

# Bitcoin: Currency but not money.

Cryptocurrencies (as illustrated by Bitcoin) in the Electronic Money Directive and the Payment Services Directive in light of the European Court of Justice *Hedqvist* ruling on Bitcoin.

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*“There are far more people using much more money, interdependently involved in a greater complex of debts and credits than ever before in human history. However, despite man’s growing mastery of science and technology, he has so far been unable to master money, at any rate with any acceptable degree of success, and to the extent that he has succeeded, the irrecoverable costs in terms of mass unemployment and lost output would seem to outweigh the benefits.”*

*- Welsh economist Glyn Davis*

## Table of contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2</b>	<b>WHAT ARE CRYPTOCURRENCIES? .....</b>	<b>4</b>
2.1	How do cryptocurrencies work? .....	7
<b>3</b>	<b>MONEY, CURRENCY AND LEGAL TENDER .....</b>	<b>13</b>
3.1	Background and History of Money .....	13
3.1.1	Banking and bills of exchange.....	15
3.1.2	Aztec Money.....	15
3.1.3	The gold standard .....	16
3.1.4	From gold to fiat .....	19
3.1.5	Central Banks and Fractional Reserve Banking .....	19
3.2	Properties and Characteristics of Money .....	21
3.2.1	Unit of Account .....	22
3.2.2	Medium of Exchange.....	23
3.2.3	Store of Value .....	24
3.2.4	Divisible.....	26
3.2.5	Portable.....	26
3.2.6	Acceptable .....	27
3.2.7	Durable .....	27
3.2.8	Scarce.....	28
3.2.9	Stable in value .....	29
3.3	Legal Money: Currency and Legal Tender .....	30
<b>4</b>	<b>CRYPTOCURRENCIES LEGAL STANDING .....</b>	<b>34</b>
4.1	International Regulation.....	34
4.2	Electronic Money Directive .....	35
4.3	Payment Services Directive .....	37
4.4	European Central Bank opinion of virtual currencies.....	43
4.5	Currency vs Asset Resolved: The ECJ ‘Bitcoin’ <i>Hedqvist</i> decision.....	46
<b>5</b>	<b>HARMONISATION OF THE EU FRAMEWORK FOR VIRTUAL CURRENCIES .....</b>	<b>50</b>
<b>6</b>	<b>CONCLUSION.....</b>	<b>53</b>
	<b>TABLE OF REFERENCE .....</b>	<b>56</b>

# 1 Introduction

Money is the prime example of a fungible good, which means that one part or quantity may be replaced by another equal part or quantity in paying a debt or settling an account<sup>1</sup>; in other words, money is a system that facilitates trade by assigning a given value to something that can be exchanged for goods and services at a more or less fix rate.

In modern times money takes the form coins, bills or banknotes and mainly of numbers that move around in electronic bank accounts that record the transactions.

Today all currencies that constitute legal tender are issued by the central bank of a given country or body (such as the European Union) in the form of fiat currency (e.g. Euro, Dollar, Yen, Peso). One thing all fiat currencies have in common is that they operate on the principle of trust.

The modern money paradigm requires people to ‘trust’ that the bank will indeed hold their money and that it will be available when they want to access it. It also requires a common agreement that a given currency issued by a government is actually worth something, as the banknotes and coins themselves are worthless in and of themselves as they are not commodity money as gold was.

The current form of banking<sup>2</sup> practiced in most countries in the world is rather complex, and as the world learned in the 2008 global financial crisis<sup>3</sup>, not without big blowback issues.

The value of different currencies with respect to each other depends on a big number of variables including inflation, a country’s gross domestic product and the trust people have in the fact that the government issuing the currency will pay its sovereign debts<sup>4</sup>.

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<sup>1</sup> <https://www.merriam-webster.com/dictionary/fungible>

<sup>2</sup> Fractional reserve banking.

<sup>3</sup> During the crisis many banks collapsed as there was the equivalent of a bank run on the money market funds, meaning that a large percentage of people who had their money in the bank withdrew it at the same time defunding the bank, which in turn meant the bank could no longer loan money to other people or institutions.

<sup>4</sup> Sovereign debt or government debt is a promise by a national government to repay the face value of a bond plus a periodic interest over a period of time. Government bonds are usually denominated in the country's own currency, in which case the government cannot be forced to default.

This money paradigm had been unrivalled through the 21<sup>st</sup> century (with some people calling for a reversal into commodity money) until October 2008, when the Bitcoin white paper was published<sup>5</sup>.

The paper “Bitcoin: A Peer-to-Peer Electronic Cash System” published under the pseudonym Satoshi Nakamoto introduced a new system which does not rely on a central bank for issuing or controlling the currency, nor does it need commercial banks to hold money in their bank accounts.

This new system challenges the collective assertion of money and rely on cryptography to ensure the integrity of the operations using a public ledger called “The Blockchain”. The paper is highly technical with respect to the cryptographic and mathematical elements that support the system, but is rather simple in describing the process of the transaction.

Since 2008 the adoption of Bitcoin slowly started gaining momentum having reached a historical high of over 11,000 USD on November 29<sup>th</sup> of 2017<sup>6</sup>.

The term coined (some pun intended) for this new type of payments system based on cryptography was *cryptocurrency*.

Bitcoin is the cryptocurrency with most widespread acceptance but it is no longer the only one, as of 2017 there are at least 1, 279 cryptocurrencies in circulation on the internet such as Litecoin (LTC), Ethereum (ETH), Zcash (ZEC) and Ripple (XRP)<sup>7</sup> most of them are based on the Bitcoin cryptographic protocol.

Some cryptocurrencies are designed to have an added value with respect to others, for example the cryptocurrency Ethereum features a smart contract functionality<sup>8</sup> and Anoncoin features enhanced privacy and anonymity in transactions<sup>9</sup>, this thesis will only focus on the payments function that all cryptocurrencies share.

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<sup>5</sup> <https://bitcoin.org/bitcoin.pdf>

<sup>6</sup> <https://www.coindesk.com/price/> consulted on November 30<sup>th</sup>, 2017.

<sup>7</sup> <https://coinmarketcap.com/all/views/all/>

<sup>8</sup> Understanding Ethereum (Report). CoinDesk. 24 June 2016

<sup>9</sup> <https://anoncoin.net/>

Also, this thesis will be largely focused on Bitcoin as the most popular example of a cryptocurrency, but the arguments apply to all forms of cryptocurrencies as long as they are intended to be used as a decentralized payment system relying on cryptography.

This new form of envisioning money has taken regulators by surprise, and the ever-increasing advancements and use of technology, in this case financial technology (FinTech), has put regulators on their back foot and racing to keep up with technological developments.

As cryptocurrencies have been gaining traction both in the amount of people using them (or at least buying them) and in their ‘net worth’ in the world economy<sup>10</sup>, regulators have begun to approach the legal issues arising from the development of this new financial technology.

The impact of cryptocurrencies is very real, to put things into perspective, if you had purchased 1,000 USD worth of BTC in 2010, in May 2017 you would have been approximately 35 **million** USD richer<sup>11</sup>.

There is a well-known story of a developer who in 2010 bought two pizzas with 10,000 BTC which were at the time worth around \$30 USD. Today those same ten thousand bitcoins are worth around \$100,000,000 USD, that is a hundred million U.S. dollars<sup>12</sup>.

Opinions and criteria by legal, economic and financial scholars and experts regarding cryptocurrencies are still very polarized. On the one hand, some people believe that this technology is disruptive to the world monetary and financial stability, or simply an economic and social experiment doomed to fail<sup>13</sup>. On the other, there are those who think cryptocurrencies are the future of the world economy, and the beginning of a new era in the way we conceptualize money and monetary transactions.

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<sup>10</sup> Bitcoin market capitalization is estimated as of November of 2017 to be over 93 thousand million Euros.

<sup>11</sup> <https://arstechnica.com/tech-policy/2017/05/price-of-bitcoin-breaks-records-at-2400/>

<sup>12</sup> <http://uk.businessinsider.com/bitcoin-pizza-10000-100-million-2017-11>

<sup>13</sup> <https://krugman.blogs.nytimes.com/2013/12/28/bitcoin-is-evil/>

Some countries, particularly the United States of America, have taken some steps to regulate the use and trade of cryptocurrencies; however most countries remain silent with regard to cryptocurrency regulation and a minority have outright banned them<sup>14</sup>.

This thesis aims to analyse if cryptocurrencies (as illustrated by Bitcoins) could fit in the existing European Union framework as a form of currency (money) or as a recognized form of payment transaction, based on a legal analysis of the regulation of money and how the technical and economical elements of virtual money fit into our current idea of it.

I will analyse the existing regulation regarding cryptocurrencies with special focus on Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC. OJ L 267, 10.10.2009, (hereinafter Electronic Money Directive or EMD) and Directive 2015/2366/EU of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC. OJ L 337, 23.12.2015., (hereinafter Payment Services Directive or PSD2), and argue from a *Lex Lata* point of view that in light of the European Court of Justice ruling on, Case C-264/14, *Skatteverket v. David Hedqvist* (hereinafter *Hedqvist*) ECLI number: EU:C:2015:718, 22.10.06., there are legal arguments that allow us to consider cryptocurrencies actual currencies and therefore money, or at least a valid payment transaction and that those considerations are within the *ratio legis* of the Electronic Money Directive and the Payment Services Directive.

## **2 What are cryptocurrencies?**

Nowadays there is a lot of discussion regarding both virtual currencies and cryptocurrencies, and while these terms may be used interchangeably they are not strictly the same. In a way, virtual currencies would be the genre while cryptocurrencies are the species.

Virtual currencies started as a form of electronic value, issued and usually controlled by its developers and used among the members of a specific virtual community.

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<sup>14</sup> Bolivia, Ecuador, Kyrgyzstan and Bangladesh.

Virtual currencies have been around for some time and they can be centralized (controlled by the developers) or decentralized; unidirectional / irredeemable when the tokens can't be exchanged back for fiat currency, or bidirectional / convertible when the virtual tokens are redeemable for traditional currencies.

Virtual currencies can be bought using fiat money or they can be generated within the virtual community that accepts them and in the case of cryptocurrencies serve as a means of payment for goods and services.

Centralized irredeemable virtual currencies examples include tokens used for specific online platforms and ecosystems such as the former Facebook Credits which were used to pay for content in the social media platform; World of Warcraft Gold used in the popular online game World of Warcraft and even frequent flyer miles redeemable for airplane travel.

Gift cards are sometimes considered centralized unidirectional virtual currencies insofar as they can only be used in a certain store and represent an electronic storage medium of monetary value, but can't be converted back to fiat money.

The Linden Dollar is an example of a centralized convertible currency which is used in the online virtual world Second Life. The rate of exchange between Linden Dollars and US Dollars is around L\$250.00 for \$1 USD<sup>15</sup>.

Cryptocurrencies are a form of decentralized convertible virtual currencies formed by the merger of cryptography and currency. Cryptography is the practice and study of techniques for secure communication in the presence of third parties called adversaries<sup>16</sup>.

The etymological roots for Cryptography or cryptology come from the Greek words κρυπτός *kryptós*, "hidden, secret"; and γράφειν *graphein*, "writing", or -λογία *-logia*, "study", respectively<sup>17</sup>.

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<sup>15</sup> [https://en.wikipedia.org/wiki/Economy\\_of\\_Second\\_Life](https://en.wikipedia.org/wiki/Economy_of_Second_Life)

<sup>16</sup> Rivest, Ronald L. "Cryptography." In *Handbook of theoretical computer science (vol. A)*, pp. 617-755. MIT Press, 1991.

<sup>17</sup> Liddell, Henry George. *A greek-english lexicon*. Harper & brothers, 1894.



