). This stance by China does not prohibit the mining or storage of cryptocurrencies by miners or investors, but specifically targets ICOs and cryptocurrency transactions, and, therefore, individual investors are still able to participate in the cryptocurrency markets and the nation remains one of the biggest markets for cryptocurrencies.

**India.** On April 6, 2018, the Reserve Bank of India released a notice “prohibiting banks, lenders and other regulated financial institutions from dealing with virtual currencies” (The Law Library of Congress, 2018). This restriction prohibits these institutions from providing services such as “maintaining accounts, registering, trading, settling, clearing, giving loans against virtual tokens, accepting them as collateral, opening accounts of exchanges dealing with them and transfer/receipt of money in accounts relating to purchase/sale of [virtual currencies]” (The Law Library of Congress, 2018). Furthermore, institutions that were already providing such services must cease doing so within three months after the posting of the notice (The Law Library of Congress, 2018). Though the degree and severity of government involvement have stifled the growth of the cryptocurrencies in India, the government has been drafting legislation that would allow for the reintroduction of cryptocurrencies with the inclusion of the regulation of the origins of funds used in crypto-transactions and of the crypto-exchanges within its borders (The Law Library of Congress, 2018). With the potential for a renewed market for cryptocurrencies, there is much anticipation for the release of the regulatory framework by the Indian government.

**United States.** On March 18, 2013, the Financial Crimes Enforcement Network (FinCEN) of the US Department of the Treasury issued guidance on the “application of FinCEN’s regulations to persons administering, exchanging, or using virtual currencies” (Department of the Treasury: Financial Crimes Enforcement Network, 2013). The guidance states that a cryptocurrency has “an equivalent value in real currency, or acts as a substitute for



real currency,” and is thus subject to the regulation by FinCEN (Department of the Treasury: Financial Crimes Enforcement Network, 2013). It goes on to state that users are not subject to their oversight, but the administrators and exchangers of the cryptocurrencies are classified as money transmitters and are thus subject to the registration, reporting, and recordkeeping regulations of FinCEN (Department of the Treasury: Financial Crimes Enforcement Network, 2013).

The U.S. Securities and Exchange Commission (SEC) issued a statement on March 7, 2018, on the “potentially unlawful online platforms for trading digital assets” (SEC, 2018). They state that if online platforms that bring buyers and sellers of cryptocurrencies (exchanges) offer cryptocurrencies determined by the SEC to be securities, that the exchanges must register with the SEC (SEC, 2018). They go on to say that the purpose of registration is to “protect investors and prevent against fraudulent and manipulative trading practices” (SEC, 2018). The SEC has also targeted ICOs, including Airfox and Paragon, which have been classified as securities by the SEC but failed to complete proper registration, and succeeded in settling with ICOs—imposing \$250,000 penalties, compensating harmed investors, and registering their tokens (SEC, 2018).

### ***U.S. Future Regulation***

Perhaps the biggest obstacle in the regulation of cryptocurrencies is the difficulty classifying them under a single definition. Some could classify cryptocurrency as a currency, a money substitute, electronic money, a financial instrument, a commodity, a security, or as property (Cvetkova, 2018). By holding different classifications, the cryptocurrencies and their users may enjoy certain advantages and experience certain disadvantages depending on the nation in which they reside and/or do business. On December 6, 2018, Representative Darren Soto of Florida’s 9<sup>th</sup> congressional district proposed two bills in the 115<sup>th</sup> Congress. The first bill,

H.R. 7224 (115<sup>th</sup>): Virtual Currency Consumer Protection Act of 2018, sought to “promote fair and transparent virtual currency markets by examining the potential for price manipulation” (116<sup>th</sup> Congress, 2019). The second bill, H.R. 7225 (115<sup>th</sup>): U.S. Virtual Currency Market and Regulatory Competitiveness Act of 2018, sought to “promote United States competitiveness in the evolving global virtual currency marketplace” (116<sup>th</sup> Congress, 2019). The two bills failed to be enacted in the 115<sup>th</sup> Congress; however, on January 30, 2019, they were reintroduced into the 116<sup>th</sup> Congress and remain at this stage as of the writing of this paper (116<sup>th</sup> Congress, 2019).

In the *Sense of Congress* sections of both bills, they each cite cryptocurrencies’ significant effect on the U.S. economy and the importance regulation has in its ability to “...protect investors, deter bad actors, create market certainty, and ensure American competitiveness...” (116<sup>th</sup> Congress, 2019). From there, the bills diverge in their goals if enacted. The first bill aims to accomplish its goals by analyzing federal agencies’ current ability to identify cryptocurrency market manipulations and if enforcement of any Federal regulations can be sought (116<sup>th</sup> Congress, 2019). After the analysis, the bill calls for proposals of any legislative changes to be made in order for Federal agencies, specifically the Commodity Futures Trading Commission, to better monitor the crypto markets for price manipulation and prevent the manipulation from happening in the first place—all with the goal of protecting those who invest in cryptocurrencies (116<sup>th</sup> Congress, 2019).

