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# Cryptocurrency

## Commodity or Credit?

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### 1. Introduction

Joseph Schumpeter wrote in 1917, “There are only two theories of money which deserve the name: the commodity theory and the claim theory” (1917: 649). The commodity theory, which is typically associated with Aristotle, John Locke, Adam Smith, Karl Marx, and Karl Menger, holds that commodities are central to understanding the nature of money. The claim or credit theory, which is associated with Georg Friedrich Knapp, Alfred Mitchell Innes, and John Maynard Keynes, holds instead that money is to be understood in terms of credit and debt. To this day, the commodity theory and the credit theory are regarded by many theorists as the two main rival accounts of the nature of money.

Yet in recent years, the institution of money has been revolutionized in ways that most commodity and credit theorists could hardly have anticipated. The revolution is the advent of cryptocurrency. The first cryptocurrency, bitcoin, was invented in the late 2000s. The central ideas behind this new form of money were described in a 2008 paper entitled “Bitcoin: A Peer-to-Peer Electronic Cash System,” authored by a person or group of people under the pseudonym Satoshi Nakamoto. In early 2009, bitcoins officially came into existence. Since then, countless alternative cryptocurrencies have been developed. According to *Coinmarketcap*, a cryptocurrency market research website, there are more than 22,000 cryptocurrencies in existence as of March 2023, and the total value of all the crypto coins in circulation exceeds \$1 trillion. It is undeniable that cryptocurrency plays an important role in today’s world of business and finance.

Supposing that cryptocurrency is a new form of money, the question arises whether the commodity and credit theories can adequately account for it. This is the central question that I address in this chapter. The question is interesting and important for two reasons. On the one hand, we currently lack a good understanding of the nature of cryptocurrency. Examining cryptocurrency through the lens of the two traditional accounts of money may help us to acquire a better understanding of this new phenomenon. On the other hand, cryptocurrency can serve as an important new test case for the commodity and credit theories. Any

theory of the nature of money that hopes to be adequate for the twenty-first century must be able to account for all existing forms of money, including cryptocurrency. Thus, examining the commodity and credit theories from the vantage point of cryptocurrency may help us to adjudicate between these two theories, which in turn may help us to move beyond the current stalemate in the literature.

I shall argue that neither the commodity theory nor the credit theory on its own can adequately account for cryptocurrency, but that a hybrid of the two theories can adequately do so. Here is a roadmap of the chapter: In section 2, I provide an overview of what cryptocurrency is and how it differs from standard forms of money. The next four sections examine the commodity and credit theories in light of the advent of cryptocurrency. Section 3 expounds and interprets the commodity theory, and section 4 considers whether and to what extent this theory can accommodate cryptocurrency. Sections 5 and 6 do the same for the credit theory. Finally, in section 7, I propose a hybrid hylomorphic account of money which draws on aspects of both the commodity and credit theories, and I argue that this hybrid account avoids the main problems faced by both theories.

## 2. Cryptocurrency

Cryptocurrency is regarded by many experts and laypersons alike as a new form of money.<sup>1</sup> The central feature that it shares with more familiar forms of money, such as US dollars or euros, is that it is designed to be a medium of exchange. Moreover, the more established cryptocurrencies, such as bitcoin and ethereum, fulfill this function of being a medium of exchange to some extent. Bitcoin, for instance, is routinely used as a medium of exchange in some corners of the internet (Hazlett and Luther 2020: 148). Of course, the number of merchants who accept bitcoin in exchange for goods and services is still relatively small, especially in comparison with the number of merchants who accept mainstream currencies such as US dollars or euros. But in this regard, bitcoin is not so different from standard currencies which are not widely traded.

Furthermore, given that cryptocurrency is designed to be an alternative to standard forms of money, it is plausible to suppose that it is designed to serve the other characteristic functions of money, namely being a unit of account and a store of value. And again, the more established cryptocurrencies do seem to fulfill these functions to at least some degree—though there is significant disagreement among experts over just how well these cryptocurrencies perform these functions. For instance, the economist David Yermack has argued that bitcoin functions poorly as a store of value due to its high price volatility (2015: 40–1), whereas the

<sup>1</sup> There are some experts who disagree. For example, Yermack (2015) maintains that bitcoin is more similar to a speculative investment than a bona fide currency.

cryptocurrency expert David Zeiler maintains that bitcoin has become a store of value like gold (Ashford 2023). However, even if the skeptics are right and cryptocurrencies function poorly as a unit of account and a store of value, cryptocurrencies would not be so different in this regard from standard currencies which are functioning poorly, such as the Argentine peso or the Zimbabwean dollar.

A final point of similarity between cryptocurrency and standard currencies is that the most established cryptocurrency—namely, bitcoin—is legal tender in certain jurisdictions, which means that it is “recognized by law as a means to settle a public or private debt or meet a financial obligation, including tax payments, contracts, and legal fines or damages.”<sup>2</sup> At present, there are two countries which recognize bitcoin as legal tender. El Salvador was the first to do so, adopting bitcoin as legal tender in 2021. The Central African Republic followed suit in 2022. Thus, until quite recently, a significant difference between cryptocurrency and standard currencies was that cryptocurrencies were not legal tender in any jurisdiction. But that has since changed.

Still, there are several important differences between cryptocurrency and standard currencies. The first is that standard currencies have physical tokens. For example, there are physical US dollar bills and physical quarters and dimes which trade hands in market transactions. Many standard currencies also have electronic tokens. Thus, there are electronic US dollars which never trade hands but nevertheless exist in someone’s bank account. However, there is no standard currency that has only electronic tokens. All standard currencies have at least some physical manifestations. In contrast, cryptocurrencies are entirely virtual or digital. There are no physical crypto coins which would serve as the analogue of US dollar bills or quarters. A crypto coin is, by its very nature, a virtual or digital thing.