Currency, as I will elaborate at some length in this paper, is a particular ‘brand’ of money usually issued by the central bank of a country or countries (as in the EU) where it constitutes legal tender.

The merge of these concepts gives rise to the now (in)famous term of cryptocurrency, which can be defined as *a digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank*<sup>18</sup>.

To illustrate how virtual currencies fit into the greater money scheme, it is useful to see it in a chart:

Money matrix <sup>19</sup>			Money format		
			Physical	Digital	
				Not based on cryptography	Cryptocurrency
Legal status	Un-regulated	Centralized	Coupons	Internet coupon Mobile coupon	Experimental national cryptocurrencies
			National and local currencies and complementary currencies (Swiss WIR Bank)	Centralized virtual currencies (Linden Dollars)	
		De centralized	Commodity Money (Gold)	Payment Networks Ripple, Stellar	
	Regulated		Banknotes and coins (Cash).	E-money Scriptural and Commercial bank money (deposits)	Experimental national currencies based on cryptography and blockchain technology

\*The cells in blue constitute virtual currencies.

<sup>18</sup> <https://en.oxforddictionaries.com/definition/cryptocurrency>

<sup>19</sup> Created based on the Virtual Currency Schemes paper published by the European Central Bank and from [https://en.wikipedia.org/wiki/Virtual\\_currency](https://en.wikipedia.org/wiki/Virtual_currency).

## 2.1 How do cryptocurrencies work?

Most cryptocurrencies are based on a version of the Bitcoin protocol; therefore I will use Bitcoins as a generic example to conceptually describe the technical function of cryptocurrencies in general, but keeping in mind that the technicalities of each cryptocurrency are based on complex cryptographic and mathematical operations which may vary.

As stated above, the technical function of Bitcoins are rather complex and I would refer enthusiasts who want a better understanding of the technology behind Bitcoins to the technical literature available on the subject.

As the **legal** academic literature on this subject is scarce at best, I will conceptually summarize the functioning of Bitcoins to understand why they serve as a means of payment and are used as a form of virtual currency parallel to fiat money.

Most cryptocurrencies operate based on three main pillars: cryptography for authentication, peer-to-peer (P2P) protocol for exchange and a public ledger called a blockchain for accounting.

A full explanation of how Bitcoins work can be found in the 2009 Satoshi Nakamoto white paper<sup>20</sup>. The following is a conceptual overview.

Bitcoins are intangible pieces of information stored in an electronic wallet identified by a public address accessible through a private key or password, transferred through a decentralized P2P network which registers all verified transactions in a publicly accessible ledger (blockchain) in a pseudonymous manner by means of contributing computing power to the network incentivised by awarding new bitcoins to the miners.

Individual bitcoins are created through a process known as ‘mining’ by means of contributing computing power to the network to verify the transactions through the publicly available P2P protocol, which in turn, awards new bitcoins to the miners, incentivising them to keep computing power, thus creating a cycle to keep the system running.

Let’s unpack this summary to better understand how the whole system works:

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<sup>20</sup> <https://bitcoin.org/bitcoin.pdf>

Bitcoins are produced in a decentralised manner by means of a publicly available peer-to-peer (P2P) protocol software. Because of this decentralised feature, the emission of bitcoins is not controlled by any State, authority, central bank or individual.

Anyone who downloads the appropriate software, can (in theory)<sup>21</sup> produce or ‘create’ bitcoins. The procedure for verifying bitcoin transactions is intrinsically connected to the ‘creation’ of new bitcoins.

The production of new bitcoins is called ‘mining’ as a reference for mining gold and other precious metals. ‘Miners’ are the people, or more accurately, the central processing units (CPU’s) in their computers that confirm bitcoin transactions and in doing so they are in turn awarded bitcoins.

The way this works is as follows: All transactions must be registered in a digital publicly accessible ledger called the blockchain. The blockchain is analogue to an accountant’s book where all the transactions are registered specifying the payer, the payee and the amount transferred.

However, this ledger is not held by a single accountant or entity but is decentralised through a P2P network; in this way, all the accountants have the same copy of the book which is updated instantly to verify its authenticity.

A bitcoin transaction is not ‘complete’, (if thought about in terms of credit cards, ‘does not go through’) until it is registered in the blockchain. When a transaction is registered in the blockchain that transaction is final and irreversible.

But before any transaction is completed and recorded in the blockchain, it must be verified whether the payer actually owns the amount of bitcoins to be transferred. This ensures that there is no double spending (e.g. a malicious user trying to spend their bitcoins to two different recipients at the same time).

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<sup>21</sup> While in theory anyone could mine bitcoins with the appropriate software, considerable computing power is needed to actually have a bitcoin reward.

To ensure the validity of the transactions and maintain the blockchain integrity (that is to say no one is double spending their bitcoins) the computers on the network must solve a puzzle that is difficult to solve but easy to verify if it is correctly solved.

This verification process is a highly sophisticated cryptographic procedure that relies on a proof-of-work<sup>22</sup> puzzle.

Miners use computers processing power to compete to solve the proof-of-work puzzle first, and whoever solves the puzzle first is awarded a determined number of bitcoins.

A way to picture the puzzle is to imagine a complex Rubik's cube: difficult to solve but very easy to verify if it is solved correctly.

Now imagine the Rubik's cube is made of Lego pieces that will attach to each other to form a Lego block-chain, but the Lego shape of every cube will change, and will attach to another cube if, and only if, all the Legos on the same side are the same **colour and shape** as the cube that was solved before.

This way, for a miner to be able to register a transaction in the blockchain, each colour coded side will have to match perfectly to the block already registered, in such way that if any square of the grid does not match perfectly with the registered block, the cube won't be able to attach (register) to the blockchain, and no subsequent block will be able to attach to the failed or fake block.

Once a miner in the Bitcoin network solves the puzzle, the rest will confirm that the transactions are valid, ensuring that the public ledger (the blockchain) is neither forged nor falsified based on the consensus of the total amount of the computing power that verifies the correct solution of the puzzle.

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<sup>22</sup> A proof of work is a piece of data which is difficult (costly, time-consuming) to produce but easy for others to verify and which satisfies certain requirements. Producing a proof of work can be a random process with low probability so that a lot of trial and error is required on average before a valid proof of work is generated.  
[https://en.bitcoin.it/wiki/Proof\\_of\\_work](https://en.bitcoin.it/wiki/Proof_of_work)

The consensus upon the solution of the puzzle and, therefore, the validity of the blockchain is reached on the grounds of the majority of the processing power of the users ('one CPU – one vote').

In other words, the computers will vote 'yes' if they found that the solution to the puzzle is correct AND matches the previous cube. If a majority of the CPUs agree, the block will be added to the blockchain; if not, it will be discarded and the transaction will not go through.

Solving the puzzles requires considerable computing power (imagine a 1,000 x 1,000 Rubik's cube), and computer power is costly. To encourage miners to contribute their computer power, the network has a built-in incentive: it makes them compete to solve the puzzles and the user who first solves the puzzle records the transaction in the blockchain is rewarded via the Bitcoin protocol with a certain amount of bitcoins.

To have an idea of how much processing power CPUs need to solve the puzzles, the Bitcoin Network uses a measuring unit called the 'hash rate'. When the network has a hash rate of 10 Th/s<sup>23</sup>, it means it could make 10 billion<sup>24</sup> calculations per second to algorithmically solve the puzzle.

As of May 2017, the hash rate of the Bitcoin Network has reached over 4 Eh/s<sup>25</sup> meaning that it can make 4 trillion<sup>26</sup> calculations per second, surpassing the capacity of most supercomputers today<sup>27</sup>.

Every time a miner successfully creates a hash<sup>28</sup>, the blockchain is updated by registering a block of operation, and the miner get a reward (in the form of a certain amount of bitcoins) as an incentive to keep mining, and therefore, keep the transactions working.

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<sup>23</sup> Terahash per second.

<sup>24</sup> Billions used as  $10^{12}$  or ten to the twelfth power.

<sup>25</sup> Exahash per second.

<sup>26</sup> Trillion used as  $10^{18}$  or ten to the eighteenth power.

<sup>27</sup> <https://news.bitcoin.com/bitcoin-hashrate-four-exahash-per-second/>

<sup>28</sup> A hash function is a mathematical function that allows to map data of arbitrary size to data of fixed size in a way that is easily verifiable. The values returned by a hash function are called hashes. A cryptographic hash function allows one to easily verify a given **hash value**, but if the input data is unknown, it is deliberately difficult to reconstruct it by knowing the hash value. It may be used to simultaneously verify both the data

To control the amount and the rate of new bitcoins mined (or created), the protocol code adjusts the difficulty for solving the puzzle every 2016 blocks, a number that was calculated so that in average a block is generated every 10 minutes. This way, if the coins are on average generated too fast since the last adjustment, the difficulty is increased, but if they are generated too slow it is decreased.

Along with the increasing difficulty, the amount of coins rewarded for recording a block in the blockchain changes in accordance to a preestablished formula so every 210,000 blocks the amount of coins awarded or mined will be cut in half; this is known as “halving”.

The reward for adding a new block was initially set to 50 bitcoins. In November 2012 the first 210,000 blocks were added and the reward fell to 25<sup>29</sup>. In July 2016, 420,000 blocks had been added and the reward fell again to 12.5<sup>30</sup>. It is calculated that the next halving where the reward will fall to 6.26 will occur in 2020<sup>31</sup>.

The protocol code dictates that 21 million coins will be released over the course of bitcoin's lifecycle. Assuming mining power remained constant, it is projected that the last bitcoins will be mined in 2140<sup>32</sup>.

The mining process also acts as a deterrent against attack. If an attacker wanted to alter the blockchain (in order to double spend) he or she would need to control over 51% of the computing power in the network to “beat” the honest nodes verifying the blockchain, this would require a enormous amount of CPUs (as seen in the figures of hash rates shown above).

Since contributing computer power is rewarded with bitcoins, supposing someone had such a huge amount of power available, it would be more profitable to supply that computing power to the network and directly mine the bitcoins than trying to gain control of the network for fraudulent purposes.

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integrity and the authentication of a message. In other words, just because you know the password decoder doesn't mean that by analyzing it you will get the password.

<sup>29</sup> <https://www.coindesk.com/making-sense-bitcoins-halving/>

<sup>30</sup> <https://bitcoin.stackexchange.com/questions/45832/what-date-does-the-2016-halving-happen-at>

<sup>31</sup> <http://www.bitcoinblockhalf.com/>

<sup>32</sup> [https://en.bitcoin.it/wiki/Controlled\\_supply](https://en.bitcoin.it/wiki/Controlled_supply)

Now that the process of verifying the transactions is explained, I will explain the transaction itself.

First the user must create an electronic wallet to send and receive bitcoins. The created wallet has both a private key and a public key. The blockchain records only the public key of the payer and the payee, but in order to access the public key, the owner needs to ‘open it’ with the private key.

This works like an e-mail address, anyone who knows an e-mail address (public key) can send e-mails to it, but only the person who has the password (private key) can retrieve the e-mails sent to that address and only with the password can e-mails be sent from that address.

The payer and the payee **do not have to participate** in the mining procedure. The only information the payee has to give to the payer is his or her public address. The payer must sign the transaction with the private key and broadcast a message to the decentralised Bitcoin network that his or her public address is sending a certain amount of bitcoins to the public address of the payee, for the miners to confirm the transaction and register it in the blockchain.

Both parties can see each other’s addresses, as well as anyone who has access to the directory (blockchain) but that information doesn’t reveal either the private key nor the person who owns or controls the address.

Bitcoin addresses (public keys) are essentially a string of letters and numbers, which for practical purposes are usually converted to a QR code that the payer can simply scan.

