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# Electronic Money and Cryptocurrencies (Bitcoin): Suggestions for Definitions

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Professor of Commercial Law, University of Glasgow, School of Law

## 1 Introduction: The four cases or aspects of money

The recent prominence of Bitcoin – and its volatility in value – have raised the question what Bitcoin is, and generally what cryptocurrencies and electronic money actually are. It appears that these new forms of currency are new in relation to the technology on which they are based, but not so new when one considers their underlying legal-conceptual framework. The following discussion will not consider much the new technology as the basis of digital currency, but the far more familiar legal concepts behind it.

From a sociological perspective money generates space by creating legal and economic relationships, and with these ‘vectors’ of the different relationships the space of money is ‘spanned’ or ‘clamped’. One can describe these vectors of relationship by analogy to the morphology and the *casus* (case) forms in Indo-European languages, for example Latin. The first case is the *casus nominativus* or standard case (*casus rectus*) (e.g. lat. *fēlēs*, the cat) which names or terms, and from which the other *casus* derive as special cases (*casus obliqui*): the second case or *casus genitivus* as the case of origin (*casus paternus, possessivus*) (*fēlis*, of the cat), the third case or *casus dativus* as the case of giving (*casus dandi, commendativus*) (*fēlī*, to the cat), and the fourth case or *casus accusativus* (*fēlem*, the cat) as the case of accusation/blame or charge, but more properly the case of effectuation or operation, following the ancient Greek term (*aitiatikè*: ‘*causativus*’) which the Romans translated inadequately.<sup>1</sup> Here we are not concerned about the fifth case and the sixth case of the Latin language.

The four cases or aspects of money are equivalent:<sup>2</sup> the *first case* is the case of naming: money is money because it is named as such by law: this is particularly so

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<sup>1</sup> Wilhelm Köller (2004), *Perspektivität und Sprache. Zur Struktur von Objektivierungsformen in Bildern, im Denken und in der Sprache* (Berlin, New York: Walter de Gruyter, 2004), p. 391; John E. Sandys, *A Short History of Classical Scholarship from the Sixth Century B.C. to the Present Day* (Cambridge: Cambridge University Press, 1915), p. 57.

<sup>2</sup> This passage follows Andreas Rahmatian, *A Legal Theory of Money: Credit and Creed*, chapter 4, forthcoming.

with regard to *fiat money* or legal/compulsory tender<sup>3</sup> issued by the central bank (banknotes and in the UK coins issued by the Royal Mint), but also with bank money created by commercial banks, where there is no explicit legal rule that terms it ‘money’, unlike with legal tender,<sup>4</sup> but one must presume an implicit recognition as money (though not – yet – as legal tender) by case law.<sup>5</sup> Money is created as, and constitutes, a legally enforceable debt, a debt that arises through granting loans (‘credit’).<sup>6</sup> It is the legal enforceability of this debt that makes an envisaged means of exchange to money which then performs the generally recognised functions of *medium of exchange*, *unit of account* and *store of value*.<sup>7</sup> Particularly bank money shows the janiform nature of money: it is a loan-debt created and remaining between customer-borrower and bank-lender, and at the same time circulating and performing as money between an indefinite number of parties.<sup>8</sup> While cash (leaving aside central bank reserves) is only an eternal, notional debt, the debt that commercial bank money constitutes is very real (sale or auction of the debtor’s property as loan-debt enforcement).<sup>9</sup>

The *second case* of money is the case of origin: the means of exchange must derive from a legally devised or recognised origin or source to be money. Monopoly money, forged banknotes, printed banknotes that are issued without authorisation,<sup>10</sup> accounting entries reflecting the grant of a loan by a non-bank, are not money. Only if the medium of exchange is created by a source designed by law or recognised by law (the second category encompasses currencies of ‘private’ origin which can be used to discharge debts provided the law then regards the debt as extinguished) it is money, so it typically must originate from a central bank (cash) or a commercial bank (bank money), but its physical appearance (metal, paper, electronic) is irrelevant.<sup>11</sup>

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<sup>3</sup> Charles Proctor, *Mann on the Legal Aspect of Money*, 7<sup>th</sup> ed. (Oxford: Oxford University Press, 2012), p. 12.

<sup>4</sup> In the UK, Currency and Bank Notes Act 1954, s. 1 (2) and (4), Coinage Act 1971, s. 2.

<sup>5</sup> Andreas Rahmatian, ‘Money as a legally enforceable debt’, (2018) 29(2) *European Business Law Review*, 205, 228-229.