The second bill varies from the first in that instead of individual investors being the main concern, it is instead the United States and its businesses within. This bill seeks to make the United States more competitive in the industry, encourage the adoption of cryptocurrencies in the commodity market that could benefit, clarify the cryptocurrencies that qualify as commodities, and provide a proposal for a regulation of crypto exchanges—including “federal licensure,

market supervision, consumer protections, and preemption of State money transmission licensing obligations for participation in [crypto exchanges]” (116th Congress, 2019).

Neither bill has moved passed the introduction phase, with their current status not having changed since being referred to the Subcommittee on Commodity Exchanges, Energy, and Credit on February 25, 2019. (116th Congress, 2020) The goals of these bills seem to mirror those of France’s closely, though it is yet to be seen if those sponsoring the bills will be successful in furthering their progression in Congress and eventually passing them into law. With the goal of expanding the authority of the U.S. Commodity Futures Trading Commission (CFTC) if needed, the bills outline this federal body as the one that will assume the responsibility of regulating cryptocurrencies.

In regard to the current oversight by the CFTC, on January 4, 2018, the CFTC released guidance to provide, in part, its “approach to the regulation of virtual currencies” (CFTC, 2018). The CFTC declared in 2014 that cryptocurrencies were commodities and were thus subject to their oversight under the Commodity Exchange Act (CFTC, 2018). The CFTC states the following about their approach to regulation:

The CFTC seeks to promote responsible innovation and development that is consistent with its statutory mission to foster open, transparent, competitive and financially sound derivative trading markets and to prohibit fraud, manipulation and abusive practices in connection with derivatives and other products subject to the CEA.

The CFTC’s guidance goes on to state their goal of responsible regulation through consumer education, asserting their legal authority, gaining the ability to monitor cryptocurrency

markets, enforcing the law and prosecuting abuse of cryptocurrencies, and coordinating with both federal and state entities (CFTC, 2018).

The latest move towards the regulation of cryptocurrencies in the United States has been the introduction of the Crypto-Currency Act of 2020 to Congress. Its stated purpose, “to clarify which Federal agencies regulate digital assets, to require those agencies to notify the public of any Federal licenses, certifications, or registrations required to create or trade in such assets...” makes a move toward wide-spread involvement by U.S. agencies in cryptocurrency markets (116th Congress, 2020). This bill proposes a multitude of changes to how cryptocurrencies are handled in the United States: outlined in six sections (116th Congress, 2020). The main, simplified takeaways from the bill are as follows:

1. The cryptocurrency category is split into three subcategories
  - (a) Crypto-commodity: economic goods or services held on blockchain
  - (b) Crypto-security: debt and equity that is held on blockchain
  - (c) Crypto-currency: representations of U.S. currency or synthetic derivatives
2. Each of these subcategories will be regulated by one of three agencies
  - (a) Commodity Futures Trading Commission (CFTC): crypto-commodities
  - (b) Financial Crimes Enforcement Network (FinCEN): crypto-currencies
  - (c) Securities and Exchange Commission (SEC): crypto-securities
3. Each of the regulators shall “make available to the public...a list of all Federal licenses, certifications, and registrations required to create or trade in digital assets” (116th Congress, 2020)
4. Through the FinCEN, each cryptocurrency will be required to create rules to require the ability for the tracing of transactions and the persons involved within them

Introduced on March 9, 2020, it has since been “referred to the Committee on Financial Services, and in addition to the Committee on Agriculture, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned” (116th Congress, 2020). This new bill has lofty goals, and its passing into law seems unlikely; however, it provides insight into the direction the United States is hoping to pursue in cryptocurrency regulation.

## **Discussion**

### **Interpretation of Current Trends**

While cryptocurrencies come with a unique set of benefits, they also bring with them unique challenges that prove difficult to manage. As can be seen from cryptocurrencies’ predecessors to modern ICOs, the payment mediums prove to be unpredictable and incredibly risky for seasoned investors and common users alike. Because of their nature, regulation on national and international levels will be suggested below.