Another key difference between cryptocurrencies and standard currencies is that standard currencies are largely issued, controlled, and maintained by a government, central bank, or other public authority. For example, US dollars are largely issued, controlled, and maintained by the US government and the Federal Reserve.<sup>3</sup> In contrast, cryptocurrencies are issued, controlled, and maintained entirely by private individuals. Many cryptocurrencies, including bitcoin and ethereum, are also decentralized. This means that there is no central authority at all—public or private—which is charged with issuing, controlling, and maintaining the currency. Instead, the currency is issued, controlled, and maintained by a diffuse network of individuals. For example, any bitcoin transaction is validated by another participant in the bitcoin system who is mining for bitcoins.

<sup>2</sup> This definition of “legal tender” is from *Investopedia* (2021: para. 1).

<sup>3</sup> It should be noted that private commercial banks also play a role in the issuance of standard currencies such as the US dollar, as these banks effectively create new money when they extend loans to customers. Thanks to Joakim Sandberg for this point.

In exchange for successfully validating a transaction, the bitcoin miner is rewarded with new units of the currency.<sup>4</sup>

A final distinctive feature of cryptocurrency is its reliance on cryptography—hence the “crypto” in cryptocurrency. In the case of standard currencies, people use the currency largely because they have trust in the public authority that is responsible for issuing and controlling the currency. For example, people use US dollars because they have sufficient trust in the US government and the Federal Reserve. But in the case of cryptocurrencies, there is no public authority that issues or backs the currency, and so the currency cannot rely on trust in the same way that standard currencies do. Instead, cryptocurrencies rely on cryptographic proof, as Nakamoto (2008) explains in his paper outlining the idea of bitcoin. Specifically, cryptography is used to control the creation of new bitcoins at a rate that was determined when the system was created. This ensures that the supply of bitcoins remains low enough that bitcoins retain their value. Cryptography is also used to validate and record all bitcoin transactions. This ensures that an individual who transfers bitcoins to another party is in fact the owner of these coins and is transferring them only once. Other cryptocurrencies employ cryptography in a similar fashion to muster confidence among would-be users.<sup>5</sup>

To summarize, cryptocurrencies resemble standard currencies insofar as they are designed to be a medium of exchange, unit of account, and store of value. And like standard currencies, they tend to fulfill these functions to at least some extent. Moreover, like standard currencies, the most established cryptocurrency is legal tender in certain jurisdictions. However, unlike standard currencies, cryptocurrencies are entirely virtual; they are issued and controlled by private individuals and not by a government or central bank; and their ability to function as money essentially relies on cryptography rather than trust in a public authority.

### 3. The Commodity Theory

Let us now proceed to examine the two main rival theories of money to see how well they are able to accommodate cryptocurrency. I begin with the commodity

<sup>4</sup> Some have argued that bitcoin is in fact more centralized than it appears to be. For example, Stefan Eich points out that bitcoin’s mining algorithm favors large conglomerates of miners and that as a result, the creation of new bitcoins and the validation of bitcoin transactions is mostly in the hands of a small number of large conglomerates (2019: 94). But even if Eich is right that bitcoin is more centralized than its proponents claim, it remains the case that bitcoin is still less centralized than standard currencies. Furthermore, it is a contingent feature of bitcoin that its mining algorithm favors large conglomerates of miners. It is not essential to cryptocurrency as such that it employ such a mining algorithm.

<sup>5</sup> As Eich notes, cryptocurrencies still rely on trust to some extent (2019: 94). For example, there must be mutual trust among the users of the cryptocurrency, trust in the underlying code, and trust in any authority that is charged with adjudicating exceptional cases. So, cryptography does not altogether obviate the need for trust. Still, trust plays a much more limited role in the case of cryptocurrencies than in the case of standard currencies.

theory. This theory has a long and illustrious history, having been endorsed in one form or another by many preeminent philosophers and economists, including Aristotle (*Politics* I.8–10), Locke (*Second Treatise* V.36–51), Smith (1776/1981: ch. 4), Marx (1867/1906: ch. 3), and Menger (1892). Unsurprisingly, there are many different versions and interpretations of this theory, and so our first task is to identify the central commitments of the theory. Following Geoffrey Ingham (2004: ch. 1), I shall construe the commodity theory as being committed to three central claims: a claim about the origin of money, a claim about the ontology of money, and a claim about the function of money. Let me elaborate on each of these claims in turn.

Commodity theorists tell a familiar story about how money emerged out of the exchange of commodities. One of the best-known versions of this story may be found in chapter 4 of Adam Smith's *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776/1981).<sup>6</sup> Smith argues that once there is division of labor in a society, a barter economy will naturally emerge. Every industrious person will specialize in producing one good and will thus end up with a surplus of this good, which they will then seek to exchange for other goods (1776/1981: ch. 4, para. 1). However, such a system of barter is inconvenient and inefficient because it requires a "double coincidence of wants." That is, each party must concurrently want what the other has. But this condition is oftentimes not met. Smith contends that a solution to this problem emerges spontaneously out of the self-interested actions of individuals:

In order to avoid the inconvenience of such situations, every prudent man in every period of society, after the first establishment of the division of labour, must naturally have endeavored to manage his affairs in such a manner, as to have at all times by him, besides the peculiar produce of his own industry, a certain quantity of some one commodity or other, such as he imagined few people would be likely to refuse in exchange for the produce of their industry.

(Smith 1776/1981: ch. 4, para. 2)

Gradually, the actions of individuals become coordinated so that everyone is stocking up on the same commodity, and everyone is accepting this commodity in exchange for their own produce. This one commodity thereby becomes a medium of exchange.