<sup>6</sup> On the credit creation theory of money as the only one compatible with banking law, especially *Foley v. Hill* (1848) 2 HLC 28, see Andreas Rahmatian, ‘Money as a legally enforceable debt’, (2018) 29(2) *European Business Law Review*, 219.

<sup>7</sup> Charles Proctor, *Mann on the Legal Aspect of Money*, 7<sup>th</sup> ed. (Oxford: Oxford University Press, 2012), p. 10.

<sup>8</sup> Joseph A. Schumpeter, *History of Economic Analysis* (New York: Oxford University Press, 1954), p. 1114; Walter Eucken, *Die Grundlagen der Nationalökonomie*, 6<sup>th</sup> ed. (Berlin-Göttingen-Heidelberg: Springer Verlag, 1950), pp. 120-121.

<sup>9</sup> E.g. in English law: Civil Procedure Rules, Part 70, Part 83 *et seq.*; Insolvency Act 1986, Second Part, ss. 251A *et seq.*

<sup>10</sup> *Banco de Portugal v. Waterloo & Sons* [1932] AC 452, HL.

<sup>11</sup> This is not a ‘State theory’ or ‘Chartalist theory’ of money, as some economists may be tempted to assume. A Chartalist theory would claim that only money issued by the State through its central bank is money (and legal tender), and that is indeed too narrow. Economists are usually unaware that all economic and market relations are the product of law. As any property or any debt is the result of the

The *third case*, the case of giving or transfer and transaction, denotes that money in its role as medium of exchange transforms the property commodity into the seller's (S1) expectation to be able to retransform it later to another (as yet unspecified) property as buyer (B) in a subsequent purchase from another seller (S2), without conferring any legal entitlement to a specific item of property. The interposition of money |m| divides one barter of two commodities |c1| and |c2| into two sales:<sup>12</sup> (S1)|c1| – |m|(S1=B) – |c2|(S2).

The *fourth case* comprises several aspects. It highlights the fact that the means of exchange can operate as money in law because it indeed constitutes a debt that is enforceable by law ('*accusativus*', 'arraign'), but also because the money debt can discharge another debt ('*causativus*'). Furthermore, it denotes the essential debtor-creditor relationship between bank and customer/account holder which is the basis for bank money. A *casus accusativus* in the narrow sense can occur when the customer sues the bank for paying out the credit on his bank account.<sup>13</sup>

With these four forms of relationship or four cases the 'vector space' of money is 'spanned'. For the present discussion the first case (*nominativus*) and particularly the second case (*genetivus*) are important.

## **2 Cash – bank money – electronic money: public and regulated digital currencies**

Cash, which is not necessarily also legal tender,<sup>14</sup> are commonly paper notes and coins, today with no significant intrinsic value. There is no conceptual reason why cash has to be represented by tangible property; electronic cash would also be possible in principle. Bank money is invariably electronic nowadays. Bank money is no longer 'fountain pen money'<sup>15</sup> (recording of a loan granted to the customer as a deposit in the customer's account),<sup>16</sup> but computer data money. Central bank reserves

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law, so must also money be – property in form of a debt. On the State theory of money, see Frederick A. Mann, *The Legal Aspect of Money*, 5<sup>th</sup> ed. (Oxford: Oxford University Press, 1992), p. 92.

<sup>12</sup> Ludwig von Mises, *The Theory of Money and Credit* (New Haven: Yale University Press, 1953), pp. 30-33.

<sup>13</sup> E.g. *Joachimson v. Swiss Bank Corporation* [1921] 3 KB 110.

<sup>14</sup> In Scotland banknotes issued by the Scottish Banks are not legal tender, see e.g. *The Glasgow Pavilion v. William Motherwell* (1903) 6 F 116, IH, at 119. Banknotes of the Bank of England are not legal tender in Scotland, except for banknotes of denominations of less than five pounds, see Currency and Bank Notes Act 1954, s. 1 (2). But such banknotes have not been issued.

<sup>15</sup> See James Tobin, *Commercial Banks as Creators of 'Money'* (Cowles Foundation Discussion Paper No. 159, New Haven: Cowles Foundation for Research in Economics at Yale University, 1963), p. 1.

<sup>16</sup> See e.g. Bank of England (McLeay, Michael, Radia, Amar and Thomas, Ryland), 'Money creation in the modern economy', *Quarterly Bulletin Q1*, (2014), pp. 14, 16; Andreas Rahmatian, 'Money as a legally enforceable debt', (2018) 29(2) *European Business Law Review*, 220, with further references.

are electronic records,<sup>17</sup> as are all commercial bank accounts. Bank money transfers (giro transfers) happen electronically only, and cheques do not pass physically through the clearing cycle, but are ‘truncated’ and now the data are transferred electronically (electronic presentation of cheques).<sup>18</sup> The difference between classical forms of money (cash and bank money) using electronic methods of recording, storage and transfer, and ‘private’ digital currency lies in the respective origin, that is, what is the legal authority of the source the money in question comes from – a question of the second case of money (*casus genitivus*).