The general global consensus on cryptocurrencies is that they are not going to disappear anytime in the foreseeable future. This poses a few possible routes for nations to journey down including strict bans, limited bans, free market, limited regulation, or strict regulation. Both strict bans and strict regulation are unsuitable, and frankly impossible, options. The former shuts a nation’s potential for the benefits of cryptocurrencies and the latter, while attempting to protect its citizens, stifles the growth of the industry within its borders. Another option that will be discarded from consideration is that of a free market with no regulation since having open doors to cryptocurrencies without oversight will expose its citizens to unnecessary fraud and other risks. This leaves the two remaining options to be weighed: limited bans and limited regulation. Should a new type of cryptocurrency arise that is inherently geared towards fraud or illicit

activities, that type should be banned; however, as of this writing, the types of cryptocurrencies in existence have the potential to benefit society and should therefore not be outright banned. Furthermore, rather than a nation depriving its citizens of the potential to share in the benefits of cryptocurrencies, they should regulate them as to protect those who would want to participate, protect their nation's interests, and discourage bad actors from engaging in the industry. The European Union has accomplished something that the United States has failed to accomplish as of yet: implementing an overarching regulatory framework. While a handful of attempts have been made in recent years, time will tell if the United States can move down the same path as the European Union.

### **Areas Requiring Further Research**

An area requiring further research as cryptocurrencies become more intertwined in daily societal life is the role they will play in more specialized components of the world's financial systems. For example, while loans of fiat currencies are offered with cryptocurrencies used as collateral, we need to examine how cryptocurrencies can be integrated into the complex payment system of auto or home loans. To explain further, we can examine the situation in which cryptocurrencies become further integrated to a point where instead of getting loans off of the value of held cryptocurrencies and if people will eventually be able to take out loans in cryptocurrency to purchase items as they would with banks. Another aspect to consider for future research is what entity will regulate this industry and what legal protections exist for those that loan their cryptocurrencies: how would foreclosures be carried out if individuals failed to make monthly cryptocurrency payments and would governments have the authority to hear bankruptcy proceedings for decentralized cryptocurrencies? Additionally, the technology behind many cryptocurrencies, blockchain, has other uses (recording real estate title transfers, digital voting,

monitoring supply chains, executing wills or inheritances, etc.) that are in the early stages of being pursued (Williams, 2018). Though, questions remain on the effectiveness and feasibility of using blockchain in these other applications and, as a result, extensive research could be done on these uses. As can be seen, there are many questions about the extent cryptocurrencies can and will be used over time, and further research as they progress will be required.

### **Conclusions**

This research paper has examined the history, current overview, investment investigation, potential for illegal and unethical use, current international regulation, comparative analysis, and regulatory progress of cryptocurrencies. As the adoption of cryptocurrencies into everyday life continues, those with regulatory jurisdiction must take steps to limit the permissible uses of cryptocurrencies through the expansion and introduction of existing and additional regulation. They must be careful, however, not to stifle development or progression towards widespread use of decentralized currency, but to provide reasonable protections to those within their jurisdiction. In order to accomplish this, the regulation of cryptocurrencies across multiple scales is needed to properly protect their users and combat unethical or illicit activities utilizing the technology. The methods undertaken to accomplish these goals will vary throughout the world and with these stark differences, the ideal methods of regulating cryptocurrencies will become more pronounced. With this technology still in its infancy and both users and regulators still uncertain about its future as a viable product, further research needs to be conducted on the effects cryptocurrencies will have on users and, in contrast, the effects regulators will have on cryptocurrencies.

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**Table 1***Number of Cryptocurrencies & Market Caps*

	Number of Cryptocurrencies	Market Cap
Coins	862	\$134,686,135,929
Tokens	1,592	\$18,713,673,901
Total	2,454	\$153,399,809,831