This means that payer and the payee, may or may not know each other’s real identity and the people who view the publicly accessible blockchain don’t know the identity of the persons involved in the transaction being registered unless they know who the public address belongs to.

Matching public addresses to real people can be very hard, because each person can have more than one public address. This feature has led to the widespread believe that bitcoin transactions are anonymous; however they would be more accurately described as pseudonymous<sup>33</sup>.

Because the system is built to work without the intervention or intermediation of a third party, there is no arbiter to solve any problem or claim, this means that if a person loses in any way the private key associated to the public address (which actually holds the bitcoins), those bitcoins are irreversibly lost and there would be no way of recovering them. It would be like burning cash.

Finally, it is important to mention that there are three independent ways in which a person may acquire Bitcoins (or any cryptocurrency for that matter).

1. Through mining as described above;
2. By buying bitcoins in a Bitcoin exchange with fiat money<sup>34</sup>, and
3. Being paid for goods and services with bitcoins.

### **3 Money, Currency and Legal Tender**

There is an ongoing debate in financial, economic, technological and legal fields if cryptocurrencies constitute (or should constitute) money or not.

Because the term ‘money’ is a representation of an abstract idea, to address this question is important to consider the origins of that idea, the current understanding of what is regarded as money and how that understanding is reflected in the regulation.

#### **3.1 Background and History of Money**

Virtual money and cryptocurrencies represent the newest forms of conceptualizing money, however questions regarding money, its meaning, value and institutions are far from new.

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<sup>33</sup> Rizos, Euripides. "The Consumer's Right of Withdrawal in case of Payment with Bitcoins." *Oslo Law Review* 2, no. 01 (2016): 1-26.

<sup>34</sup> Bitcoin exchanges in general operate the same way as fiat currency exchanges.



Given that the world throughout its history has experienced many changes to monetary policies, and that they have become more complex and better documented as we move closer to our time, it is relevant to review some basic elements and data concerning the history of money, if for no other reason than to learn from issues that have arisen in the past which could shine a light on the direction present day policies may take, in a manner best described by Welsh economist Glyn Davis in his book *A History of Money From Ancient Times to the Present Day*:

*“Around the next corner there may be lying in wait apparently quite novel monetary problems which in all probability bear a basic similarity to those that have already been tackled with varying degrees of success or failure in other times and places.*

*Yet despite the antiquity and ubiquity of money its proper management and control have eluded the rulers of most modern states partly because they have ignored the wide-ranging lessons of the past or have taken too blinkered and narrow a view of money.”<sup>35</sup>*

The use of money is almost as old as civilization, but it hasn't always had the same form. Thousands of years ago a precursor of money was most likely cattle<sup>36</sup> which was used in trade.

Around 3,000 to 2,000 BC a primitive form of banking began in Mesopotamia and its neighbouring civilizations by simply keeping accounts and records of owed and loaned cattle and grain<sup>37</sup>.

The use of money came almost hand in hand with the development of banking. Even in ancient Egypt the practice of settling loans through banks had become a popular recourse, with payments being transferred from one account to another without 'physical' forms of money trading hands<sup>38</sup>.

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<sup>35</sup> Davies, Glyn. *A History of money From Ancient Times to the Present Day*. University of Wales Press, 2010. pp xiv.

<sup>36</sup> Davies, *op. cit.* pp 43-44.

<sup>37</sup> Davies, *op. cit.* pp 49 – 50.

<sup>38</sup> Rostovcev, Mihail Ivanovic. *The Social and Economic History of the Hellenistic World*, by M. Rostovtzeff. Clarendon Press, 1941.

### 3.1.1 Banking and bills of exchange

In the renaissance period, Italian merchants began trading ‘bills of exchange’ which constituted written documents ordering the payment of a certain amount of money to a certain person at a certain time and place.

This transaction represented the sale of one kind of money for another kind that would be paid in another currency at a specified future date. These bills of exchange worked also through a system of currency exchange, and therefore the Italian bankers were also organized into a guild of currency exchangers. The system roughly worked like this:

*“The banker gave him the necessary money in cash, in the florins of Florence or the ducats of Venice, and they both signed the bill of exchange whereby the merchant agreed to pay a slightly higher amount of money in another currency at the next fair in Lyons or Champagne, France”<sup>39</sup>.*

The system of bills of exchange was based (much like today's fiat money system) in the honesty and goodwill of the parties involved, so when the government borrowed excessively and became burdened with debt it had the power to simply cancel those debts<sup>40</sup>.

Italian banking families were crushed from defaulted loans, but the banking system itself survived and it would be revamped in the 15<sup>th</sup> century<sup>41</sup>.

### 3.1.2 Aztec Money

The concept of money has not been exclusive to Indo European and Asian societies in the “Old World”. Thousands of kilometres across the Atlantic Ocean, the Aztec civilization flourished in Mesoamerica and they too came up with a monetary system based on ‘commodity money’ albeit with a substantially different idea for the value of commodities.

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<sup>39</sup> Weatherford, *op. cit.* p. 91.

<sup>40</sup> Sovereign debt or government debt is a promise by a national government to repay the face value of a bond plus a periodic interest over a period of time. Government bonds are usually denominated in the country's own currency, in which case the government cannot be forced to default.

<sup>41</sup> Weatherford, *op. cit.* pp. 95 – 96.

A major and interesting difference between European and Aztec societies in terms of money was the **concept of value** and its corresponding **medium of exchange**.

Aztecs did not assign a high value to precious metals; to them it was natural resources that had 'real' value and instead of coins, Aztecs used cocoa seeds or beans as their form of money.

These cacao beans are an early example of what we now call commodity money and was used as a complementary tool for the barter system<sup>42</sup>.

Commodity money consists of objects that have value in and of itself. In this sense cattle, precious metals and cocoa beans are all considered forms of commodity money, but while precious metals derive their value more from the fact that they are scarce and ornamental, cocoa beans (which for the Aztecs were abundant and an item of consumption) retain a value in and of itself since they can always be consumed regardless of their value in the market.

Despite the value that commodity money may have in and of itself, its value as a form of money is still dependant and subjective to whatever the government or society using it assigns to it.

*“Chocolate, like all other types of money, has no inherent value outside of a cultural context. In order for it to have value, people have to want it and know how to use it. The Mesoamerican love of chocolate as a food and as a means of exchange contrasted greatly with the values of the first European...<sup>43</sup>”*

### 3.1.3 The gold standard

Despite civilizations long history with precious metals as a form of 'commodity money', at the beginning of the nineteenth century no modern state had developed a real gold standard system<sup>44</sup>.

The first legal steps towards the establishment of the gold standard, understood as “*a monetary standard under which the basic unit of currency is defined by a stated quantity of gold and*

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<sup>42</sup> Weatherford, *op. cit.* p. 36

<sup>43</sup> Weatherford, *op. cit.* p. 36

<sup>44</sup> Davies, *op. cit.* p 282 - 284

*which is usually characterized by the coinage and circulation of gold, unrestricted convertibility of other money into gold, and the free export and import of gold for settling of international obligations*"<sup>45</sup> took place in England in 1821 when the Bank of England was required to redeem its notes in gold.

In 1844 the Bank Charter Act (Peel's Act) established that Bank of England notes were fully backed by gold and became the legal standard, effectively establishing bank notes or bills redeemable in gold as British money.<sup>46</sup>

In the period between 1850 to 1914, the gold standard became the prime form of commodity money keeping with the centuries old concept of money having intrinsic value, and was seen by 19<sup>th</sup> century contemporaries as "*permanently guaranteed by the very degree of near-perfection so obviously achieved by such an ideal form of currency*"<sup>47</sup>.

The gold standard effectively 'anchored' the value of a money to gold. This had many effects over the degree of control the government and the banks can had on the economy as it necessitates that all or most of the paper money in circulation be backed up by gold, disallowing the government (or bank) to simply 'print' more money inflating the currency and thus, devaluating it.

In 1933, during the American great depression US President Franklin D. Roosevelt responding to a run on the gold reserves at the Federal Reserve Bank of New York forced all the banks and citizens to turn in all their gold to the Federal Reserve and banned the exportation of gold.

This move allowed the US to hold the world's largest supply of gold reserves, which are kept to this day in the famous Fort Knox and allowed the government to pump money into the economy and lower interest rates.

A hundred years after the Bank Charter Act in the United Kingdom and with the world recovering from World War II, in July 22<sup>th</sup> 1944, the International Monetary Fund (IMF) came about

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<sup>45</sup> <https://www.merriam-webster.com/dictionary/gold%20standard> (consulted on October 1<sup>st</sup>, 2017)

<sup>46</sup> Peel's act permitted the Bank of England to issue notes up to a specific amount with no gold backing, anything above that amount had to be fully backed by gold.

<sup>47</sup> Davies, *op. cit.* p 356.

as a result of the United Nations Monetary and Financial Conference held in the United States city of Bretton Woods.

The articles of agreement of the IMF introduced a par value system that determined the value of currencies in relation to gold. It became known as the Bretton Woods system:

Article IV of the articles of agreement of the IMF stated:

- (a) *The par value of the currency of each member shall be expressed in terms of gold as a common denominator or in terms of the United States dollar of the weight and fineness in effect on July 1, 1944.*
- (b) *All computations relating to currencies of members for the purpose of applying the provisions of this Agreement shall be on the basis of their par values.*<sup>48</sup>

The Bretton Woods system effectively made currencies convertible to gold, but more specifically it made currencies convertible to US dollars which were convertible to gold. This meant that all US dollars were effectively redeemable in gold.

The era of the gold standard was the last time the world's economic and financial systems at large relayed on 'commodity money'. The gold standard model has been referenced by many economists and some lawyers as having a lot of similarities to cryptocurrencies model (Bitcoin in particular).

These similarities rely mainly on the fact that bitcoins are scarce, as there will be only a finite amount of them mined and they are "hard to mine", the impossibility of establishing a fractional reserve system and with that an impossibility to inflate the currency.

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<sup>48</sup> [https://fraser.stlouisfed.org/scribd/?item\\_id=7570&filepath=/files/docs/publications/books/1948\\_state\\_bwood\\_v1.pdf&start\\_page=954](https://fraser.stlouisfed.org/scribd/?item_id=7570&filepath=/files/docs/publications/books/1948_state_bwood_v1.pdf&start_page=954)

A particular study produced by the Bank of Canada<sup>49</sup> details a series of conjectures of how a “Bitcoin Standard” might operate based on the many similarities with an economy based on the gold standard.

#### 3.1.4 From gold to fiat

Just like the United Kingdom had the central role in stabilising the gold standard and the United States of America in making it an international standard, the latter would also have the primary role of ending it.

The Bretton Woods system had made US dollars convertible to gold, but while the total number of U.S. dollars circulating in the United States and abroad steadily grew, the U.S. gold reserves backing those dollars steadily shrunk.

By 1966, foreign central banks and governments held considerable amounts of millions of U.S. dollars and if they tried to convert even a quarter of those holdings to gold at one time the United States would not have been able to honour its obligations.<sup>50</sup>

After some European countries had left the Bretton Woods system, and being clear the U.S. could not redeem its dollars to gold, in 1971, United States President Richard Nixon unilaterally cancelled the direct international convertibility of the United States dollar to gold.

The aforementioned decoupling of U.S. dollars from gold was part of a series of economic measures taken by the United States which became known as the ‘Nixon Shock’ that effectively ended the gold standard and with it, the era of commodity money to enter into today’s *fiat money* phase.

#### 3.1.5 Central Banks and Fractional Reserve Banking

Fiat money is no longer backed by any commodity that has value in itself. Money has value because of two factors: (i) people agree that it does and (ii) trust that the central bank will enact responsible financial and monetary policies that will maintain the peoples trust in a currency.