The origin of conventional cash and bank money has been dealt with before. Electronic money is regulated in EU-Directive 2009/110/EC which defines electronic money in Art 2 (2) as ‘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 ... and which is accepted by a natural or legal person other than the electronic money issuer.’ Art 2 (2) establishes the *first case*, that is, naming in law the value in question as money. Money issuers include banks,<sup>19</sup> authorised post office giro institutions, and the European Central Bank and national central banks when not acting in their capacity as monetary authority.<sup>20</sup> The electronic money issuer must be authorised,<sup>21</sup> has to meet minimum capital and ‘own funds’ requirements, is required to safeguard funds received in exchange for issued electronic money, must issue and redeem electronic money at par value, and is prohibited from paying interest on the electronic money held.<sup>22</sup> In its nature this electronic money is a form of bank money, not legal tender and not cash in its physical form. Even if issued by central banks, it is probably still bank money because the central banks are supposed to act as a normal commercial bank and not ‘in their capacity as monetary authority or other public authorities’.<sup>23</sup>

The difference between traditional bank money which was at one time written down in the books of the bank (‘fountain pen money’) and electronic money which never was, is determined by the origin and authority of the issuer or creator of that

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<sup>17</sup> Bank of England (McLeay, Michael, Radia, Amar and Thomas, Ryland), ‘Money in the modern economy: an introduction’, *Quarterly Bulletin Q1* (2014), pp. 4, 11.

<sup>18</sup> For discussion regarding the UK, see Sandra Booyen, ‘Cheques: to be or not to be?’, (2018) 4 *Journal of Business Law*, 283, 292-295: payment is not processed as cheque clearing, but as a debit funds transfer.

<sup>19</sup> Directive 2009/110/EC, Art. 1(1)(a): ‘credit institutions as defined in point 1 of Article 4 of Directive 2006/48/EC’ (according to this provision ‘credit institution’ is: (a) an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account; or (b) an (authorised) electronic money institution, the authorisation being granted under Title II of the Directive 2009/110/EC).

<sup>20</sup> Directive 2009/110/EC, Art. 1(1)(c) and (d).

<sup>21</sup> Directive 2009/110/EC, Art. 10.

<sup>22</sup> Directive 2009/110/EC, Arts. 4, 5, 7, 11, 12.

<sup>23</sup> Directive 2009/110/EC, Art. 1(1)(d).

money (*casus genitivus*). Electronic money may allow a bigger circle of (still authorised and regulated) issuers beside the usual commercial banks creating traditional bank money, but the quantity of electronic money issued may be subject to restrictions<sup>24</sup> different to those for traditional bank money where the creation is only – rather notionally<sup>25</sup> – limited by the fractional reserve system. A central bank that issues its own electronic money effectively launches a digital currency beside cash or legal tender currency and competes as commercial bank with the other commercial banks and other authorised issuers. This digital currency can be a cryptocurrency, but that is a technological, not legal, categorisation.

The Bank of England defines cryptocurrencies as private currencies: ‘Cryptocurrencies combine new payments systems with new currencies that are not issued by a central bank’,<sup>26</sup> and gives Bitcoin and Ethereum as examples.<sup>27</sup> This definition is not compelling because a central bank can also use cryptocurrency technology for its own digital currency. Apart from that, electronic or digital currencies have already been provided by the Bank of England for a long time, mostly to commercial banks as central bank reserves, while the general public can currently hold central bank money (as cash) in physical form only (banknotes).<sup>28</sup>

However, since the terminology is really a question of labelling, one can make the distinction between regulated digital currencies (called ‘electronic money’) which are issued by central banks, commercial banks and other electronic money issuers, all of which are authorised, and cryptocurrencies which are privately created and not necessarily authorised or regulated. The terminology is not stringent in any particular direction. The Bank of England has recently dropped plans to launch its own digital currency to rival private cryptocurrencies, because of fears that the issuing of digital currencies by central banks could lead to instabilities of the global financial system,<sup>29</sup> a concern that was echoed by the Bank for International Settlement (BIS).<sup>30</sup>

A digital currency issued by an ordinary commercial bank, or by a central bank acting as a normal commercial bank in line with the EU-Directive 2009/110/EC, is similar to the old commercial banks’ practice to issue their own banknotes, a practice which continued well into the nineteenth century. Digital currency is cash

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<sup>24</sup> Directive 2009/110/EC, Art. 5.