*Note.* Data retrieved from CoinMarketCap.com

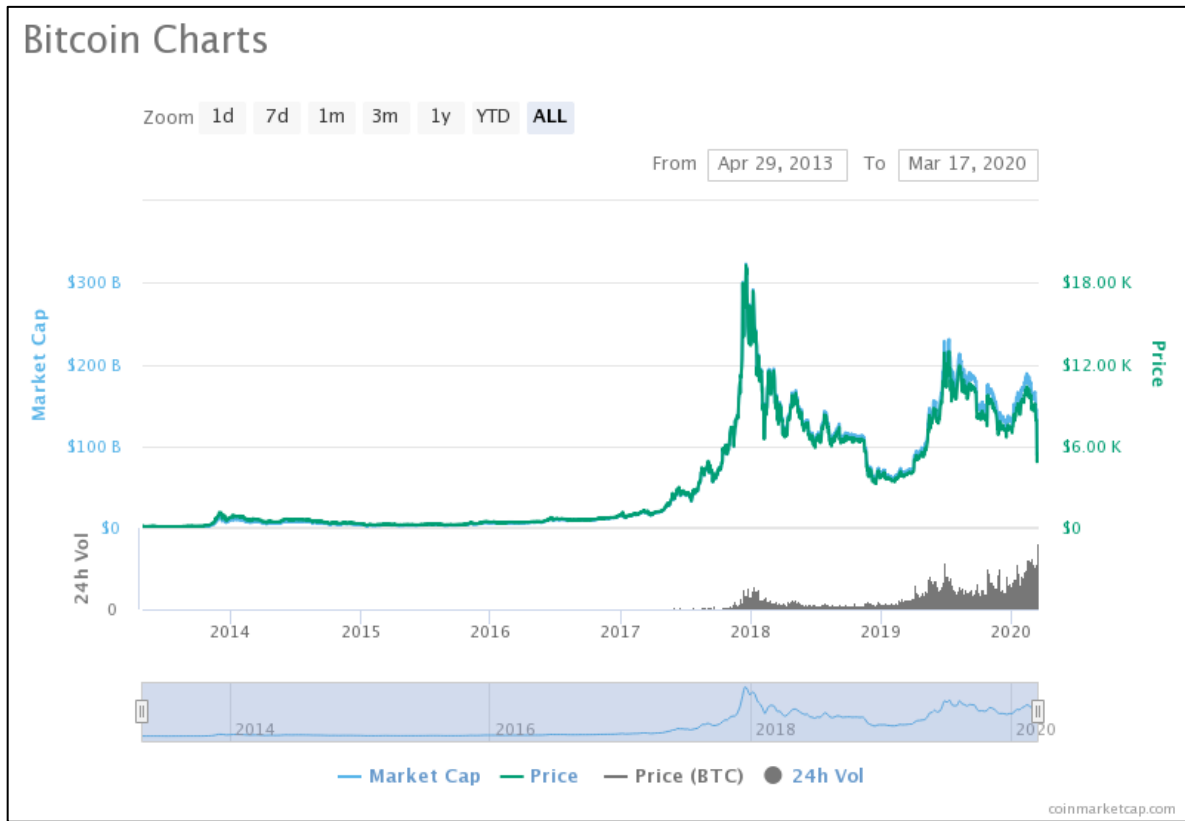
**Table 1***Top 10 Cryptocurrencies: Market Caps and Types*

Cryptocurrency	Market Cap	Type
Bitcoin	\$94,450,324,536	Coin
Ethereum	\$12,735,569,429	Coin
XRP	\$6,373,959,152	Coin
Tether	\$4,590,706,862	Token
Bitcoin Cash	\$3,241,645,988	Coin
Litecoin	\$2,184,897,095	Coin
Bitcoin SV	\$2,105,185,901	Coin
EOS	\$1,776,801,116	Coin
Binance Coin	\$1,505,922,038	Token
Tezos	\$965,243,938	Coin
Total	\$129,930,256,055	

*Note.* Data retrieved from CoinMarketCap.com

**Figure 1**

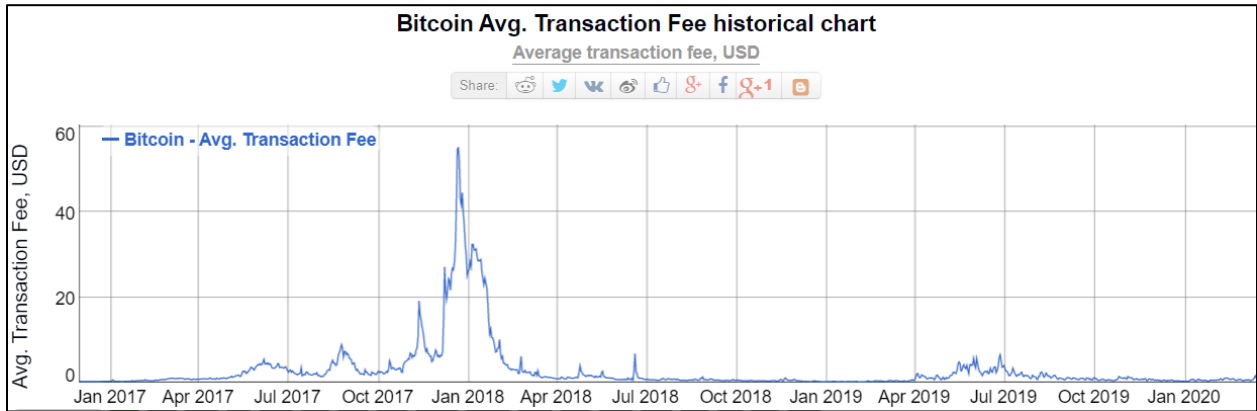
*Bitcoin Value per Coin*



*Note.* Retrieved from CoinMarketCap.com

**Figure 2**

*Bitcoin Average Transaction Fee*



*Note.* Retrieved from BitInfoCharts.com