Smith notes that different commodities played the role of medium of exchange in different societies throughout history, for example, cattle in antiquity, shells in some parts of India, dried cod in Newfoundland, tobacco in Virginia, and sugar in some of the West India colonies (1776/1981: ch. 4, para. 3). But he suggests that all

<sup>6</sup> For another influential account, see Menger (1892: §§6–9).

societies eventually settle on some precious metal as their preferred medium of exchange. The reason is that metal is durable, easily divisible, and easily re-combinable, which makes it especially well-suited for being a medium of exchange (1776/1981: ch. 4, para. 4). Still, there is a problem with using precious metals in the form of “rude bars, without any stamp or coinage” as a medium of exchange; namely, they need to be weighed and their purity needs to be ascertained, and both of these tasks can be tedious and difficult. The solution to this problem which naturally emerges is regulation of the money supply by a public authority (1776/1981: ch. 4, para. 7). Thus, we have the emergence of money in one of its most familiar forms, namely metal coins issued and guaranteed by the government.

It is important to note that this story about the origin of money may be interpreted in several different ways. First, it is not entirely clear whether the story is meant to account for only the first forms of money or all forms of money. On the former interpretation, the story is only meant to explain how barter money and coined money came into being, whereas on the latter interpretation it is also meant to explain how paper money, electronic money, and other forms of money came into being. Second, it is unclear whether the story is providing a historical account of how money happened to originate or a philosophical account of how money must have originated. On the former interpretation, the story is giving an account of the actual contingent origin of money, whereas on the latter interpretation it is giving an account of the necessary origin of money.<sup>7</sup> I shall remain neutral on both of these interpretive issues. On my construal, then, the commodity theorist is committed to some version of the following claim about the origin of money:

COMMODITY ORIGIN: The first (or, all) forms of money actually (or, necessarily) originated spontaneously out of the market exchange of commodities, as a solution to the inconveniences of barter.

Commodity theorists also typically subscribe to a certain ontology of money. According to this ontology, a token of money just is a commodity. Thus, Aristotle conceives of money as “something that [is] a useful thing in its own right and that [is] convenient for acquiring the necessities of life: iron or silver or anything else of that sort” (*Politics* I.9 1257a37–9). How exactly we construe the commodity ontology will of course depend on how exactly we construe commodities. According to one standard definition, a commodity is a raw material or a primary

<sup>7</sup> Some of Smith’s remarks suggest that he takes himself to be giving an account of the necessary origin of money. For example, he says that “every prudent man in every period of society... must naturally have endeavored” to stockpile one commodity (1776/1981: ch. 4, para. 2). Furthermore, he claims that “it has been found necessary, in all countries that have made any considerable advances towards improvement, to affix a publick stamp” on certain quantities of metals (1776/1981: ch. 4, para. 7).

(i.e. basic) agricultural product that can be bought and sold.<sup>8</sup> Given this definition, the commodity ontology has it that a token of money just is a raw material or a basic agricultural product. This view would accommodate nearly all of Smith's examples of money, including cattle, shells, dried cod, tobacco, sugar, and precious metals.<sup>9</sup> However, the view cannot account for coined money or paper money, as metal coins and printed pieces of paper are neither raw materials nor basic agricultural products.

This problem can be dealt with by adopting a broader definition of commodities.<sup>10</sup> In particular, we may take a commodity to be a material thing that has some utility or value for us independently of its value in exchange.<sup>11</sup> Metal coins and printed pieces of paper are commodities in this broader sense because they do have some limited use value independently of their exchange value. Thus, for example, printed pieces of paper can be used as scratch paper, as material for a paper airplane, or as wallpaper.<sup>12</sup> I will interpret the commodity theorist's ontological claim in terms of this broader notion of a commodity, as the resulting claim is more plausible since it can accommodate coined money and paper money. Thus, I construe the commodity theorist's claim about the ontology of money as follows:

COMMODITY ONTOLOGY: A token of money is a commodity, in the sense of being a material thing that has some use value independently of its exchange value.

Finally, some interpreters construe the commodity theory as being committed to the view that the central or primary function of money is being a medium of exchange.<sup>13</sup> The other characteristic functions of money (viz., being a unit of

<sup>8</sup> This definition of "commodity" is from Oxford Languages.

<sup>9</sup> The view also accommodates Locke's main examples of money, which include gold, silver, diamonds, shells, and pebbles (*Second Treatise* V.46). However, Locke also writes that money is "some lasting thing that men might keep without spoiling" (*Second Treatise* V.47), which precludes many primary agricultural products from being money.

<sup>10</sup> Ingham offers another solution on behalf of the commodity theorist, which is to construe a token of money as "itself a tradable commodity, or the direct representative of a commodity or commodities" (2004: 33). Cf. also Menger, who writes of "certain commodities (these being in advanced civilizations coined pieces of gold and silver, together subsequently with documents representing those coins) becoming universally acceptable media of exchange" (1892: 239). However, to say that a token of money represents a commodity or commodities is not yet to say what this token of money is, any more than to say that Michelangelo's *David* represents David is to say what *David* is. In neither case have we specified the ontological nature or identity of the relevant entity (e.g. whether it is a material thing identical to its matter, a material thing distinct from its matter, or some other kind of thing). Thus, the view in question does not really provide an ontological account of money. Thanks to Olivier Massin for helpful discussion of this point.

<sup>11</sup> Marx construes commodities along these lines, writing that "a commodity is, in the first place, an object outside us, a thing that by its properties satisfies human wants of some sort or another" (1867/1906: 41).

<sup>12</sup> German banknotes were famously used as wallpaper during the period of hyperinflation following World War I.

<sup>13</sup> See Ingham (2004: 24) and Hubbs's unpublished manuscript "Only Two Theories Deserving of the Name: Explanations of the Ontology of Money."

account and a store of value) are taken to be secondary to, or derivative of, the function of being a medium of exchange. It is not entirely clear what this claim of centrality or primacy amounts to, and there are various ways in which one might try to spell it out. I propose to formulate the claim in essentialist terms, drawing on a neo-Aristotelian conception of essence.<sup>14</sup> According to this conception, a claim about the essence of a given item specifies what it is to be that item. The claim provides a partial or complete “real definition” of the item, which is a definition of the item itself as opposed to a definition of our word for it or our concept of it. Thus, for example, the claim that water is a substance composed of H<sub>2</sub>O molecules is plausibly construed as a claim about the essence of water, as it specifies what it is to be water and provides a real definition of water. Likewise, a claim about the essence of money specifies what it is to be money and provides a real definition of money. My proposal, then, is to construe the commodity theorist’s claim about the function of money as follows:

COMMODITY FUNCTION: It is essential to something’s being money that it function as a medium of exchange, but it is not essential to something’s being money that it function as a unit of account or a store of value.