<sup>25</sup> Bank of England (McLeay, Michael, Radia, Amar and Thomas, Ryland), ‘Money creation in the modern economy’, *Quarterly Bulletin Q1* (2014), pp. 14, 15.

<sup>26</sup> See Bank of England, ‘Digital Currencies’, available at: <https://www.bankofengland.co.uk/research/digital-currencies> (visited 21 Nov. 2018).

<sup>27</sup> See below under 3 for these private digital currencies.

<sup>28</sup> Bank of England, ‘Digital Currencies’, available at: <https://www.bankofengland.co.uk/research/digital-currencies> (visited 21 Nov. 2018).

<sup>29</sup> David Thorpe, ‘Bank halts crypto-currency plans over stability fears’, *FT Adviser*, 4 Jan. 2018.

<sup>30</sup> Claire Jones, Hannah Murphy, ‘Central bank cryptocurrencies pose stability risk, says BIS’, *Financial Times*, 12 March 2018.

and currency, but not legal tender. But that is not a novelty either: traditional bank money essentially also operates as currency today, and although it is not technically legal tender, there is very little difference in effect. Both traditional bank money and electronic money undermine the old State theory of money<sup>31</sup> with its arguably already out-dated idea that money ('cash') must be issued by a state authority, either by the state itself (coins) or its central bank (banknotes). Electronic money and digital currencies are therefore not really new phenomena from a legal-conceptual perspective.

It can become complicated to distinguish the pedigree of different versions of electronic money if a central bank does decide to issue digital currency: what is traditional cash and what is electronic cash? As long as traditional cash is reified by banknotes (paper money), such a distinction is possible in principle. However, 'cashless payment', that is, electronic bank money transfer, looks the same as a central bank money transfer of this new electronic money/digital currency, and any concept of legal tender becomes doubtful. The origin and creation of these versions of electronically recorded, stored and transferred money are nevertheless fundamentally different: the central bank money creation of electronic money on the one hand, and the commercial bank money creation of electronic money on the other. For the ordinary customer a distinction between electronic cash (central bank money) and electronic bank money is almost inconceivable, particularly if operated through the same plastic card and paid in electronically into a bank account.

There could also be the option of issuing electronic money not through creation of a debt: the fundamental distinguishing factor between central and commercial bank money on the one hand and forms of electronic money on the other would then be whether the money comes into existence as a debt – like with cash/central bank money and commercial bank money – or not (which would also be a possibility since money need not be based on debt). In case of a difference, parallel systems of electronic currency (electronic commercial bank money and electronic central bank money or 'e-money') could hardly be maintained separately in banking practice. However, the EU-Directive on electronic money seems to envisage electronic money based on debt anyway.<sup>32</sup>

This difficulty of distinguishing also affects the discussion about the abolition of cash: in principle, the abolition of paper notes does not necessarily mean that cash

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<sup>31</sup> Charles Proctor, *Mann on the Legal Aspect of Money*, 7<sup>th</sup> ed. (Oxford: Oxford University Press, 2012), pp. 50-51.

<sup>32</sup> Directive 2009/110/EC, Art. 2(2): "electronic money" means electronically ... 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 ...' (emphasis added). That seems to mirror the *Foley v. Hill* rule of customer's deposits in a bank account and the transferability of the customer's claim or credit for the purpose of payment, so that this rule does not indicate a conceptual difference.

will be abolished, as long as the electronic money replaces the paper money but the origin and method of money creation remain the same: the issue of electronic money stays with the central bank on the same terms as with old paper money. However, it will be hard to ascertain the conversion of electronic central bank money ('cash') into commercial bank money when a customer pays her electronic cash into her bank account, for example. The underlying idea of the abolition of cash is, however, not so much the progress towards digitisation, but the complete replacement of central bank money by commercial bank money that is to circulate in the economy, so that the creation of money is entirely in the hands of commercial banks, that is, private enterprises. That obviously raises serious economic and political concerns.<sup>33</sup> But it could be a move with results probably not too different from the effect of private digital currencies or cryptocurrencies.