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<sup>49</sup> Weber, Warren E. *A Bitcoin standard: Lessons from the gold standard*. No. 2016-14. Bank of Canada Staff Working Paper, 2016.

<sup>50</sup> [http://www.imf.org/external/np/exr/center/mm/eng/sc\\_sub\\_3.htm](http://www.imf.org/external/np/exr/center/mm/eng/sc_sub_3.htm)

The trust element is very important as now, the central bank technically has an unlimited capacity to ‘print’ money, however recklessly putting money into circulation, will inflate the currency and make it less valuable which leads to the currency being devaluated.

This trust, also enables the banks to engage in a practice called fractional reserve banking, by which banks hold reserves in amounts that are less than the amounts of their deposit liabilities, which in turn permits the money supply to grow beyond the amount of the underlying base money originally created by the central bank<sup>51</sup>, thus creating new money.

Australian economist Steve Keen explains it well:

*“Money creation starts with the government injecting “fiat money” into the economy – say by giving a welfare recipient \$100 in cash. That recipient then deposits the cash in a bank, which hangs on to a government-mandated fraction of it (the “Reserve Requirement”) – say 10 per cent or \$10 – and lends out the rest to a borrower. The borrower then deposits that \$90 in another bank, which does the same thing – hangs onto 10 per cent of the \$90 or \$9, and lends out another \$81 to another borrower.*

*The process repeats ad infinitum, and in the end a total of \$1,000 is brought into existence: the original \$100 in cash, plus \$900 in credit money created by the private banking sector (matched, of course, by \$900 in debt).”<sup>52</sup>*

Some scholars like Adair Turner, former UK financial regulator takes a slightly different approach and gives further explanation on the fractional reserve system, he said:

*“Banks do not, as too many textbooks still suggest, take deposits of existing money from savers and lend it out to borrowers: **they create credit and money ex nihilo***

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<sup>51</sup> Abel, Andrew B., Ben S. Bernanke, and Dean Croushore. "Macroeconomics (5th ed)." Boston: Pearson Education, Inc. (2005). pp. 522–532

<sup>52</sup> <http://www.theaustralian.com.au/business/business-spectator/the-myth-of-the-money-multiplier/news-story/14f31261e897bb9e849344838103822f>

*extending a loan to the borrower and simultaneously crediting the borrower's money account*"<sup>53</sup> (emphasis added).

Some have described this last phase of monetary systems in which there is a full-fledge central banking with pure fiat money issuance having no tie to gold, as a system that allows reckless spending and the rule of unrestrained government characterised by hairbrained banking practices<sup>54</sup>.

Some argue that cryptocurrencies are the begging of a new phase in monetary systems that may compensate or improve on some of these criticisms by first and foremost taking banks out the monetary equation. Only time will tell.

### **3.2 Properties and Characteristics of Money**

Having laid out a very brief but illustrative summary on the history of money, we must now analyse the properties and characteristics of fiat money as understood by economists today.

The topic of properties and characteristics of money could be the object of a full and independent study within the field of economics, but for the purposes of this thesis I will centre in those that have achieved a wide consensus in the economic studies community to see if those standards can be applied to cryptocurrencies.

The definition of money varies from source to source and in many cases the definition includes several references to the underling properties of money. One of the most complete and descriptive definitions of money is one form the Collins Dictionary of economics:

*“money: an ASSET that is generally acceptable as a medium of exchange. Individual goods and services, and other physical assests, are ‘priced’ in terms of money and are exchanged using money as a common denominator rather than one GOOD, etc., being exchanged for another (as in BARTER). The use of money as a means of payment enables an economy to produce more output because it facilitates*

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<sup>53</sup> Turner, Adair. "Credit, money and leverage: What Wicksell, Hayek and Fisher knew and modern macroeconomics forgot." In *Stockholm School of Economics Conference Towards a Sustainable Financial System*, Stockholm, vol. 12. 2013.

<sup>54</sup> White, Lawrence H. "The Rule of Law of the Rule of Central Bankers." *Cato J.* 30 (2010): 451.



*SPECIALIZATION in production and reduces the time spent by sellers and buyers in arranging exchanges. Other important functions of money are its use as a store of value or purchasing power (money can be held over a period of time and used to finance future payments), a standard of deferred payment (money is used as an agreed measure of future receipts and payments in contracts) and as a unit of account (money is used to measure and record the value of goods or services, e.g. GROSS NATIONAL PRODUCT, over time). See LEGAL TENDER”<sup>55</sup>*

Like the one above, most definitions of the concept of money rely on three properties that a thing must have to be considered money. The thing must represent a unit of account, a medium of exchange and a store of value.

### 3.2.1 Unit of Account

A unit of account is the concept that whatever money is it must be able to serve the function of accounting, where you can count a determined number of items of money with a certain value in itself.

When asked how much is 1 Euro worth, the value will come either in the form of another currency or measured by the acquisitive power of that unit of account, either in goods or services (e.g. 100 Euros is worth one phone, or 100 Euros is worth 1 hour of legal services).

In that sense, it wouldn't be rare if someone answered that 100 Euros is worth *one hundred Euros*, implying that money has value in itself.

The property of a unit of account also serves to make money a *middle man* in a barter so that two goods or services can both be priced in the same unit of account, in such way that one may trade chairs for legal services without having a necessity for what economist call *a double coincidence of wants*, meaning that the producer of chairs wants my legal services and I want his or her chairs.

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<sup>55</sup> *Collins Dictionary of Economics*, 4th ed. S.v. "money." Retrieved October 9 2017 from <https://financial-dictionary.thefreedictionary.com/money>

With a unit of account, I can offer my legal services to whoever wants them and be paid a certain amount of money which I can then convert to chairs by buying them at a price in units of account of that money.

This of course means everything else is priced (or has value) based on that unit of account.

This property of money coupled with technology also enables debts to be kept without having the actual token of such money. In other words, one does not need to hand over a 1,000 Euros in cash to the bank to have a positive balance with that bank, it is only needed to have a balance sheet with a deposit expressed in the unit of account.

In fact, most people today earn and spend money without ever touching it. Economists estimate that **only 8 percent of the world's currency is physical cash**, the rest exists only in computer hard drives of banks and other financial institutions<sup>56</sup>.

Cryptocurrencies certainly represent a unit of account in the form of 1 bitcoin, 1 ether, 1 litecoin in the same form that fiat currencies do in the form of 1 dollar or 1 euro.

The fact that cryptocurrency values can be expressed in units of fiat money does not mean that they are interdependent. For example, the Ether cryptocurrency is normally exchanged for bitcoins and not for fiat money.

### 3.2.2 Medium of Exchange

For a unit of account to be able to serve as money, it must also be a medium of exchange, meaning that both parties must assign the same value to a determined unit of account.

This way, one can say that an apple is worth 1 Euro and a computer is worth a 1,000; however, that wouldn't necessarily mean that one computer is worth 1,000 apples, nor does an apple can be converted into a medium of exchange on its own.

In a *pure* form of barter, one may assign to the items or services being exchanged any value with regards to the service or products being exchanged so that one may offer 100 hours of

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<sup>56</sup> <https://money.howstuffworks.com/currency6.htm>

legal services in exchange for a car, but this barter would be cumbersome to have every time, as different legal services and different cars have different prices depending on their specificity and other factors. The problem is solved by representing the value of both things in money.

All parties to the exchange assign the same value to a determined unit of account and that way all goods and services can be converted or translated to a standardized value which serves as a medium of exchange.

It is possible to have a medium of exchange that is not necessarily money, as long as the parties are willing to assign the same value to it. There can be a token that serves as a medium of exchange which is not money, but all money must serve as a medium of exchange.

The legal approximation for something that serves as a medium of exchange is a *fungible* good. Legally if something is fungible it can be exchanged for another of the same kind without having to be the same item. That way one can say that a cow is fungible as long as it can be exchanged for **another** cow of the same characteristics in the future.

There is wide consensus that cryptocurrencies do represent a medium of exchange even if they are not considered money.

By admitting that cryptocurrency tokens do not have any intrinsic value, it is only a matter of whether people accept it as a unit of account that enables it to function as a medium of exchange.

As long as a sufficient amount of people accept a cryptocurrency as a means of payment it will work as a medium of exchange.

### 3.2.3 Store of Value

Being a store of value means that money will retain its value in the future, so if 100 Euros has an acquisitive power of 1 phone, in 1 year those same 100 Euros should have a similar purchasing power.

If the purchasing power is less than before so now the same phone costs 120 Euros, money has then lost value or devaluated, but if the purchasing power is more and phone now costs 80 Euros, then money has earned value or revaluated with relation to that phone.

Historically, the store of value function of money has probably been the most diverse, when it comes to commodity money, as it relates to the value placed in the commodity money represents. As shown before, different civilizations have placed different values to different commodities, including cattle, grain, cacao beans, gold and silver.

A difference between commodity money and fiat money is that, when using commodity money, the functions of medium of exchange and store of value can 'merge' into one token, this is seen throughout history as coins were produced using precious metals, and in that case the medium of exchange (a coin) had the store of value in itself (gold or silver).

The property of store of value used to be pretty straight forward in the times of Bretton Woods system and the gold standard, as all currencies were paired to gold in a fixed rate of 1 US dollar equalling 1/35<sup>th</sup> of an ounce of gold.

Back then, currencies either devaluated or appreciated with relation to their parity to gold. The value stored in money now a day is complex as it is not backed by anything tangible.

Because of this, the store of value of money changes from one currency to another, which in turn depends on a floating exchange rate (as opposed to a fixed rate) by which each currency's store of value is usually determined in other currencies (e.g. 1 euro is worth 2 US dollars; 10 Norwegian Kroner are worth 1 Euro).

Cryptocurrencies represent a store of value in the same way that fiat currencies do, they are worth something simply because the parties agree that they do, just as a 1 Euro banknote or a 1 U.S. dollar bill is worthless if it cannot be redeemed for goods or services.

Having established the properties of money, I will now enumerate the characteristics which something must possess to be considered money, as some things might have all the properties of money but not have the necessary characteristics for it to be a viable form of money.

### 3.2.4 Divisible

Money must be divisible, that is, it must be able to fraction itself into smaller parts.

This division can have many forms but probably the most widely used is the decimal system by which each currency is divided into decimals in such way that 100 cents make 1 whole of the currency.

Cryptocurrencies being digital are fully divisible, in the case of Bitcoins, 1 bitcoin is divisible to the 8th decimal place (0.00000001 bitcoin), meaning that it is divisible in 100,000,000 units. The smallest unit of Bitcoins is called 'satoshi'.

### 3.2.5 Portable

Money must be portable, meaning that it must have the capacity to be carried around easily, that is not to say that whatever gives the money value must have the same mobility.

This is one of the most visible characteristics of the concept of money and its basic and intrinsic relation to accounting.

A good example to illustrate this is gold. Even though gold has served as a prime commodity regarding money and its value, gold is heavy and it is not something that can be easily moved around.

It is much more practical to have a piece of paper that can represent a certain amount of gold, and move the paper around as a trade instrument instead of moving around with 200 or even 20 kilograms of gold.

Cash is an interesting example because while small number of banknotes or bills can be easily carried around in a wallet or clip, when large figures of money are involved bills will quickly accumulate and become less and less portable. So much so, that it is well known that many criminal organizations who deal with very large amounts of illegally acquired money in cash have resorted to weighting the money rather than counting it.

However as stated before, most of the money that exists today is digital and exists only in computers and because numbers are abstract concepts, they can be ‘moved’ by simply writing them down in different places.

Cryptocurrencies being digital are almost as portable as abstract numbers, vastly different amounts of bitcoins can be carried in a small USB device, or (the files) can even be e-mailed from one place to another, making cryptocurrencies as portable if not more than fiat money.