In other words, the medium of exchange function specifies what it is to be money, whereas the unit of account and store of value functions do not specify what it is to be money. These latter functions are either necessary accidents (i.e. necessary but inessential features) or contingent features of money tokens, which are causally or constitutively explained by the medium of exchange function of money tokens.

#### 4. Cryptocurrency as Commodity

Having articulated the commodity theory’s central claims about money’s origin, ontology, and function, we are now ready to consider whether and to what extent the theory can accommodate cryptocurrency. Let us begin with the claim about money’s function, as it is the most conducive to cryptocurrency. As noted earlier, at least the more established cryptocurrencies, such as bitcoin and ethereum, fulfill the function of being a medium of exchange to some extent. Thus, if we restrict our attention to these cryptocurrencies, we do not find an obvious counterexample to the commodity theorist’s claim that it is essential to something’s being money that it function as a medium of exchange. The more established cryptocurrencies also fulfill the functions of being a unit of account and a store of value to some extent. But this is consistent with the view that money functions as a unit

<sup>14</sup> This conception of essence is prominent in contemporary analytic metaphysics. See, e.g. Fine (1994), Correia (2006), and Koslicki (2012).



of account and a store of value necessarily but accidentally, or contingently. So again, we do not find an obvious counterexample to the commodity theorist's claim that it is not essential to something's being money that it function as a unit of account or a store of value. It follows that the commodity theorist's claim about money's function can accommodate at least the more established cryptocurrencies.

Consider now the commodity theorist's claim about money's origin. Versions of this claim which pertain only to the first forms of money can accommodate cryptocurrency. For cryptocurrency is not one of the first forms of money; and it could not have been one of the first forms of money, as it requires advanced and sophisticated technology. However, versions of the claim which pertain to all forms of money cannot accommodate cryptocurrency. For cryptocurrency did not emerge spontaneously out of the market exchange of commodities as a solution to the inconveniences of barter. Instead, it was intentionally designed and created by individuals as a solution to the perceived problem of poorly managed government-issued currencies. The upshot is that some versions of the commodity theorist's claim about money's origin can accommodate cryptocurrency, whereas other versions of the claim cannot.

Finally, let us consider the commodity theorist's claim about money's ontology. Crypto coins do seem to belong to the ontological category of thing or object. Like physical coins, which are paradigmatic things, crypto coins can exist or fail to exist; they are located in time and persist through time; and they are capable of undergoing change over time. For example, a particular bitcoin can exist or fail to exist. If it exists, then it came into existence at a particular point in time and is therefore located in time. Furthermore, the bitcoin persists through time as it is transferred from one owner to another. And it can undergo change over time, such as fluctuations in its value. However, as noted earlier, crypto coins are not material things. They are entirely digital or virtual entities. As such, they are counterexamples to the commodity theorist's ontological claim.

It may be thought that the commodity theorist can deal with this problem by adopting an even broader definition of commodities. Specifically, the commodity theorist may simply drop the requirement that a commodity be a material thing. This move would accord with some recent usages of the term "commodity," which count cell phone minutes, bandwidth, and other such immaterial entities as commodities.<sup>15</sup> The resulting notion of a commodity would be that of a thing which has some utility or value for us independently of its value in exchange. A crypto coin, it may be argued, is a commodity in this very broad sense.

However, once the notion of a commodity has been broadened to this extent, it is unclear whether the resulting ontology is properly construed as a commodity

<sup>15</sup> See, e.g. Lioudis (2023).

ontology. After all, most commodity theorists take money to be material.<sup>16</sup> This indicates that materiality is a central aspect of the commodity theorist's ontology. But even setting this issue aside, the proposed modification is unsuccessful. For crypto coins are not commodities in the proposed sense of commodity: a crypto coin has absolutely no utility or value for us independently of its value in exchange. Unlike shells, cod, tobacco, sugar, pieces of metal, and even printed pieces of paper, crypto coins cannot be used for anything other than exchange. Thus, the ontology in question still cannot accommodate crypto coins. I conclude that cryptocurrency does pose a problem for the commodity theorist's ontology of money.

## 5. The Credit Theory

Let us now consider the credit theory. The credit theory has historically been the main alternative to the commodity theory. Versions of this theory were put forward by Knapp (1905/1924), Mitchell Innes (1913, 1914), and Keynes (1930/2013). More recently, the credit theory has been espoused by David Graeber (2011) and Stephanie Kelton (2020). I will argue that the credit theory also cannot accommodate cryptocurrency. I begin by expounding what I take to be the three central claims of the credit theory. These claims concern money's origin, ontology, and function, respectively.

Credit theorists offer a very different story of money's origin than commodity theorists. Here is Graeber's version of it:

Say, for example, that Joshua were to give his shoes to Henry, and, rather than Henry owing him a favor, Henry promises him something of equivalent value. Henry gives Joshua an IOU. Joshua could wait for Henry to have something useful, and then redeem it. In that case Henry would rip up the IOU and the story would be over. But say Joshua were to pass the IOU on to a third party—Sheila—to whom he owes something else. He could tick it off against his debt to a fourth party, Lola—now Henry will owe that amount to her. Hence is money born.

(Graeber 2011: 46)

In this story, money does not emerge as a medium of exchange that solves the problem of the double coincidence of wants. Rather, it emerges as an accounting tool that enables people to keep track of who owes whom what.