### **3 Private digital currencies: cryptocurrencies – Bitcoin**

Cryptocurrencies, the best known being Bitcoin, are defined here as private digital currencies that are not – or in principle not – originating from a central or commercial bank or another authorised issuer of electronic money. Sweden, for example, is currently looking into a 'cryptocurrency', but that also appears to be a form of electronic money (central bank money), and the Swedish Riksbank has recently warned against false reports that it sells 'e-kronas'.<sup>34</sup> For the question whether a medium of exchange is money it is theoretically irrelevant whether it is a debt, reified in form of paper or coin or not, or a token without the quality of a debt, physical or virtual, such as a 'Bitcoin'. What matters for its quality as being money is whether the law designates or recognises it as money (*first case*) and whether it originates from a legally authorised issuer (*second case*). As with electronic money or digital currency issued by banks, the most important distinguishing factor with cryptocurrencies is whether the money comes into existence as a debt – like with cash and commercial bank money – or not. If not, then it also matters whether this virtual monetary unit is expected to be converted readily into conventional cash or bank money, in which case one may ask whether there is a need to interpose this unit as an additional means of exchange if one finally resorts to conventional debt-based money anyway. Bitcoin, for example, seems to be dependent on this (perceived) convertibility. The following

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<sup>33</sup> E.g. Chris Giles, 'Scrap cash altogether, says Bank of England's chief economist', *Financial Times*, 18 Sept. 2015; Patrick Jenkins, 'We don't take cash: is this the future of money?', *Financial Times*, 10 May 2018.

<sup>34</sup> See Swedish Central Bank (Riksbank), available at: <https://www.riksbank.se/en-gb/financial-stability/payments/e-krona/> (visited 21 Nov. 2018).



discusses Bitcoin as the most important example of a private digital currency or cryptocurrency.

Bitcoin operates on the basis of blockchain technology. Blockchain ensures the digital transfer of information with a mathematical algorithm, a hash function, that takes an input and transforms it into an output (hash). The algorithm used is cryptographic, so that the input data can hardly be recreated from the algorithmically transformed value. Blockchain consists of a chain of transactional records that network participants or ‘miners’ enrich by solving difficult mathematical-computational problems. Miners then compete anonymously on the network to solve the mathematical problem and in this way add the next block to the blockchain. The block reward for this endeavour are ‘newly minted coins’ (newly created digital tokens) which are sent to the miner’s public address. The more miners exist, the more complicated the computational problems become to mine a new block. For the transfer of information, for example payment, blockchain technology ensures the elimination of double-payment.<sup>35</sup> Each agent is assigned a private key (kept secret) and a public key (shared with all other agents). A transaction is initiated when the future owner of the ‘coins’ sends his/her key to the original owner. The ‘coins’ are transferred by the digital signature of a hash. Public keys are cryptographically generated addresses stored in the blockchain. Each coin is associated with an address, and a transaction is a transfer from one address to another. If the miner wants to use/spend these ‘coins’ he/she has to sign with the corresponding private key. Transactions do not disclose the actors’ identity but remain traceable as such.<sup>36</sup> The potential use of blockchain technology is not restricted to cryptocurrencies, but can extend to the safe signing and transfer of digital contracts and documents of all sorts, like conveyancing documents or negotiable instruments.<sup>37</sup>

Blockchain is a distributed ledger technology – ‘ledger’ because any change of information appears as a new entry in the ledger, a new ‘block’, so that all changes of information are recorded and not replaced and can therefore be traced. When a party makes a transaction to another, a number of Bitcoins are transferred, and the parties’ public addresses and the transaction time are recorded on a public ledger. The distributed, as opposed to a centralised, method, makes the apparent appeal of

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<sup>35</sup> Usually Bitcoin explanations talk about the ‘double-spending’ problem, a legally imprecise term, because what we are interested in here is ‘payment’ in a technical sense.

<sup>36</sup> Marc Pilkington, ‘Blockchain Technology: Principles and Applications’, in F. Xavier Olleros and Majlinda Zhegu (eds), *Research Handbook on Digital Transformations* (Cheltenham: Edward Elgar, 2016), pp. 225, 226, 228.

<sup>37</sup> For example with the use of Ethereum, a blockchain-based platform for digital contracts, see Marc Pilkington, ‘Blockchain Technology: Principles and Applications’, in F. Xavier Olleros and Majlinda Zhegu (eds), *Research Handbook on Digital Transformations* (Cheltenham: Edward Elgar, 2016), p. 240.

