

Preamble

Sam Bankman-Fried's alleged getaway flight to Argentina was apparently the most closely watched flight statuses on Flight Radar over the weekend of 12/13 November. Who was watching? Was it the retail investors who had taken a punt with their hard-earned savings? Was it the institutional investors who had finally found a grown-up platform that allowed them to get over their FOMO? Or was it the regulators who have long struggled to enforce an infrastructure that protects clients from this sort of risk? It was probably all of them.

With FTX having filed for bankruptcy, its equity worthless and creditors likely only to recoup cents on the dollar, there are many, many questions to be answered. The simplest to ask but most complex to answer being, "what went wrong?" We will leave the detail to others and look forward to the book and Netflix series. While we are waiting, we decided to return our 2021 white paper on the topic of cryptocurrency. We corrected a typo and added to the section on social issues reflecting crypto's increasing use in facilitating access to child pornography. There isn't much else we would change. But there is more to say: in the intervening months the crypto market has evolved, and not for the better.

Perhaps the most interesting development in cryptosphere has been how far the industry has deviated from its libertarian ideals. The original Bitcoin paper was published in October 2008 as a reaction to the unfolding great financial crisis, a response to the opaque, risky and overleveraged financial system. Satoshi Nakamoto wanted to create a financial system without leverage, without counterparty risk and without the fragility inherent in fractional reserve banking. He envisioned that Bitcoin holders would self-custody their assets, that transactions would take place without settlement risk, and that one man's¹ crypto asset was no other man's liability.

It is true that crypto does allow purists to fulfil these ideals provided that the holder makes use of cold storage and decentralised exchanges. However, events this year culminating in the collapse of FTX have shown that, for the vast majority of participants in crypto, the reality is very different. Rather than creating a new financial system, crypto has simply recreated a facsimile of the old financial system it sought to replace. Unfortunately, this new system is rather worse than that its predecessor.

First, it is largely unregulated with no oversight of either the safe custody of assets nor the prudent management of reserve liquidity. Second, it operates without a central bank without which any liquidity crisis can create a cascading sequence of liquidations and bankruptcies. Third, and most fundamentally, the asset pool of the traditional banking system is productive: loans to governments, businesses and people. These financial assets are capable of service through their claims on taxation, corporate profits, rents and household incomes. Taken as a whole, the crypto system has no such claim on real economic activity nor any inherent productivity of its own. Indeed, it continues to consume rather than generate resources through its high electricity consumption. The only way that its aggregate value can increase is through the continued flow of savings into the system at a faster rate than insiders withdraw their gains. If this sounds suspiciously like a ponzi scheme that is because it is precisely that. Indeed, we need a new term for crypto's more recent "innovations" of staking² and yield farming which places further ponzi

¹ Given the relative participation in crypto of men vs. women, the choice of the masculine pronoun is intentional!

² Staking is an alternative approach to transaction verification from computing intensive "proof of work", it might more kindly be described as a network fee.

upon ponzi. Perhaps ponzi-squared will suffice? The role of a central bank, first articulated by Walter Bagehot in his masterpiece, “Lombard Street – a Description of the Money Market” is that in times of liquidity crisis a central bank should lend freely, but expensively, against good collateral. How could a putative crypto central bank determine what is “good collateral” when it is called upon to step into a crisis? With no intrinsic value, the only definition of “good” is that which the crypto market has decided is valuable, but as the crises in Terra/Luna, Serum and FTT³ have shown, the notion of value is ephemeral and can evaporate in an instant.

Perhaps the greatest lesson from the crypto winter is that though social and financial systems change, human nature does not. Satoshi set about creating a new – more simple, more pure – financial system. No sooner had he done so than it became overlaid with derivatives, leverage, and ponzi schemes of all kinds. We can only speculate on what he thinks of the monster that his original paper spawned.

Nearly two years on from our original paper, our view remains the same: Bitcoin it is not an “asset” that we are prepared to buy for our clients.

Chris Clothier, Co-Fund Manager
18 November 2022

³ The native token of FTX

Executive Summary

- We have followed Bitcoin since 2011 and entirely understand its attractions in the eyes of its proponents: we share their concerns over monetary debasement, inflation and financial repression.
- However, the history of non-governmental “token based” currencies does not give us confidence in its long-term popularity.
- This time *might be different* but for us that is insufficient comfort to deploy our client’s capital in something that has a fundamental worth of zero.
- Bitcoin is nothing short of an environmental disaster. No investor who upholds ESG principles should own it under any circumstances.
- We are very reluctant to purchase any asset that has fallen, with reasonable frequency, by more than 80%.

Introduction

We have followed the progression of Bitcoin since 2011 when it was little more than a curiosity beloved of programmers and libertarians. Since then we have never thought it an appropriate constituent for a multi-asset portfolio since it: i) has no fundamental value; ii) offers no income or margin of safety; iii) is highly volatile and, in our view, speculative; and iv) is positively correlated to other risk assets. Nevertheless, it recently is receiving serious attention from institutional investors and so we think it appropriate to set out more fully our reasons for excluding it from our client’s portfolios.

Bitcoin is a digital currency with various innovative features heralded by its proponents. First, it is decentralised and therefore incapable of being co-opted by illiberal governments. Second, its supply is constrained – the ultimate number of Bitcoins is limited to around 21m; it is a currency that is incapable of debasement. Third, it is built onto a blockchain – a single ledger containing a complete history of all transactions and all present ownership. Fourth, unlike Gold, it is entirely portable.

Textbooks agree that money has three features: a medium of exchange, a unit of account and a store of value.⁴ How does Bitcoin stack-up against these?