<sup>16</sup> See Aristotle (*Politics* I.9 1257a37–9), Locke (*Second Treatise* V.46–7), Smith (1776/1981: ch. 4), and Menger (1892: §1). It is less clear whether Marx construes money as something material, but it is also more controversial whether Marx is best construed as a commodity theorist.

However, as Graeber notes, “systems like these cannot create a full-blown currency system, and there’s no evidence that they ever have” (2011: 47). The problem is one of trust. Why should someone trust that an IOU with Henry’s signature is legitimate? After all, the signature might be forged, Henry may not be a man of his word, or Henry might not have the resources to make good on his promise. While it may be possible to ascertain all of this in a small village, it is practically impossible to do so in a larger society. State or chartalist credit theorists such as Knapp (1905/1924) and Keynes (1930/2013) came up with a solution to this problem—in a full-blown currency system, the IOUs are issued by the state rather than by private individuals. These IOUs are denominated in the state’s own unit of account, and they are officially accepted as payment for taxes. People trust the IOUs insofar as they trust the state and have confidence that they will be able to use the IOUs to pay their taxes. Full-blown currency—that is to say, money in its modern form—is therefore a creation of the state.

As in the case of the commodity theory, it is important to note that this story about the origin of money may be interpreted in several different ways. First, it may be taken to concern either the first forms of money or all forms of money. Second, it may be construed as providing an account of either the actual contingent origin of money or the necessary origin of money. As before, I shall remain neutral on both of these interpretive issues. On my construal, then, the credit theorist is committed to some version of the following claim about the origin of money:

CREDIT ORIGIN: The first (or, all) forms of money actually (or, necessarily) originated as an accounting tool to keep track of who owes whom what.

Furthermore, I construe the chartalist credit theorist as being committed to some version of the following further claim:

CHARTALIST CREDIT ORIGIN: Money in its modern form actually (or, necessarily) originated through state decree.

Credit theorists typically also subscribe to a substantially different ontology of money than commodity theorists. According to credit theorists, money is not a material thing. “The eye has never seen, nor the hand touched a dollar,” Mitchell Innes famously proclaimed (1914: 155). Instead, credit theorists construe money as an abstract relation, namely a credit/debt relation. Thus, Mitchell Innes says that “credit and credit alone is money” (1913: 392). More precisely, the credit theorist may be construed as maintaining that money is the abstract relation *having a claim or credit on*. An individual or entity  $x$  stands in the money relation to  $y$  just in case  $x$  has a claim or credit on  $y$  or  $y$  has a claim or credit on  $x$ . Credit theorists typically also hold that a unit of money or currency, such as the dollar or the euro, is an abstract entity. Specifically, it is taken to be an abstract unit of

measurement like the centimeter or the pound, and what it measures is the size of a credit or debt.<sup>17</sup> Thus, according to the credit theorist's ontology of money, both money itself and units of money are abstract entities rather than material things. Here, then, is how I construe the credit theorist's claim about the ontology of money:

**CREDIT ONTOLOGY:** Money itself is an abstract credit/debt relation, and a unit of money is an abstract unit of measurement which measures the size of a credit/debt.

Finally, credit theorists tend to uphold the view that the central or primary function of money is being a unit of account. Thus, for example, Keynes writes that "money of account, namely that in which debts and prices and general purchasing power are *expressed*, is the primary concept of a theory of money" (1930/2013: 3, emphasis in original).<sup>18</sup> The other characteristic functions of money (*viz.*, being a medium of exchange and a store of value) are taken to be secondary to, or derivative of, the function of being a unit of account. As in the case of the commodity theory, I propose to formulate this functionalist claim in essentialist terms. Specifically, I will construe the credit theorist's claim about the function of money as follows:

**CREDIT FUNCTION:** It is essential to something's being money that it function as a unit of account, but it is not essential to something's being money that it function as a medium of exchange or a store of value.

In other words, the unit of account function specifies what it is to be money, whereas the medium of exchange and store of value functions do not specify what it is to be money. These latter functions are either necessary accidents or contingent features of money tokens, and they are causally or constitutively explained by the unit of account function of money tokens.

## 6. Cryptocurrency as Credit

Having articulated the credit theory's central claims about money's origin, ontology, and function, let us now consider whether and to what extent the theory can accommodate cryptocurrency. I begin with the claim about money's function. As noted earlier, at least the more established cryptocurrencies fulfill the function of being a unit of account to some extent. So, if we restrict our attention to these

<sup>17</sup> See, e.g. Graeber (2011: 46).

<sup>18</sup> See also Ingham (2004: 56).

cryptocurrencies, we do not find an obvious counterexample to the credit theorist's claim that it is essential to something's being money that it function as a unit of account. The more established cryptocurrencies also fulfill the functions of being a medium of exchange and a store of value to some extent. But this is consistent with the view that money functions as a medium of exchange and a store of value necessarily but accidentally, or contingently. So again, we do not find an obvious counterexample to the credit theorist's claim that it is not essential to something's being money that it function as a medium of exchange or a store of value.

It may be objected that functioning as a medium of exchange is essential to cryptocurrencies because cryptocurrencies are primarily designed to serve the function of being a medium of exchange.<sup>19</sup> This objection presupposes that if *Ks* are primarily designed to serve function *F*, then it is essential to something's being *K* that it fulfill function *F*. While this principle has some intuitive plausibility, there are counterexamples to it. For example, chopsticks are primarily designed to serve the function of being eating instruments. Yet it is not essential to something's being a chopstick that it fulfill this function. Just consider a chopstick that is only used as a hair decoration. This is still a chopstick despite the fact that it never functions as an eating instrument.<sup>20</sup> Examples like this give us good reason to reject the principle underlying the present objection. The upshot, then, is that the credit theorist's claim about money's function can accommodate at least the more established cryptocurrencies.