Bitcoin.<sup>38</sup> The most important feature is that it is a peer-to-peer system of electronic cash creation and transmission: transactions occur among users directly without the involvement of a financial intermediary, that is, a bank.<sup>39</sup> This decentralised public ledger system can become a competitor to traditional payment agencies, and since the transfer system is effected by millions of anonymous users, any regulation is difficult. That is the original idea of Bitcoin: digitally sending something of actual value directly between the parties to the transaction, without any human intermediary,<sup>40</sup> with greatest reliance on the accuracy of the encrypted data, but without any possible interference by a regulating body who could seize upon an intermediary, such as a bank, and, equally important, without an intermediary bank imposing costs and fees. Bitcoin also competes with the fiat currency issued by the central banks.<sup>41</sup>

This brief explanation of Bitcoin should be sufficient for present purposes. It has been commented that available descriptions of Blockchain and Bitcoin ‘are marked by an apparent widespread absence of sufficiently authoritative description. It appears that most descriptions of the two are liberally sprinkled with metaphor, ostensibly in order to more carefully explain it to a business readership.’<sup>42</sup> This reflects the author’s own observations at respective conferences and elsewhere: when the merits of Bitcoin or otherwise will be discussed now, one should never forget that Bitcoin is just another financial business product that wants to be sold, like mortgages or credit derivatives, and its apparent libertarianism and anarchistic freedom are only advertising strategies that pretend an alternative. But it seeks to present itself as a social movement.<sup>43</sup>

The system of Bitcoin is based on scarcity, that is, the ‘mining’ of ‘coins’ is limited by the algorithm to just under 21 million Bitcoins. In this regard it is not dissimilar to commodity money or commodity-backed money based on precious

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<sup>38</sup> Gary Lilienthal, Nehaluddin Ahmad, ‘Bitcoin: is it really coinage?’, (2018) 24(3) *Computer and Telecommunications Law Review*, 49, 50.

<sup>39</sup> Lerong Lu, ‘Bitcoin: speculative bubble, financial risk and regulatory response’, (2018) 33(3) *Butterworths Journal of International Banking and Financial Law*, 178. In the words of the purported inventor of Bitcoin, Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008): ‘What is needed 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. Transactions that are computationally impractical to reverse would protect sellers from fraud, and routine escrow mechanisms could easily be implemented to protect buyers.’, available at: <https://bitcoin.org/bitcoin.pdf> (visited 15 July 2018).

<sup>40</sup> Gary Lilienthal, Nehaluddin Ahmad, ‘Bitcoin: is it really coinage?’, (2018) 24(3) *Computer and Telecommunications Law Review*, 50.

<sup>41</sup> Max Raskin, David Yermack, ‘Digital currencies, decentralized ledgers, and the future of central banking’, in: Peter Conti-Brown and Rosa Lastra (eds), *Research Handbook on Central Banking* (Cheltenham: Edward Elgar, 2018), pp. 474, 476.

<sup>42</sup> Gary Lilienthal, Nehaluddin Ahmad, ‘Bitcoin: is it really coinage?’, (2018) 24(3) *Computer and Telecommunications Law Review*, 49.

<sup>43</sup> Nigel Dodd, ‘The Social Life of Bitcoin’, (2018) 35(3) *Theory, Culture and Society*, 35, 40.

metal. The difference is that technological advances can make the mining of gold and silver quicker and more efficient, while the Bitcoin system makes mining more complex with every new Bitcoin created. The intensive use of energy for mining by computers is already dangerously high, and given the challenging situation of the world climate any extensive further mining for more widespread use of Bitcoin would be out of question just because of that.<sup>44</sup> This scarcity – literally a virtual scarcity – was a principal reason behind the speculative bubble of Bitcoin until late 2017; the bubble burst just before Christmas: on 16 July 2017 the price of Bitcoin was US\$ 1,938.94, on 15 Nov. 2017: \$ 7,279.00, on 15 July 2018: \$ 6,349.04, with the peak of \$ 19,343.04 on 16 Dec. 2017. This is market behaviour comparable to the historical Dutch tulip speculation of 1637, and equally perilous. Not surprisingly, Bitcoin has already been termed a ‘scam’.<sup>45</sup> A member of the executive board of the European Central Bank has described Bitcoin as ‘the evil spawn of the financial crisis’ and as ‘a combination of a bubble, a Ponzi scheme and an environmental disaster’.<sup>46</sup>

The scarcity inbuilt in the Bitcoin system invites hoarding and speculation, and if Bitcoin is a currency, then this is a particularly extreme example of the non-neutrality of money (although mainstream economics postulates money as neutral). It is certainly not an invariant unit of account or *numéraire*, but a commodity for speculation purposes, whereby the original purpose of the commodity becomes irrelevant in the speculation. Bitcoin is not a generally accepted means of payment either, so it is not a medium of exchange as normal money would be. And Bitcoin is not a store of value because that cannot be achieved with these massive changes in value due to the speculative movements of a small number of issuers and of investors in the high-tech sector. Thus Bitcoin is not a currency as normally understood. If anything, then Bitcoin gives a chance to obtain currency of an increased amount of value at a later point in time. A major reason for the Bitcoin boom has been that with Bitcoin businesses in China could circumvent the official banking channels for transferring money abroad which are severely restricted and closely monitored by the Chinese government. So transferors convert currency into Bitcoin and then reconvert Bitcoins into the currency of the destination to avoid government regulation. Leaving aside the further concern of Bitcoin as a vehicle for money laundering and other

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<sup>44</sup> Lerong Lu, ‘Bitcoin: speculative bubble, financial risk and regulatory response’, (2018) 33(3) *Butterworths Journal of International Banking and Financial Law*, 178-179.