### 3.2.6 Acceptable

An apparently obvious characteristic of money is that others must accept it as payment regardless of the intrinsic or perceived value of the item.

A curious example would be to think of anti-matter, Scientists claim that antimatter is the costliest material to make. In 2006, scientist Gerald Smith of NASA estimated \$250 million U.S. dollars could produce 10 milligrams of positrons or anti-electrons (\$25 USD billions per gram)<sup>57</sup>.

And yet no one (except NASA perhaps) would really take a milligram of anti-matter to settle \$250 million USD debt.

Different countries regard different currencies as money for legal purposes, however in most parts of the world people are free to trade and accept as payment any form of currency, token, artefact or service, as long as it is not deemed illegal (e.g. drugs, sex, stolen art).

Cryptocurrencies acceptance is still low, however some of the world’s largest companies accept payments in bitcoins including Microsoft, PayPal, DISH Network and Expedia<sup>58</sup>.

### 3.2.7 Durable

Money must be durable for a set amount of time, in order for it to preserve its value over time, regardless of the relative value money may have in relation to other currencies or even to itself.

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<sup>57</sup> [https://www.nasa.gov/exploration/home/antimatter\\_spaceship.html](https://www.nasa.gov/exploration/home/antimatter_spaceship.html)

<sup>58</sup> <https://www.fool.com/investing/2017/07/06/5-brand-name-businesses-that-currently-accept-bitc.aspx>  
<https://www.lifewire.com/big-sites-that-accept-bitcoin-payments-3485965>

If the material money is made of is not durable, the simple passage of time would render it worthless.

Since cryptocurrencies are digital they can be easily preserved in that form, they can even be held in multiple devices at the same time (this does not mean they can be double spent), making them at least as durable as fiat money in its electronic form.

### 3.2.8 Scarce

In order for money to be valuable (and remain valuable) it must be scarce, that is because something readily available to everyone wouldn't have any value relative to itself as anyone could produce it or have it.

Fiat money scarcity is controlled by Central Banks, they decide how much currency to put into circulation, or as it is commonly referred, how much money to print.

As fiat money becomes less scarce it becomes less valuable. Printing or putting more money in circulation without changing the underlying value is an old tactic, in the past it was known as debasing, today it is known as inflation.

One of the most typical examples of currencies that have lost their relative value, and hence have stopped being money in any practical sense is the Zimbabwe dollar, which was introduced in 1980 with a parity of 1:1 with the US dollar.

The currency's value eroded rapidly over the years and by July 2006, the parallel market value of the Zimbabwean dollar fell to Z\$1,000,000 (one million Zimbabwe dollars) for £1 GBP.

This was reflected in the now infamous 100 trillion dollar banknote, that has since been considered as prime example of a worthless currency despite being legal tender.



### 3.2.9 Stable in value

Having a stable value refers to the acquisitive power that money has over a period of time. As with the scarcity, the stability of money has a lot to do with inflation. All currencies under a fractional reserve system are inflationary and thus will be worth less and less as time goes by.

Because of this, it is important to stress that a “stable value” is relative, all government currencies are worth less today than what they were fifty years ago.

That is why, at the very least, an adjustment for inflation needs to be considered when discussing the value of things in the past.

Using an inflation calculator<sup>59</sup> one can see how \$250 USD in 1950 had the same buying power as \$2,557 USD in 2017, and £250 GBP of 1950 have the same buying power as £8,125 GBP in 2017.

This is probably the most contended characteristic of money with regards to cryptocurrencies today, as their price with regards to fiat currencies fluctuates greatly, even though unlike fiat currencies, most cryptocurrencies are deflationary.

Because there is a limited number of tokens, cryptocurrencies will tend to be deflationary, meaning their purchasing power will increase with time.

Cryptocurrencies value depends greatly (as do fiat currencies to a lesser degree) on speculation in the financial markets. However, it is curious to note that unlike fiat currencies, cryptocurrencies have steadily gain purchasing power over time.

There isn't enough data to consider whether or not cryptocurrencies will stabilize sufficiently in relation to their fiat currency counterparts to be considered money, as there are many

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<sup>59</sup> This calculator shows inflation during the selected time frame. Using the Consumer Price Index (CPI) data provided by the Bureau of Labor Statistics of the United States government. The CPI shows how the cost of products has changed over time. This includes everything from a gallon of gas, milk, bread, etc. The inflation rate is calculated from the beginning of the year. Other inflation calculators might use inflation at different times of the year or an average annual inflation, so they might show slightly different results.



economists like Warren Buffet who predict that there is a Bitcoin bubble that will violently burst and will drive their price down significantly<sup>60</sup>.

### **3.3 Legal Money: Currency and Legal Tender**

Once having laid down the main economic principles of money, is time to see the legal aspects of it.

As it has been pointed out through this thesis, money is an abstract construct and because of it there are many types, kinds or forms of money. Therefore, it is important to look at the legal distinctions of money and what they mean.

The shortest definition of currency I can come up with is: *Legal money*, or money that constitutes legal tender in a specific jurisdiction.

That means that a currency is a particular ‘brand’ of money that a government or recognized legal entity issues ‘as their own’.

Currently there are over 150 currencies in use in the world<sup>61</sup>, identified the International Organization for Standardization code ISO 4217.

Currency has different definitions depending on the context and the jurisdiction consulted. In a general sense, currency is synonymous to money with the distinction of being a specific money system of common use in a given territory; or within a certain group or society, but in a legal sense currency is synonymous with legal tender.

In general, legal tender refers to the power of a currency to settle debts, which means that a natural or legal person is obliged to accept, and may not refuse a given currency as payment.

The United Kingdom Royal Mint, explains Legal Tender as:

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<sup>60</sup> <https://www.forbes.com/sites/johnwasik/2017/11/06/why-buffett-sees-bitcoin-bubble/#6f7d916762a8>

<sup>61</sup> <http://www.xe.com/iso4217.php>

*“Legal tender has a very narrow and technical meaning in the settlement of debts. It means that a debtor cannot successfully be sued for non-payment if he pays into court in legal tender. It does not mean that any ordinary transaction has to take place in legal tender or only within the amount denominated by the legislation. Both parties are free to agree to accept any form of payment whether legal tender or otherwise according to their wishes.”*<sup>62</sup>

In the United States, a definition as well as the legal entity entitled to issue legal tender was given in the 1884 Supreme Court ruling *Juilliard v. Greenman* as

*“Congress had the right to issue notes to be legal tender for the payment of public and private debt. Legal-tender notes are treasury notes or banknotes that, in the eyes of the law, must be accepted in the payment of debts”*<sup>63</sup>.

To further clarify, the Coinage Act of 1965<sup>64</sup> establishes that *“United States coins and currency (including Federal reserve notes and circulating notes of Federal reserve banks and national banks) are legal tender for all debts, public charges, taxes, and dues. Foreign gold or silver coins are not legal tender for debts.”*<sup>65</sup>

In Norway, the Norwegian krone (NOK) is legal tender according to Norway’s Central Bank<sup>66</sup>, Norges Bank.

In the EU 19 of its 28 members form the euro area, and all share the same currency, the Euro. In all these countries<sup>67</sup> euro banknotes and coins are legal tender.

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<sup>62</sup> <http://www.royalmint.com/aboutus/policies-and-guidelines/legal-tender-guidelines>

<sup>63</sup> Allen, Larry. *The Encyclopedia of money*. ABC-CLIO, 2009. pp. 250 – 251.

<sup>64</sup> 31 U.S. Code § 5103 - Legal tender.

<sup>65</sup> <https://www.law.cornell.edu/uscode/text/31/5103>

<sup>66</sup> [https://lovdata.no/dokument/NL/lov/1985-05-24-28/KAPITTEL\\_3#§14](https://lovdata.no/dokument/NL/lov/1985-05-24-28/KAPITTEL_3#§14)

<sup>67</sup> Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

On January 1<sup>st</sup>, 2002 the Euro replaced, at fixed conversion rates, the banknotes and coins of the national currencies like the Belgian franc, the Deutsche Mark and the Spanish peseta<sup>68</sup>.

As seen in the examples cited above, for all practical purposes, currency is a legal term for a countries' money.

It is worthwhile mentioning that although most countries issue their own currencies, some adopt the currency of another country as their own<sup>69</sup>. This is usually done for a mixture of economic and political reasons, but adopting the currency of a foreign State implies a loss of economic sovereignty as the adoptive country has no means of control over the monetary policy of the adopted currency as it is not their central bank who controls it.

And while legal tender is relatively easy to understand, codify and regulate because each sovereign State has the inherent capacity to determine what will constitute legal tender and thus currency in their territory (even a currency not issued by such State), the concept of 'foreign currencies' may not be so easily defined.

Firstly, because any given State may only determine what is legal tender in their territory, but may not determine the legal tender of others and is therefore limited to recognizing the existence of foreign currencies in such a way that foreign currencies would constitute any currency which does not constitute legal tender in that territory.

This distinction enables people from settling contracts in a foreign currency as they see fit, because it is understood in most of the world that parties enjoy contractual freedom to determine the applicable rules and procedures under which they wish to oblige themselves, even if this freedom is not absolute.

And it is precisely because of this freedom that contracts all over the world are voluntarily settled in currencies which do not constitute legal tender in the territory they are signed will be fulfilled in.

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<sup>68</sup> <http://www.ecb.europa.eu/euro/intro/html/index.en.html>

<sup>69</sup>For example, the US dollar constitutes legal tender in the following States: East Timor, Ecuador, El Salvador, Federated States of Micronesia, Marshall Islands, Palau, the Caribbean Netherlands and Panama.

If we define ‘foreign currency’ as a form of money which does not constitute legal tender in a given jurisdiction, then cryptocurrencies may very well be regarded as ‘foreign currencies’ with regard to all known jurisdictions.

Some might argue that for money to be a currency it must have legal tender status in at least one State, however, in my view this is an arbitrary decision that is outside the scope of what sovereign regulators may establish, as they cannot impose a prohibition for contractual parties to use any form of available foreign currency irrespective of their status as legal tender in another State or jurisdiction.

And while regulators are certainly free to regulate and even impose restrictions on the use of foreign currency, a full prohibition of use of a specific foreign currency would be contrary to contractual freedom, detrimental to international commerce and very hard to enforce in globalized economy.

It is important to point out that these definitions are not static, and just like the expression of money has evolved, so has legal tender. Already in 1997, an article in the Harvard Journal of Law and Technology entitled Coins, Notes, and Bits: The Case for Legal Tender on the Internet<sup>70</sup> expressed:

*“Throughout history, **economic development has depended on the creation of new monetary abstractions**. Long ago currency supplanted barter in our society; more recently, paper checks and plastic cards have replaced currency in many contexts. Likewise, electronic payments may soon achieve primacy in the settlement of accounts”* (emphasis added).

This prediction, made in 1997, has been fulfilled insofar as electronic payments are in fact the primary way in the settlement of accounts, and I argue that society, through its regulators, would do well by adapting to new monetary abstractions better fitted for electronic payments, rather than trying to prohibit them.

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<sup>70</sup> Konvisser, Joshua B. "Coins, notes, and bits: The case for legal tender on the Internet." *Harv. JL & Tech.* 10 (1996): 321.

## 4 Cryptocurrencies legal standing

With currency now existing in the legal realm, we can enter in a more in-depth discussion regarding the regulation of currencies, which for the purposes intended in this thesis will be synonymous with the regulation of legal money.

Cryptocurrencies don not have a clear legal standing anywhere in the world with the exception of places where they are outright banned or prohibited.

The legal standing of cryptocurrencies depends on a number of factors including if they are considered an actual form of currency or a digital asset which should behave like a tangible good.

### 4.1 International Regulation

Since cryptocurrencies are a current and ongoing topic amongst regulators around the world, regulation regarding cryptocurrencies is changing very rapidly. However, it would be fair to say that most of the world has remained silent on the issue.