Consider now the claims concerning money's origin which are put forward by the credit theorist and the chartalist theorist. Versions of the credit theorist's claim which pertain only to the first forms of money can accommodate cryptocurrency because cryptocurrency is not, and could not have been, one of the first forms of money. However, versions of this claim which pertain to all forms of money are more problematic because it is unclear whether cryptocurrency originated primarily as an accounting tool. As for the chartalist's claim, which pertains to money in its modern form, either version of this claim is problematic given that cryptocurrency is a modern form of money. For cryptocurrency originated out of the individual actions of private individuals and not through state decree. Thus, the chartalist's claim concerning money's origin cannot accommodate cryptocurrency. And while some versions of the credit theorist's claim can accommodate cryptocurrency, it is less clear whether other versions can.

Finally, let us consider the claim about money's ontology. Crypto coins are virtual or digital as opposed to material, and this accords well with the credit theorist's claim that money is abstract as opposed to concrete. However, as I argued earlier, a crypto coin is plausibly taken to be a thing or object rather

<sup>19</sup> Thanks to Graham Hubbs for raising this objection.

<sup>20</sup> This example is adapted from Thomasson (2014: 53–4). Cf. Koslicki (2018: §8.4.1) on how user intentions may sometimes override original author intentions.

than a relation or unit of measurement. For crypto coins possess many of the most characteristic features of things, including existing or failing to exist, being located in time, persisting through time, and being capable of undergoing change over time. In construing money as a relation and units of money as units of measurement, the credit theorist cannot account for the thing-like nature of crypto coins.

It may be objected that there is another important characteristic feature of things which crypto coins lack, namely having a single and relatively determinate location whenever they exist. My response to this objection is twofold. On the one hand, if the relevant notion of location includes location in digital space, then it may be argued that crypto coins do have a single and relatively determinate location in digital space. For example, any given bitcoin is located within the bitcoin blockchain. On the other hand, if the relevant notion of location is that of location in physical space, then I agree that crypto coins do not have a single and relatively determinate spatial location. In fact, I would argue that crypto coins do not have any spatial location whatsoever, as they are immaterial things.<sup>21</sup> However, it is not a characteristic feature of things in general that they have a single and relatively determinate spatial location whenever they exist. In particular, immaterial or abstract things, such as fictional characters, musical works, or novels, are not spatially located. Nevertheless, they are things or objects. Likewise, I suggest, crypto coins are things or objects despite not being spatially located. I conclude that cryptocurrency does pose a problem for the credit theorist's ontology of money.

## 7. A Hybrid Account

We have seen that the most problematic claim in the case of both the commodity theory and the credit theory is the claim concerning money's ontology. Neither the commodity ontology nor the credit ontology can adequately account for crypto coins: the former accounts for their thing-like nature but not their immateriality, whereas the latter accounts for their immateriality but not their thing-like nature. A natural thought is that a hybrid of the two ontologies—one that construes tokens of money as things but allows for these things to be immaterial or abstract—may be able to account for crypto coins. I shall now endeavor to develop such a hybrid ontology, drawing upon the resources of contemporary hylomorphism.<sup>22</sup>

<sup>21</sup> Crypto coins do bear a close relation to spatially located things. For example, bitcoins are stored on the bitcoin blockchain, and this blockchain is itself stored on a vast network of computers. But crypto coins are not spatially located where these computers are located, any more than the *Moonlight Sonata* is located where the computers on which it is stored are located. Thanks to an anonymous referee for pressing this point.

<sup>22</sup> For some prominent contemporary hylomorphic accounts of ordinary objects, see Fine (1982, 1999), Johnston (2006), and Koslicki (2008, 2018).

The basic idea of hylomorphism is that objects are compounds of matter and form. Consider, for example, an H<sub>2</sub>O molecule. According to hylomorphism, this object has both matter and form. We may take the matter to be the two hydrogen atoms and the oxygen atom, and we may take the form to be a certain chemical arrangement that is exhibited by the atoms (viz., being chemically bonded in the appropriate way). The H<sub>2</sub>O molecule, then, is a compound of these atoms and this chemical arrangement. Applying this basic idea to the case of money, we have it that tokens of money, such as dollar bills, metal coins, and bitcoins, are likewise compounds of matter and form.

Let me now develop the details of this hylomorphic conception of money.<sup>23</sup> I begin by addressing the following question: what serves as the matter of money tokens? In the case of physical money tokens such as quarters or dollars, the answer is straightforward: it is ordinary material objects that serve as matter. Thus, the matter of a quarter is a piece of metal, and the matter of a dollar bill is a piece of paper. But in the case of immaterial money tokens such as abstract “points,” electronic dollars, or bitcoins, there are no ordinary material objects which may plausibly serve as matter. I suggest that in these cases, it is immaterial or abstract objects which play the role of matter. Thus, numbers may serve as the matter of abstract “points,” and bits or blocks of data may serve as the matter of electronic dollars and bitcoins. One might worry that immaterial or abstract matter is a contradiction in terms because matter is, by definition, physical. But hylomorphists do not construe matter as physical by definition. In their view, an object’s matter is just the substance or substances from which that object is made. Given this conception of matter, there is nothing inherently contradictory in the idea of immaterial or abstract matter. For there is nothing inherently contradictory in the idea of immaterial or abstract substance.<sup>24</sup> Indeed, many hylomorphists explicitly countenance hylomorphic compounds with immaterial or abstract matter.<sup>25</sup>

The next question that must be addressed is this: what plays the role of form for money tokens? Following Kit Fine (1982, 1999) and Mark Johnston (2006), I adopt the view that properties and relations may play the role of form. Thus, for example, the form of an H<sub>2</sub>O molecule may be taken to be the relation *being chemically bonded in such-and-such way*. Given this general account of form, our task then is to specify the relevant properties or relations in the case of money tokens. My proposal is that the form of any given money token is a relational normative property, specifically a property involving a claim on or credit with some other individuals or entities. One important issue is whether this claim or

<sup>23</sup> Here I draw on the hylomorphic theory of social objects developed in Passinsky (2021).