<sup>45</sup> Bill Harris (founding CEO of PayPal), ‘Bitcoin is the greatest scam in history’, *recode*, 24 April 2018, available at: <https://www.recode.net/2018/4/24/17275202/bitcoin-scam-cryptocurrency-mining-pump-dump-fraud-ico-value> (visited 15 July 2018).

<sup>46</sup> Claire Jones, ‘ECB official dubs bitcoin ‘evil spawn of the financial crisis’, *Financial Times*, 15 November 2018.

criminal activities,<sup>47</sup> this shows that Bitcoin, though technically a separate unit, still operates with reference to a real currency only for the foreseeable future: in this regard, there is no difference to property or gold as an object of speculation, transfer and/or money laundering. The nature of Bitcoin has also been likened to a bill of lading or another registrable security or documentary intangible.<sup>48</sup> This may be so, but a bill of lading refers to property with an intrinsic value, goods and physical property, while Bitcoin ultimately refers to currency as the most fungible property. So its interposition is superfluous, given that real currency can achieve at least the same as Bitcoin, especially payment. Since for its actual purpose, payment, Bitcoin must ultimately rely on existing currency, this suggests that the real role of Bitcoin at the moment is to enable speculation and the circumvention of fiscal regulations in particular.

The distinguishing and seemingly attractive feature of Bitcoin, to cut out the middleman in the money transfer, the bank, or to become independent from state-issued fiat money, is no longer that appealing after a closer look. The Bitcoin idea suggests decentralised ‘money’ and therefore independence from banks and denationalisation of money or cash that is supposed to become free from central banks as issuers. The argument for a denationalisation of money is not a new one; a prominent representative of this argument was F. A. Hayek. In his view, a free trade in money would ensure that monetary and financial agencies were forced to issue a kind of money that is not substantially less reliable and useful than that of their competitors, because the public would otherwise switch to the more reliable alternative currency. Since discharge of debts does not have to happen with legal tender, and legal tender is a mystical and dispensable concept anyway, there is no need that the state issues the money. Hayek argues that private money can perfectly well operate as a payment method: it is sufficient if the law enables the judge to decide in what sort of money a particular debt can be discharged. Far better than government monopoly, competition would control and safeguard the value of a currency. The situation for such private money, Hayek says, is similar to that of existing bank money: here depositors also trust their banks that they will always be able to exchange demand deposits for cash, even if they know that a bank can never meet all cash payment obligations at the same time. Money which preserves its purchasing power without significant variability would remain in continuous

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<sup>47</sup> Lerong Lu, ‘Bitcoin: speculative bubble, financial risk and regulatory response’, (2018) 33(3) *Butterworths Journal of International Banking and Financial Law*, 178, 180.

<sup>48</sup> Gary Lilienthal, Nehaluddin Ahmad, ‘Bitcoin: is it really coinage?’, (2018) 24(3) *Computer and Telecommunications Law Review*, 55.

demand.<sup>49</sup> M. Friedman and A. J. Schwartz seconded Hayek and added that government intervention was at least as often a source of instability and inefficiency as the reverse, and that the establishment of a central banking system (Federal Reserve System in the US) did more harm than good; monetary and banking arrangements should rather be left to the market.<sup>50</sup>

As with all ideas of *laissez-faire* liberalism, this one also presupposes all market participants being on a level playing field which has never existed at the beginning and which becomes increasingly skewed with further evolvement. If one assumes that Bitcoin is already a fully functioning currency, this and other private (digital) currencies would have the following effects. As all currencies, these ‘free’ currencies would be the object of speculation, so every market participant would have to decide which currency should be used for the discharge of debts: effectively, all businesses and all individuals would have to be their own informed private trader and follow closely the currency market to avoid severe exchange losses. That would apply to the pensioner, the specialist in medieval history, the French teacher, the garden designer and the doctor because we all pay with currency: beside our actual jobs we would all have to acquire the relevant business skills to cope with keeping our purchase power afloat. There would also be an unprecedented rise in carry trade which may contribute to the destabilisation of currencies,<sup>51</sup> and this trade would not only happen between different national currencies as it is now, but between parallel global private currencies, and further perilous speculation would ensue. The ‘free market’ would necessarily lead to monopolies and oligopolies soon, so that a few remaining players would dominate the Bitcoin and cryptocurrency market in respect of mining, hoarding and payment facility. The history of the internet in the 1990s is a role model for such a development: the supposedly democratic-anarchistic internet has become an internet of Facebook, Google and Amazon. The entities which control cryptocurrencies can be the existing or new transnational internet giants, but also banks themselves who either directly, or through subsidiaries, become the hidden dominant powers in the cryptocurrency market. That can assist them in circumventing banking regulation applicable to them.