The United States stands out as one of the countries that has engaged more heavily in the discussion and regulation of cryptocurrencies.

Of particular interest are two rulings which established precedent with regards to cryptocurrencies. The first was handed by the United States District Court Eastern District of Texas in the case *SEC v. Shavers*<sup>71</sup>.

The US Securities and Exchange Commission charged Trendon T. Shavers for defrauding investors in a Ponzi scheme involving Bitcoins. Shavers argued that the investments could not be considered securities because Bitcoin was not money.

In a memorandum establishing the Court's jurisdiction, the Judge declared Bitcoins as a form of currency, and in determining whether or not Bitcoins constituted money, the Judge reasoned

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<sup>71</sup> *SEC v. Shavers*, No. 4:13-CV-416, 2013 WL 4028182, at \*2 (E.D. Tex. Aug. 6, 2013)

that since Bitcoins can be used to purchase goods or services, pay for individual living expenses, and be exchanged for fiat currencies, they did in fact constitute an investment of money.

The other case was resolved by the United States Southern District Court of New York<sup>72</sup> in the case *US v Faiella*.

Robert Faiella and Charlie Shrem were charged with operating an unlicensed money transmitting business and conspiring to commit money laundering in connection with the deep web site the Silk Road, famous for being an anonymous online market place where the trade of illegal goods took place.

The defendants argued that Bitcoin did not qualify as ‘money’, and therefore operating a Bitcoin exchange could not constitute ‘transmitting money’ under US laws.

The Judge reasoned that Bitcoin clearly qualifies as ‘money’ or ‘funds’ using plain meaning definitions found in the dictionary as it “*can be easily purchased in exchange for ordinary currency, acts as a denominator of value, and is used to conduct financial transactions.*”

The Court also found that this definition was consistent with the legislative purpose of the law because Congress had chosen to use the term ‘funds’ sufficiently open as to keep up with the evolving methods of money launderers<sup>73</sup>.

## **4.2 Electronic Money Directive**

In the EU the concept of electronic money (also referred to as e-money) is defined and regulated in the Electronic Money Directive. The EMD was adopted in 2009 and recognizes the need to regulate electronic money as the most predominant form of payments in the 21<sup>st</sup> century.

Recital 7 of the directive states the need to ‘introduce a clear definition of electronic money in order to make it technically neutral’ and that such definition ‘should cover all situations where the payment service provider issues a pre-paid stored value in exchange for funds, which can be used for payment purposes because it is accepted by third persons as a payment’.

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<sup>72</sup> United States v. Faiella, 39 F. Supp. 3d 544, 545–47 (S.D.N.Y. 2014).

<sup>73</sup> Tsukerman, Misha. "The block is hot: A survey of the state of Bitcoin regulation and suggestions for the future." *Berkeley Tech. LJ* 30 (2015): 1127.

Furthermore, recital 8 continues to elaborate on the need for the definition ‘be wide enough to avoid hampering technological innovation and to cover not only the electronic money products available today in the market but also those products which could be developed in the future’.

Electronic money is properly defined in article 2(2) of the EMD as:

*‘electronic money’ means electronically, including magnetically stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions defined as [an act, initiated by the payer or on his behalf or by the payee, of placing, transferring or withdrawing funds, irrespective of any underlying obligations between the payer and the payee]<sup>74</sup> and which is accepted by a natural or legal person other than the electronic money issuer” (emphasis added).*

This may seem at first hand as a proper standalone definition, however notice how e-money is monetary value stored electronically **represented by a claim on the issuer which is issued on receipt of funds**. To fully understand the definition, we must understand who or what the issuer is and its meaning as well as the meaning of the term ‘funds’.

In the first part, the directive shifts the focus from electronic money to the issuer of such money, defined as ‘electronic money institutions’. The definition for these institutions is given as the first definition in article 2(1) of the EMD:

*“‘electronic money institution’ means a legal person that has been granted authorisation under Title II<sup>75</sup> to issue electronic money”.*

A big issue with this definitions of electronic money and electronic money institution, is that they are intertwined in a way that e-money is tied to the institutions supplying it and the institution is defined in terms of issuing the e-money.

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<sup>74</sup> In point 5 of Article 4 of Directive 2007/64/EC.

<sup>75</sup> Title II of the EMD lays down the requisites for becoming a e-money issuer, including initial capital requirements, calculation of the amount of ‘own funds’ needed to be a e-money issuer, permitted activities for e-money issuers, economic safeguard requirements and relationships with third countries.

The definition of the term ‘funds’ is given in the Payment Services Directive which will be analysed next, but for clarity the definition reads as follows:

*“‘funds’ means banknotes and coins, scriptural money or **electronic money as defined in point (2) of Article 2 of Directive 2009/110/EC**” (emphasis added).*

As it can be seen the definition of funds **IS** money (fiat [represented by banknotes and coins], scriptural or electronic).

**That way e-money (and money in general) is defined as funds and funds are defined as electronic money (or money in general).**

This kind of circular definition reminded me of the common practice in Britain (until the Banking Act 1979) to deride the lack of a proper definition of banking by referring to legal cases which defined a banker as someone carrying on the business of banking, and banking as a business carried on by a banker<sup>76</sup>.

Tying the definition of e-money to its issuer exclude cryptocurrencies from constituting money simply because they are not issued by an electronic money issuer, even if they do constitute an electronically stored monetary value for the purpose of making payment transactions which is accepted by a natural or legal person other than the electronic money issuer.

Since cryptocurrencies do not constitute electronic money on account of not being issued in terms of the EMD, let's analyse if cryptocurrencies (understood as the process inherent to the verification and creation of a cryptocurrency token) could constitute a payment service.

### **4.3 Payment Services Directive**

While the EMD regulates the concept and institutions that can issue electronic money, the Payment Services Directive<sup>77</sup> also referred to as PSD2 regulates services focused on enabling

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<sup>76</sup> Davies, *op. cit.* pp 71

<sup>77</sup> Directive 2015/2366/EU of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC OJ L 337, 23.12.2015.



payment transactions for parties to pay for goods and services across different platforms and currencies, with a specific focus on electronic payment services and transactions.

The PSD2 explicitly recognized the need to update the framework for payment transactions citing in recital 3 how *‘the retail payments market has experienced significant technical innovation, with rapid growth in the number of electronic and **mobile payments and the emergence of new types of payment services in the market place**, which challenges the current framework’* (emphasis added).

Unlike the EMD the PSD2 regulates only the service providers themselves and not the issuers of the funds used in such payments. Therefore, it would be interesting to see if there is room for cryptocurrencies to operate in the payment transaction sphere separate from money issuing.

Recital 25 of the PSD2 explicitly states that *“This Directive does not, [...] regulate the issuance of electronic money as provided for in Directive 2009/110/EC. Therefore, payment institutions should not be allowed to issue electronic.”*

In the 21<sup>st</sup> century some prominent payment services players have gained important widespread acceptance, these services such as Amazon Pay and Verifone in the US, do not hold money deposits, nor do they emit credit, and do not engage in fractional reserve banking but rather facilitate payment between third parties through e-money linked to a bank account.

In the case of cryptocurrencies, in the Bitcoin 2009 white paper the author describes Bitcoin as an electronic payment system, rather than as a form of e-money or virtual currency:

*“[Bitcoin] is an **electronic payment system** based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party.”* (emphasis added).

Just as the EMD differentiates between e-money and e-money issuer, so does the PSD2 differentiate between the service and the providers.

One of the main inclusion in the PSD2 is that of third party providers (TPPs), which offer payment solutions or services not necessarily related to holding funds. One of these are ‘payment initiation services’ (PIS).

PIS providers facilitate the use of online banking to make internet payments by helping to initiate a payment from the user account to the merchant account by creating a software “bridge” between these accounts, fill-in the information necessary for a transfer (amount of the transaction, account number, message) and inform the merchant once the transaction has been initiated<sup>78</sup>.

What’s interesting about these new concepts introduced in the PSD2 is that they revolve around 2 principles: The first is that the service provider is never actually in possession of any funds and the second is that the service providers have access to user’s important and often sensitive financial information.

Article 1 of the PSD2 details the subjects of the directive which include credit institutions (banks), e-money institutions as defined by the EMD and the European Central Bank (hereinafter ECB) and national central banks when not acting in their capacity as monetary authority or other public authorities.

Article 2 defines the scope of the directive, as applicable to both Member States and foreign currencies following the ‘one leg principle’ where it is sufficient for only one of the payment service providers to be located in a Member State for the directive to be applicable allowing the EU to regulate payment service transactions when at least one of the parties is located in the EU.

Article 3 lays down the acts to which the PSD2 does not apply, notably: payment transactions made exclusively in cash directly from the payer to the payee, without any intermediary intervention; **cash-to-cash currency exchange operations where the funds are not held on a payment account**, and most paper-based forms of payment arrangement including vouchers, cheques and bills of exchange.

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<sup>78</sup> European Commission - Fact Sheet. Payment Services Directive: frequently asked questions [http://europa.eu/rapid/press-release MEMO-15-5793\\_en.htm?locale=en](http://europa.eu/rapid/press-release_MEMO-15-5793_en.htm?locale=en)

Letter (j) of Article 3, contains an interesting exclusion from the exclusion, specifying that even though AIS and PIS never come into possession of funds and could be seen as services that support the provision of payments, they are deemed payment service providers and therefore the PSD2 is still applicable.

Article 4 sets forth the definitions used throughout the PSD2. There are 48 definitions in total, but for the purposes of this thesis I will only focus on some which are important to analyse and consider having cryptocurrencies in mind:

*(5) 'payment transaction' means an act, initiated by the payer or on his behalf or by the payee, of placing, transferring or withdrawing funds, irrespective of and underlying obligations between the payer and the payee;*

*(25) 'funds' means banknotes and coins, scriptural money or electronic money as defined in point (2) of Article 2 of Directive 2009/110/EC;*

*(27) 'reference exchange rate' means the exchange rate which is used as the basis to calculate any currency exchange and which is made available by the payment service provider or comes from a publicly available source;*

*(29) 'authentication' means a procedure which allows the payment service provider to verify the identity of a payment service user or the validity of the use of a specific payment instrument, including the use of the user's personalised security credentials;*

*(30) 'strong customer authentication' means an authentication based on the use of two or more elements categorised as knowledge (something only the user knows), possession (something only the user possesses) and inherence (something the user is) that are independent, in that the breach of one does not compromise the reliability of the others, and is designed in such a way as to protect the confidentiality of the authentication data;*

*(33) 'unique identifier' means a combination of letters, numbers or symbols specified to the payment service user by the payment service provider and to be provided by the payment service user to identify unambiguously another payment service user and/or the payment account of that other payment service user for a payment transaction;*

These definitions define concepts that are central to cryptocurrency's function (authentication), how they relate to fiat currencies (reference exchange rate) and what they are used for (payment transactions).

On their function, the PSD2 defines a rather large number of authentication methods that must be met by Payments Service Providers which are 'built into' the code of many cryptocurrencies as procedures that verify *the validity of the use of a specific payment instrument*, by ways of strong customer identification *based on the use of two or more elements categorised as knowledge (something only the user knows), possession (something only the user possesses) and inherence (something the user is) that are independent.*

Cryptocurrencies require a password (*something only the user knows*) to access the private key, and the possession of the private key file (*something only the user possesses*).

Regarding their interaction with fiat currencies, using the definition of '*reference exchange rate*' which can be publicly available or can be made available by the payment service provider, cryptocurrencies can be (and in fact are) converted into fiat currencies.

Even though cryptocurrencies may comply with the strong authentication schemes required by the PSD2 they are still left out of the regulation as they do not constitute funds nor are they considered e-money in terms of the EMD because of the circularity of the definition already mentioned.