<sup>24</sup> Thus, Descartes famously held that the mind is a nonphysical substance.

<sup>25</sup> See Aristotle (*Metaphysics* Z.10 1036a9–12), Fine (1999: 72), Johnston (2006: 654–5), and Evnine (2016: §4.4).

credit is moral, legal, or merely social in character. My view is that the nature of the relevant claim or credit may vary depending on the kind of money token at issue. Consider, for example, Henry's IOU. Its form is plausibly taken to be the relational normative property *being such that the bearer has a credit of such-and-such size with Henry*, where the relevant claim or credit is a moral one. In contrast, in the case of a US \$1 bill, the form is plausibly taken to be the relational normative property *being such that the bearer has a credit of \$1 with the US government*, where the relevant claim or credit is a legal one.<sup>26</sup> In still other cases, the relevant claim or credit may be purely social, having its basis in a prescribed or practiced social norm or rule. For example, consider a community in which there is a social practice of using seashells as money. The form of the seashell money tokens may be taken to be the relational normative property *being such that the bearer has a credit of such-and-such size with other members of the seashell money community*, where the relevant claim or credit is a purely social one that has its basis in the relevant social practice.

Having provided an account of the matter and form of money tokens, we must now clarify the sense in which these tokens are "compounds" of matter and form. I think that there are two viable approaches for the hylomorphist here, and I will mention both of them. The first approach holds that both the matter and the form of a given money token are literally proper parts of that token.<sup>27</sup> For example, the proper parts of Henry's IOU would include a particular piece of paper as well as the relational normative property *being such that the bearer has a credit of such-and-such size with Henry*. The second approach denies that a money token's form is a proper part of it. Instead, it holds that the real definition of any given money token makes reference to both the matter and the form of that token.<sup>28</sup> Thus, the real definition of Henry's IOU would make reference to both the particular piece of paper and the relevant relational normative property. According to the first approach, it is the money token itself which is made up of both matter and form, whereas according to the second approach, it is the real definition of the money token that has both a material and a formal aspect to it.

Finally, let us state the existence conditions for tokens of money. I take it that any money kind *K* is essentially associated with a range of suitable matter and a form. To illustrate, consider the money kind *US \$1 bill*. This kind is essentially associated with a range of suitable matter, namely pieces of paper of a particular size and shape which bear a certain inscription and were printed by the US Bureau of Engraving and Printing.<sup>29</sup> The kind is also essentially associated with a form, namely the relational normative property *being such that the bearer has a credit of*

<sup>26</sup> Proponents of legal anti-positivism may argue that this legal claim entails a moral claim, as legal facts are necessarily partially grounded in moral facts in their view.

<sup>27</sup> See Fine (1999), Koslicki (2008: ch. 7), and Passinsky (2021) for hylomorphic views on which an object's form is a proper part of it.

<sup>28</sup> See Johnston (2006) for a hylomorphic view along these lines.

<sup>29</sup> Cf. Searle (1995: 45–6).



*\$1 with the US government.* The following principle, then, tells us when an object  $x$  constitutes a US \$1 bill:

EXISTENCE \$1 BILL: An object  $x$  constitutes a US \$1 bill at a time  $t$  if and only if (i)  $x$  is a piece of paper of the right size and shape which bears the right inscription and was printed by the US Bureau of Engraving and Printing; and (ii) the bearer of  $x$ , qua bearer, has a credit of \$1 with the US government at  $t$ .

Note that this principle entails that a counterfeit dollar bill is not a dollar bill. That is because the piece of paper which constitutes a counterfeit dollar bill was not printed by the US Bureau of Engraving and Printing, and so condition (i) is not met.<sup>30</sup> I take this to be a virtue of the account, as there is an intuitive difference between counterfeit dollars and real dollars.<sup>31</sup>

More generally, the following principle tells us when some objects  $x_1, \dots, x_n$  constitute an object of money kind  $K$ :

EXISTENCE: Some objects  $x_1, \dots, x_n$  constitute an object of money kind  $K$  at a time  $t$  if and only if (i)  $x_1, \dots, x_n$  are suitable matter for a  $K$ ; and (ii)  $x_1, \dots, x_n$  instantiate the form associated with  $K$  at  $t$ .

Whenever some objects  $x_1, \dots, x_n$  constitute an object of money kind  $K$  at a time  $t$ , the resulting money token is a compound of matter and form. The matter of this compound consists of  $x_1, \dots, x_n$  and the form is the relevant relational normative property.

Let me now explain why I construe my hylomorphic account of money as a hybrid of the commodity and credit ontologies. On the one hand, my account takes tokens of money to be things, as per the commodity ontology. Furthermore, it makes room for money tokens that have ordinary material objects—including commodities—as their matter. On the other hand, my account holds that a credit or claim is involved in the very nature or identity of money, as per the credit theory. Moreover, it makes room for money tokens that have immaterial or abstract objects as their matter. Thus, my hylomorphic account incorporates central aspects of both the commodity and credit ontologies.

This hybrid ontology can accommodate cryptocurrency better than the commodity and credit ontologies. Unlike the commodity ontology, it can accommodate the virtual or digital nature of crypto coins because it allows for the matter of money tokens to be immaterial or abstract (and entirely useless in its own right).

<sup>30</sup> Since having been printed by the US Bureau of Engraving and Printing is a historical property, the kind *US \$1 bill* is a historical kind (i.e. a kind whose conditions of membership include historical properties).

<sup>31</sup> Thanks to Graham Hubbs for discussion of this point.