Once a domination of the ‘free’ market of cryptocurrencies is established, large multinational entities can then exercise economic pressure against states, other businesses and individual employees as to which currencies have to be accepted as

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<sup>49</sup> Friedrich August Hayek, *Denationalisation of Money: The Argument Refined*, 3rd ed. (London: The Institute of Economic Affairs, 1990), pp. 23, 37-38, 48-49, 52.

<sup>50</sup> Milton Friedman and Anna J. Schwartz, ‘Has the Government any Role in Money?’ (1986) 17 *Journal of Monetary Economics*, 37, 40, 59.

<sup>51</sup> Markus K. Brunnermeier, Stefan Nagel, Lasse H. Pedersen, ‘Carry Trades and Currency Crashes’, (2008) 23(1) *NBER Macroeconomics Annual*, 313, 341-342.

payment of business debts or of salaries. One can be sure that the currency issuers/controllers will not lose out, so that they may stipulate that specific currencies are not (always) accepted as full discharge of debt. That would be possible because there is not supposed to be a fiat money system anyway. Every payment in a certain currency is therefore really *in lieu of* payment, and the accepted concrete payment will be the one with a currency which gives the creditor the best purchase power according to the market at a given moment. Currency market manipulations will be likely. A free digital currency system would allow creditors to control when and with which currency the debt can be discharged at all. Since Bitcoin prides itself of providing a secure encryption to prevent fraud and of being open to an indefinite number of users in a peer-to-peer network, an effective banking regulation is practically impossible. While the transactions can be traced, the identity of the multitude of users cannot, and there is no established entity (like a bank) which could be the addressee of regulatory measures. For a regulator and the law, this is asymmetric warfare. That may appeal to some internet gurus, but only large corporations can and will eventually benefit.

For these reasons, liberalisation of currencies in form of Bitcoin and other private digital currencies should be rejected; even an open prohibition should be a debatable option.<sup>52</sup> Bitcoin was never ‘free’, libertarian or ‘anarchistic’, this is only a sales pitch of the companies that sell the technology for cryptocurrencies. Bitcoin also has a tinge of the clandestine and secretive with its complex energy-intensive computer operations and the opacity of its private actors, which does not make it an appealing alternative currency in a democratic society.

#### **4 Conclusion**

A categorisation of different forms of electronic money, digital money or cryptocurrencies is probably best based on a concept of ‘cases’ or ‘features’ of money which circumscribe the legal and sociological space of relations which money creates. Relevant here are the first case of money, the case of naming (*nominativus*) which denotes the naming of money as ‘money’ by the law, through either (statutory) designation or recognition, and the case of origin (*genitivus*) which establishes whether the medium of exchange has been issued by a legally established or recognised authority. Through this authorised issue the medium in question obtains

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<sup>52</sup> On the crackdown on Bitcoin exchanges by the Chinese authorities, see Lerong Lu, ‘Bitcoin: speculative bubble, financial risk and regulatory response’, (2018) 33(3) *Butterworths Journal of International Banking and Financial Law*, 181.

the quality of money. This approach is not dependent on whether the money is represented by physical property (paper notes) or electronically. Today conventional bank money is already always ‘electronic money’, so ‘electronic or physical’ is a false dichotomy. In this way one can also define cryptocurrencies, the most important example being Bitcoin. However, the qualities of Bitcoin, scarcity, extensive energy use, lack of transparency and impossibility to regulate because of its peer-to-peer setup, which invites speculation and illegal transactions, make Bitcoin appear unattractive as a future currency alternative. The libertarian-anarchistic rhetoric of the Bitcoin movement is here rather delusive. Indeed, an outright prohibition may be the appropriate course of action. Currencies in democratic political systems should not stand against democratic transparency. However, myths always seem to be at the cradle of systems of money: the narrative of the mysterious inventor of Bitcoin<sup>53</sup> is just one further telling example.

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<sup>53</sup> L.S., ‘Who is Satoshi Nakamoto?’, *The Economist*, 2 Nov. 2015.