But could cryptocurrency's networks be considered a form of payment transaction, and therefore subject to regulation when used by a company, if they represent a transfer of funds as currently defined?

Since Bitcoin and other cryptocurrencies are a software programs that run on the Internet; are not financial institutions (not even a recognizable legal entity) and, do not hold accounts belonging to customers<sup>79</sup>, it is hard to imagine that cryptocurrencies networks and protocols constitute payments services by themselves, but they could constitute a payment transaction method.

Many online cryptocurrency ‘exchanges’ do not buy and sell cryptocurrencies that they own for fiat money nor do they buy with their own funds cryptocurrencies from the public, but rather enable third parties to buy and sell their cryptocurrencies into fiat and charge a small percentage of the operation in the form of a commission (both in cryptocurrencies and fiat currencies).

These services never come into possession of cryptocurrencies or ‘funds’ as established in the PSD2, but rather facilitate the exchange between different cryptocurrencies and traditional currencies.

I argue, that companies who facilitate trade between cryptocurrencies and fiat currencies and never come into possession of funds could be regarded as payment service providers as they bridge a gap (using the cryptocurrency protocol) between different platforms of payments.

The PSD2 limits the meaning of funds to fiat money and electronic money as defined by the EMD which is a problem in itself, because as it has been repeatedly stated, e-money is defined in part as *stored monetary value as represented by a claim on the issuer which is issued on receipt of funds*, but it could incorporate cryptocurrency’s networks as a means of making secure transactions based on the receipt of funds as they are currently defined.

If the technology of cryptocurrencies is regarded as a method of payment transfers and the tokens simply the part of that method that serves to ensure the integrity of the transaction, rather than as a form of currency on its own, companies using this method to convert fiat currencies into cryptocurrencies (as a means to transfer value expressed in any fiat currency using a token) would qualify as payment service providers regardless of the fact that cryptocurrencies are not funds.

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<sup>79</sup> Ly, Matthew Kien-Meng. "Coining Bitcoin's Legal-Bits: Examining the Regulatory Framework for Bitcoin and Virtual Currencies." *Harv. JL & Tech.* 27 (2013): 587.

If virtual currencies and specifically cryptocurrency's tokens (eg. 1 bitcoin, 1 ether) are not to be considered as e-money or funds, service providers that use cryptocurrency's networks as means to bridge gaps between different services and currencies could still be considered payment services.

#### **4.4 European Central Bank opinion of virtual currencies**

A mayor part of the discussion surrounding cryptocurrencies is their ability to make transactions anonymous, or at least, pseudonymous (as explained before).

For some, this is a major asset because as the worlds' transactions have become electronic, some people have lost all hope for privacy relating to their finance.

Furthermore, electronic payments and transactions are encouraged by most tax agencies in the world as they provide a means to survey natural and legal persons income-spending ratio and in conjunction with banks may flag possible tax evasion schemes and money laundering activities.

On the other hand, the capacity for anonymity in financial transaction is seen as liability by most governments and law enforcement, as the source of the funds and the recipient of the funds in a transaction can be easily hidden.

Add to that that cryptocurrencies are a *de facto* currency in the sense that some people will trade goods and services in exchange for cryptocurrencies, regardless of what the law says.

This peculiar combination lead to Bitcoin being the currency used in the infamous black-market site "The Silk Road", a trading web site located in the deep web<sup>80</sup> famous for trading all sorts of goods including illegal ones such as guns, stolen or cloned credit cards and drugs.

The price of the items located in The Silk Road web site were all in bitcoins. Because of this phenomenon, it is not surprising that the place where virtual currencies are named as such and

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<sup>80</sup> The Deep Web is a part of the Internet that cannot be accessed through search engines, and requires a special web browser known as The Onion Router or TOR, designed specifically for anonymity by hiding or making inaccessible the users IP addresses.

where more direct language has been used regarding them is in anti-money laundering regulation proposals.

In a paper published in June 2017 by European Parliament entitled “Revision of the Fourth Anti-Money- Laundering Directive”<sup>81</sup> the European Commission proposed two amendments to Directive (EU) 2015/849 of the European Parliament and of the Council of 20 May 2015 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, amending Regulation (EU) No 648/2012 of the European Parliament and of the Council, and repealing Directive 2005/60/EC of the European Parliament and of the Council and Commission Directive 2006/70/EC. OJ L 141, 5.6.2015 (hereinafter (Anti-Money Laundering Directive or AML4) to include virtual currencies:

*“Article 2, adding virtual currency exchange platforms as well as custodian wallet providers to the list of obliged entities within the scope of the directive;*

*Article 3, adding the definitions for ‘electronic money’ and ‘virtual currencies’ to the list of definitions ...;”*

Regarding the same document, the ECB provided a formal opinion<sup>82</sup> in which they expressed several concerns regarding the regulation of virtual currencies both related to money laundering prevention and economic and financial issues:

*“In this context, the ECB also mentions that digital currencies do not necessarily have to be exchanged into legally established currencies. They could also be used to purchase goods and services, without requiring an exchange into legal currency or the use of a custodial wallet provider. Such transactions would not be covered by any of the control measures provided for in the proposal and could provide a means of financing illegal activities.*

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<sup>81</sup> [http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/607260/EPRS\\_BRI\(2017\)607260\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/607260/EPRS_BRI(2017)607260_EN.pdf)

<sup>82</sup> Opinion of the European Central Bank on a proposal for a directive of the European Parliament and of the Council amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing and amending Directive 2009/101/EC (CON/2016/49). Available at <http://data.consilium.europa.eu/doc/document/ST-13303-2016-INIT/en/pdf>

Further on, the ECB recognizes that the technological advances in the underlying technology of virtual currencies may have the potential to increase the efficiency and choice of payment methods, but that regulators should be careful not to promote the use of virtual currencies as they, amongst other risks, “*could in principle affect the central bank’s control over the supply of money with potential risks to price stability, although under current practice this risk is limited*”.

The ECB makes a series of specific comments regarding the proposed definition of virtual currencies as ‘*a digital representation of value that is neither issued by a central bank or public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as means of payment and can be transferred, stored and traded electronically*’.

Upon this definition the ECB makes a number of specific comments:

*“First, ‘virtual currencies’ do not qualify as currencies from a Union perspective. ... the ECB recommends defining virtual currencies more specifically, in a manner that explicitly clarifies that virtual currencies are not legal currencies or money.*

*Second, given that **virtual currencies are not in fact currencies**, it would be more accurate to regard them as means of exchange, rather than as means of payment.*

*...Additionally, the proposed directive’s definition of ‘virtual currencies’ as means of payment does not take into account that in some circumstances virtual currencies can be used for purposes other than that of means of payment.*

*... In the light of the above, the ECB suggests that the proposed directive also refers to other possible uses of virtual currencies in the proposed definition of that term.”*  
*(emphasis added).*

While this discussion take place in the sphere of anti-money laundering activities, the concepts and views expressed by the ECB relate to the general treatment of virtual currencies including cryptocurrencies and it is easy to see that the European Union central bank is not keen on defining virtual currencies as a form of either currency or money.



It should come as no surprise that Europe's Central Bank does not like a currency system that deems central banks obsolete, particularly when their arguments focus more on the fact that such virtual currencies do not constitute legal tender anywhere in the world because they are not issued by a central bank.

#### 4.5 Currency vs Asset Resolved: The ECJ 'Bitcoin' Hedqvist decision

One of the problems regarding cryptocurrencies is that it is not very clear if they constitute a currency or a digital asset. As one author puts it:

*'bitcoins are an uncomfortable combination of commodity and currency. The commodity value of bitcoins is rooted in their currency value, but the more of a commodity they become, the less useful they are as a currency.'*<sup>83</sup>

This question may not seem very relevant but it is. If a cryptocurrency is assumed to be a digital asset then it is a 'good' and it is subject to regulation regarding the sale and purchase of goods.

If on the other hand it is assumed to be a currency then, like other currencies, it would not be considered 'goods', and the activities related to them become a matter of financial services.

In general currencies exchanges and other financial services are heavily regulated and the trade of goods is not, in part because the value of goods is always fluctuating in accordance to the rules of demand and supply.

This question becomes particularly relevant when discussing cryptocurrency exchanges where one can exchange fiat currencies for cryptocurrencies and vice versa. The reason the question is relevant has to do with the application value added tax regulation (VAT).

*"The question of whether or not Bitcoin should be subject to VAT is a simple one – if it is considered a currency it shouldn't be subject to VAT and if it is considered a product it should be"*<sup>84</sup>

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<sup>83</sup> <https://medium.com/@felixsalmon/the-bitcoin-bubble-and-the-future-of-currency-2b5ef79482cb>

<sup>84</sup> <http://www.ibtimes.co.uk/european-court-justice-ruling-bitcoin-currency-exchanges-are-vat-exempt-1525169>

The argument was resolved in favour of cryptocurrencies (Bitcoin specifically) being currencies on the first ever ruling by the European Court of Justice on cryptocurrencies in *Case C-264/14, Skatteverket v. David Hedqvist* on 22<sup>th</sup> October 2015.

The case revolved around a question posed by Mr. David Hedqvist, a Swedish citizen who wanted to open a Bitcoin exchange where he would exchange the popular cryptocurrency Bitcoin for fiat money and vice versa, just like a currency exchange would exchange Swedish kroner for Euros, and if such activity would be exempt from value added tax (VAT) in terms of the Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax. OJ L 347, 11.12.2006, p. 1–118 (hereinafter VAT Directive).

More specifically, Mr. Hedqvist transactions would be carried out electronically via the company's web site. The company would purchase units of bitcoin directly from private individuals and companies, or from an international exchange site. The company would then resell the units on such an exchange site, or store them. The company would also sell such units to private individuals or to companies that place an order on its website.

The bitcoin units sold by the company would be those purchased directly on the exchange site after the client had placed his order, or those that the company already had in stock. The price would be based on the current price on a particular exchange site, to which a certain percentage would be added. The difference between the purchase price and the sale price would constitute Mr Hedqvist's company's earnings. The company would not charge any other fees.

The *Högsta förvaltningsdomstolen* (Supreme Administrative Court of Sweden), unsure of how to interpret the VAT Directive, asked the European Court of Justice (ECJ) to answer two questions:

1. Is the exchange of virtual currency for traditional currency and vice versa a service effected for consideration under Article 2(1) of the VAT Directive?

Article 2(1) of the VAT Directive enumerates the various activities that are subject to VAT in the EU, including both (a) the supply of goods and (b) the supply of services for consideration.

But there is another question implied in the first question, which the ECJ had to answer first, and that was whether the exchanging of bitcoins constituted a supply of goods (digital assets) or a supply of services (currency exchange).

The question is very interesting as it relates to a basic legal distinction regarding virtual money in general and cryptocurrencies in particular, are cryptocurrencies goods (digital commodities) or a form of currency?

The ECJ ruled very concisely in paragraphs 24 and 25 that:

*“It must be held, first, that the ‘bitcoin’ virtual currency with bidirectional flow, which will be exchanged for traditional currencies in the context of exchange transactions, cannot be characterised as ‘tangible property’ within the meaning of Article 14 of the VAT Directive, given that, as the Advocate General has observed in point 17 of her Opinion, **that virtual currency has no purpose other than to be a means of payment.***

*The same is true for traditional currencies, since it involves money which is legal tender...”* (emphasis added).

Therefore, on this point, the ECJ found that based on previous case law, in particular *First National Bank of Chicago*<sup>85</sup> **selling currencies** on a margin is clearly a form of supply of services for consideration, and thus the *trading* of cryptocurrency should be subject to VAT unless it fell under one of the Directive’s exemptions.