Unlike the credit ontology, it can accommodate the thing-like nature of crypto coins because it treats them as things as opposed to relations or units. To illustrate, consider bitcoins. According to our hybrid ontology, a given bitcoin is a compound of matter and form. Its matter is plausibly taken to consist of immaterial or abstracts objects, such as blocks of data. And its form is plausibly taken to be the relational normative property *being such that the bearer has a credit of one bitcoin with other members of the bitcoin community*, where the relevant claim or credit is a purely social one that has its basis in the relevant social practice. The bitcoin is a compound of this matter and form either in the sense that the blocks of data and the relevant property are both parts of the bitcoin, or in the sense that the real definition of the bitcoin makes reference to both the blocks of data and the property. Finally, the existence conditions for bitcoins are given by the following principle:

EXISTENCE BITCOIN: Some objects  $x_1, \dots, x_n$  constitute a bitcoin at a time  $t$  if and only if (i)  $x_1, \dots, x_n$  are blocks of data that were generated through the process of mining; and (ii) the bearer of  $x_1, \dots, x_n$ , qua bearer, has a credit of one bitcoin with other members of the bitcoin community at  $t$ .

As in the case of US \$1 bills, this principle entails that a counterfeit bitcoin would not be a bitcoin. A counterfeit bitcoin, like a counterfeit dollar, would be something that resembles a real bitcoin but is not constituted by objects with the right sort of history. Specifically, a counterfeit bitcoin would not be constituted by blocks of data that were generated through the process of mining. Whether such counterfeit bitcoins are a practical possibility—as opposed to a mere theoretical possibility—is a question that I leave for the cryptography experts.

To conclude, let me briefly contrast my hylomorphic account of money with several existing views in the literature which may also be regarded as hybrid accounts. Francesco Guala (2020) maintains that money can take the form of either a material object (e.g. a bill or coin) or an abstract object (e.g. a “point” in a bank account). Guala’s view is similar to my own in that we both hold that money tokens may be either material or immaterial. However, unlike Guala, I hold that any given money token is a compound of pre-existing material or immaterial objects and a relational normative property. An advantage of my view is that it preserves a deep ontological unity among the diverse array of money tokens: dollar bills, coins, “points” in a bank account, bitcoins, and so on are all ontologically unified in virtue of having a formal component which is a relational normative property involving a claim or credit.<sup>32</sup>

<sup>32</sup> Another virtue of my view is that it can explain why a given money token is not identical to its matter. The explanation is that the money token has a formal component which the matter lacks. For example, a dollar bill is not identical to the piece of paper which constitutes it because the relational normative property *being such that the bearer has a credit of \$1 with the US government* is a component

Frank Hindriks defends a different disjunctive account according to which money is either a concrete object or a property of an agent, namely purchasing power.<sup>33</sup> For example, a dollar bill is a concrete object, whereas electronic money is a property of an agent. My view, like Hindriks's, appeals to properties to account for the nature of money. However, whereas Hindriks appeals to properties only in the case of electronic money, I appeal to properties in the case of all forms of money, including both concrete and electronic money. Again, I think that one advantage of my view is that it is more ontologically unified. It is hard to see what, if anything, ontologically unifies dollar bills and electronic money in Hindriks's view. On my view, it is clear what unifies these different forms of money: it is their formal component, which is a relational normative property involving a claim or credit. A further advantage of my view is that it can adequately account for cryptocurrency, whereas Hindriks's view cannot. For crypto coins are neither concrete objects (since they are immaterial) nor properties of an agent (since they are things).

Finally, Tony Lawson proposes a hybrid account according to which money is a "positioned thing or stuff, the latter being thereby incorporated as a component of a wider system, whereupon certain of its capacities (that are already possessed prior to its being positioned) are effectively harnessed to serve one or more system doings or functions that have come to be associated with money" (2016: 965–6). The property that any thing or stuff must possess prior to being positioned as money is being a reliable form of value (2016: 967). It is this property that grounds the capacities of the thing or stuff which are then harnessed to serve the system functions of money. While I agree with Lawson that certain pre-existing entities are "positioned" as money through our social practices, I disagree that these pre-existing entities must be a reliable form of value. In my view, the material or immaterial objects which serve as the matter of money tokens need not have any value for us prior to being "positioned" as money.<sup>34</sup> This difference in our views is crucial when it comes to cryptocurrency, since the bits or blocks of data which are "positioned" as crypto coins arguably have no prior value for us. Thus, whereas my view can accommodate cryptocurrency, Lawson's view arguably cannot.<sup>35</sup>

of the dollar bill but not the piece of paper. It is unclear whether Guala's view has the resources to likewise explain the non-identity of the dollar bill and the piece of paper. For arguments in favor of the non-identity of social objects and their constituting matter, see Passinsky (2021: §3.1).

<sup>33</sup> See chapter 1 in this volume and Hindriks (2012, 2013).

<sup>34</sup> Of course, in some cases the matter of money tokens will have value for us prior to being "positioned" as money. Examples include the sorts of cases discussed by Smith (e.g. cattle in antiquity, shells in some parts of India, dried cod in Newfoundland, tobacco in Virginia, and sugar in some of the West India colonies).

<sup>35</sup> Lawson acknowledges that bitcoin appears to pose a challenge to his view. See Lawson (2016: 974, n. 16).

## 8. Conclusion

In this chapter, I argued that neither the commodity theory nor the credit theory on its own can accommodate cryptocurrency into its ontology of money. I then proposed a novel hybrid hylomorphic account of money which draws on aspects of both the commodity and credit ontologies. This hybrid account, I argued, can accommodate cryptocurrency. In conclusion, I want to acknowledge the possibility that some credit theorists may be happy to embrace my hybrid ontology under the banner of the credit theory, on the grounds that this ontology makes an abstract credit relation central to the identity of money. Likewise, I want to acknowledge the possibility that some commodity theorists may be happy to embrace my hybrid ontology under the banner of the commodity theory, on the grounds that this ontology construes tokens of money as things and allows for these things to be constituted by commodities. Since the commodity and credit theories have many different versions and interpretations, I ultimately view this as a largely verbal issue. The substantive issue is whether the proposed hybrid ontology is viable. I hope to have shown that it is—particularly when it comes to the new forms of money of the twenty-first century.

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