The second question was:

2. If so, should Article 135(1) of the Directive be interpreted as meaning that such transactions are nevertheless tax exempt?

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<sup>85</sup> ...the Court observes first of all that the currencies which are exchanged against other currencies in a foreign exchange transaction cannot be regarded as ‘tangible property’ within the meaning of Article 5 of the Sixth Directive, since money used as legal tender is involved. Foreign exchange transactions are thus supplies of services within the meaning of Article 6 of the Sixth Directive.

Article 135(1) states which activities are exempt for VAT tax, including (e) transactions, concerning **currency, bank notes and coins used as legal tender**, with the exception of collectors' items, that is to say, gold, silver or other metal coins or bank notes which are not normally used as legal tender or coins of numismatic interest.

The question in this instance relied on whether or not 'bitcoins' were considered to meet the criteria relating to *currency, bank notes and coins used as legal tender*, expressed in the directive.

As I have reviewed at some length, the differences between money, currency and legal tender is a distinction of the utmost importance, particularly with regard to the place of cryptocurrencies amongst them.

And because of the importance of this differences the Swedish court's confusion or doubt in interpreting the term becomes clear. The difficulty lies in the words '*legal tender*', because while it may be conceivable to regard Bitcoin as a type of currency, it is most definitely not *legal tender*, as no country in the world recognises them as such.

The ECJ recognized that the exemptions established in article 135 of the VAT Directive needed to be interpreted strictly, but nevertheless the interpretation should also be consistent with the objectives pursued by the Directive, and not be construed in such a way as to deprive the exemptions of their effect.

Curiously, the Advocate General (hereinafter AG) noted that although the German version requires all of the exchanged currencies to be legal tender to qualify for exemption, the English version might allow for only one of them to be legal tender, the Finnish version would appear to require only bank notes and coins to be legal tender but not currencies, and the Italian version didn't care about the legal status of any of them.

The ECJ agreed with the opinion of the AG that the meaning of Art. 135(1)(e) could mean different things in different languages and therefore the expression could not be determined on the basis of an interpretation which is exclusively textual, rather it must be interpreted in the light of the context in which it is used considering the aims and scope of the VAT Directive.

Therefore, the ECJ ruled that the phrase *currency, bank notes and coins used as legal tender* should not be interpreted on a strict principle as *numerus clausus* to apply only to transactions involving *traditional* currencies or if it is also intended to cover transactions involving *another* currency.

It is important to examine the Court's reasoning in coming to this conclusion, as the ruling establishes that it was more important to interpret the case (and the factors in the case including Bitcoin) in terms of their inherent functions and regulatory purposes.

The court thought more important to consider bitcoins as means of payment, as that is their function, and a bitcoin exchange as identical to a currency exchange pursuant to *inter alia* the purpose of alleviating the difficulties connected with determining the taxable amount and the amount of VAT deductible, considering that financial transactions (defined by their nature)<sup>86</sup> are exempt from VAT even though they do not necessarily have to be carried out by banks or financial institutions.

Even though the Hedqvist case does not answer all cryptocurrencies' questions directly, it certainly gives us a good overall picture of how the ECJ views these forms of virtual money with regards to fiat money in so far as they are purely interchangeable currencies. In my perspective The Court's reasoning correctly establishes that it is the function of things rather than a particular wording in the law that should prevail.

## 5 Harmonisation of the EU framework for virtual currencies

The ECJ ruling leaves open an apparent contradiction in the European framework regarding virtual currencies. On one hand, according to the Hedqvist decision, bi directional virtual currencies act as any other fiat currencies.

But on the other, both the EMD and the PSD2 do not consider by their definition cryptocurrencies by themselves to be either money nor a payment service. Furthermore, as seen above, the ECB has recommended “*defining virtual currencies more specifically, in a manner that explicitly clarifies that virtual currencies are not legal currencies or money*”, even if this

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<sup>86</sup> As established by cases C-455/05 Velvet & Steel Immobilien and C-461/12, Granton Advertising.

recommendation apparently contradicts the ECJ reasoning regarding that the purpose and actual use of cryptocurrencies (as currencies) rather than an arbitrary definition that at the very least would deter innovation on new forms of monetary abstraction.

I argue that if the legal reasoning applied by the ECJ is to be followed, it would be wrong (and illegal or at least contrary to legal coherence) to consider virtual currencies synonymous with traditional currencies for VAT purposes but not for other purposes.

Moreover, I argue that it is incoherent to say that virtual currencies in general are currencies but not money, following the logical arguments *a maiore ad minus*<sup>87</sup> and the *Regulæ Juris: qui potest plus, potest minus*<sup>88</sup>.

The logic premise would be: If all forms of currency are money, then any form of currency must be money too.

And because I argue that all forms of currency must constitute money, I propose to make the definition of electronic money in the EMD non-dependent upon the issuer but on the thing itself in order to make it self-sustained, simply by deleting the reference to issuer, so it would read as follows:

“‘electronic money’ means electronically, including magnetically, stored monetary value for the purpose of making payment transactions defined as [an act, initiated by the payer or on his behalf or by the payee, of placing, transferring or withdrawing funds, irrespective of any underlying obligations between the payer and the payee]<sup>89</sup> and which is accepted by a natural or legal person as means of payment”

In this case, the representation of the electronically monetary value is not important insofar as the purpose of such representation is to make a payment transaction and it is accepted by the payee as means of payment.

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<sup>87</sup> In logic, this form of argumentation draws upon an existing proposition to argue in favour of a second proposition that is held to be implicit in the first by describing a simple and obvious inference from a claim about a general class to one about a specific member of that class.

<sup>88</sup> Roughly translated as ‘Who can do more, can do less’

<sup>89</sup> In point 5 of Article 4 of Directive 2007/64/EC.

Another way of resolving the matter at hand is to simply incorporating the definition put forth by the ECB<sup>90</sup> of virtual currency within the definition of funds given in the PSD2, so it would read as follows:

*funds' means banknotes and coins, scriptural money, electronic money as defined in point (2) of Article 2 of Directive 2009/110/EC or virtual currencies as defined by the ECB;*

With this simple but significant inclusion the word *funds* in the EMD would include virtual currencies, even if it does not solve the problem of it being circular.

I believe that the advantages of bringing cryptocurrencies within the EU regulatory framework for digital or electronic money vast outweighs any disadvantages, recognizing that as it is often the case with regulation it is impossible to 'keep everyone happy' as there will always be trade-offs relative to the *status quo*.

My biggest argument in favour of regulating cryptocurrencies as electronic money is that it gives regulators the ability to regulate them to some extent, as it is clear that with cryptocurrencies left unregulated they have generated a sufficient impact in monetary policy to merit some form of regulatory intervention.

Another important argument for regulating cryptocurrencies as electronic money is that it gives people legal certainty by making binding rules (both for the users of cryptocurrencies and for central banks and monetary authorities). The fact that cryptocurrencies can *de facto* interact with fiat currencies, in my view, compels regulators to recognize that fact and establish rules to deal with it.

Regulators need to recognize that cryptocurrencies are being used as money and even more they are being regarded as money (even if they are not everyone is using yet), and therefore, I argue, the appropriate legal step towards regulating them would be regard them as money.

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<sup>90</sup> Virtual currencies: 'a digital representation of value that is neither issued by a central bank or public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as means of payment and can be transferred, stored and traded electronically'

Another advantage in regulating cryptocurrencies as money is that people using them would have to abide by the same rules as all other money does, which would entail among other things that certain operations would not be allowed to be anonymous, that certain capital requirements would need to be met for operating cryptocurrency exchanges and would allow monetary value to be expressed in cryptocurrency form.

I propose that the changes to EU regulation suggested in this thesis constitute a sensible way to enable regulation to incorporate cryptocurrencies in general as a form of digital money and specifically as an equivalent to foreign currency as a starting point to determine the rules for cryptocurrencies to interact with its surroundings.

However, if the suggestion of equating cryptocurrencies to money is not deemed viable for any reason, they could still be regulated as a form of payment service in order to have some form of control over and establish clear rules regarding their use.

## **6 Conclusion**

Independently of how mainstream cryptocurrencies adoption may be or how much widespread acceptance they may have in a near future, regulators must acknowledge the reality that this system of decentralised P2P money network and distributed ledger is a revolutionary approach to economic and financial systems.

It may very well be that cryptocurrencies are just a trendy fad in the finance world and that they constitute just ‘another payment system like many which have come and gone’ as expressed by professor Olav Tormund in a payment systems lecture in the spring of 2017 at the University of Oslo.

However, it may also be that cryptocurrencies constitute a completely different form of envisioning money and value that will play a major role in the world’s economy and finances.

One thing is clear, cryptocurrencies exist and unlike past forms or experiments in payment systems, cryptocurrencies have been gaining important momentum and it is naïve to expect that the world’s regulators should not intervene in some form regarding this new technology.



As expressed in this thesis I propose that cryptocurrencies could be brought into the EU regulatory framework specifically by either:

- a) Slightly altering the definition of e-money in the EMD to make it self-sufficient and non-dependant on the issuer of the e-money, or;
- b) Incorporating virtual currencies in the definition of funds given by the PSD2, or at least
- c) Recognizing the technology of cryptocurrencies and their interaction with fiat currencies as a valid form of payment system.

In my view, the fact that virtual currencies in general and cryptocurrencies in specific can be purely interchangeable with fiat currencies, is a very important legal argument for considering cryptocurrencies a *de jure* form of money. This is not to be confused with considering cryptocurrencies legal tender, but a foreign currency which is **recognized** to have the power to settle debts.

I'm aware that not everyone shares this view, as at least one author considers that currency and money should not be synonymous and that considering cryptocurrencies money would be illogical as they are not issued by any government:

*“Bitcoins are not backed by any government. It is unlikely that any government will ever fully back Bitcoins, since they would serve as competition to whatever currency that particular government is already using. This support would also go against the decentralized nature of Bitcoins. As a result, attributing the label of “money” to Bitcoins is illogical. Yet, merely defining Bitcoins as “currency” still subjects them to the laws and scrutiny designed for money, or things competing with money. This poses an unnecessary risk to Bitcoins as an innovation and creates the potential for haphazard regulation. [...] the synonymous use of currency and money has created a legal and regulatory environment that is toxic for Bitcoin and that a permanent legal label of “currency” will increase this toxicity.”<sup>91</sup>*

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<sup>91</sup> Farmer, Paul H. "Speculative Tech: the Biotin Legal Quagmire & the Need for Legal Innovation." *J. Bus. & Tech. L.* 9 (2014): 85.

I disagree with such claim because, as stated throughout this thesis, money is conceptual abstraction for which useful abstract properties and characteristics have been set out, and currency is but a legal dimension of the abstract concept of money.

And although powers to regulate such technology may be limited either in a legal or practical way, such as it has happened with the Internet, because of the non-national and decentralised manner in which the technology operates (short of completely banning the use of cryptocurrencies, as it has happened with censored or banned access to the Internet), I believe regulators could (and should) incorporate cryptocurrencies in the realm of e-money and payment services by making minor modification to the existing legal and regulatory framework in the EU.

I understand that the legal reasoning behind the arguments being made in this thesis borderline in philosophical ones regarding the conception and accepted general consciousness concerning the abstract idea of money, but I find that many of the arguments against recognizing virtual currencies and more specifically cryptocurrencies as a form of digital money tend to be arbitrary or circular, lacking in a legal analysis focused on the intersection of new technologies and monetary abstractions.

Anything less than a complete ban on cryptocurrencies requires regulation. I believe that my proposal accomplishes the most while risking the least and is in line with the purpose set forth in recitals 7 and 8 of the EMD and 10 of the PSD2 with regards to keeping the language and concepts of technology neutral encompassing future electronic money products without hindering innovation.

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