Bitcoin is not used as a medium of exchange. Certainly, a small number of businesses accept Bitcoin but this tends to be a marketing gimmick. Indeed, so spectacular has been Bitcoin’s rise and such is the speculative fever surrounding it, that users tend to hoard it. On 18 May 2010, Laszlo Hanyecz paid 10,000 Bitcoins for 2 pizzas. Today those 10,000 Bitcoins are worth \$355m. This example is frequently cited as why Bitcoin should never be used to purchase real world goods. Bitcoin is also not a very good payment network. It is only able to process around 4.6 transactions per second compared with Visa that, on average, transacts 1,700 per second. Of course, this limitation may yet be resolved but would require fundamental changes to the code that underpins the currency. For the time being Bitcoin’s use in payment transactions is confined to illegality: drugs, child pornography, money laundering, etc.

Nor is Bitcoin a unit of account, historically its price has been so volatile that most merchants (whose expenses are denominated in fiat currency) will immediately convert Bitcoin into fiat

⁴ The 19th century British economist William Stanley Jevons considered money to have a fourth attribute the standard of deferred payment, essentially the ability to contract debts.

currency to meet their liabilities. We don't rule out this changing – Paypal recently launched Bitcoin denominated wallets, for example – but we judge this outcome to have a low probability.

To date then, Bitcoin has only taken a single characteristic of money that of – at least in the eyes of its proponents – a store of value. That property is the subject of this essay.

If Bitcoin is money, what kind of money is it?

At this point it is worth carrying out a brief review of the history of money to see how Bitcoin compares to other types of money that the world has known. In most societies the first kind of money which developed was *Commodity Money*. This was usually a frequent *leg* of a barter trade, was naturally out of barter systems. Commodities that were prized as jewellery were popular in this role because they tended to be small and portable while simultaneously allowing ostentatious displays of wealth. Over time these forms of commodity money were replaced by coins minted from metal. Gold quickly became the pre-eminent metal thanks to its scarcity, lustre, chemical inertness and pleasing heft⁵. Gold became so dominant that for thousands of years gold was money and money was gold. To say that gold “held its value” was tautological.

The initial rise of fiat money was a point of convenience. Bank notes were nothing more than depositary receipts issued against vaulted gold and issued privately rather than by government. Fractional reserve banking followed, where each unit of paper currency was no longer backed 1:1 by gold but instead by a mixture of gold and loans advanced by the bank. Governments soon took control of the creation of paper money and vested it in the hands of a single, central, bank. Paper money issuance – effectively issuing debt with no coupon – was much too valuable an activity for governments to allow it to remain in private hands and so such *seigniorage* became the sole province of the state. Of course, it proved so irresistible that, over time, the proportion of central bank's assets which comprised gold dwindled relative to other assets. This didn't stop the value of fiat currencies being tied (with occasional hiccups) to gold as was the case throughout the Gold

Standard and Bretton Woods eras. This came to an abrupt end on 15 August 1971. Since then paper money has been just that – paper.

The preceding describes the evolution of money in Asia Minor and Europe. Other societies followed different paths. Societies in the Americas, Asia, Africa and Australasia used shells instead of, or in tandem with, metal currency. Gold's global dominance as the pre-eminent form of money, prior to the fiat era, probably has as much to do with European imperialism as anything else. Even among metallist countries, the monetary path has not always been straight: commodity money has made reappearances from time to time when precious metals became scarce.

Where does Bitcoin fit against these historical examples of money? Or is it a new kind of money altogether? It might be tempting to think that it is like the private currency issued by banks in earlier centuries. However, those notes were backed by assets in the form of gold or loans to borrowers. Bitcoin, as we have seen, is backed by nothing. Gold aficionados often like to say that gold is “*no man's liability*” and therefore not subject to another's performance. Proponents of Bitcoin contend that it has the same attraction. We would argue that “*no man's liability*” is only a virtue to the extent that asset has some fundamental worth of its own. Indeed, another man's liability gives significant comfort where the rule of law exists to enforce that liability. Gold clearly

⁵ In reality the picture was more complex, with bimetallism the most common monetary system over many centuries gradually ceding ground to a gold standard.

has *some* fundamental worth given its use in jewellery, combined with its scarcity and high cost of extraction. Bitcoin has neither any worth nor is it another's obligation.

Viewed that way, it seems that Bitcoin is much more like shells or perhaps the Rai Stones of Micronesia⁶: it has value because everyone agrees that it has value. Cowry shells were a common form currency chosen because they are reasonably rare⁷ and therefore not subject to inflation. Revealingly, the shell currency of one tribe was often valueless in the eyes of a neighbouring tribe. The number of Bitcoin that are created is carefully controlled and the ultimate number of 21m is finite.

What makes the price of an asset change?

How should we rationalise the recent price movements of Bitcoin? We are told that it is an asset and all asset prices respond to four things.

The first is that the fundamental value of the asset changes. This can be either be absolute (e.g. the earning power of Apple increases) or relative (e.g. short-term interest rates collapse increasing the relative value of a government bond with fixed coupons).

The second is that the demand to hold an asset by investors changes. This is known as the quantity theory of asset prices. Shifts in demand can be caused by fashion. An example of this was in the 1960s when pension funds switched from predominantly owning fixed income to owning equities. Latterly we have seen the opposite shift by government fiat where UK pension funds are forced to match their liabilities with index linked bonds. Put simply, if there is a fixed stock of the asset and a group of buyers, with a collective wealth of X, decide to put Y% of their wealth into that asset, then the value of that asset must equal $X*Y\%$.

The third is that the ability to pledge the asset as collateral for a loan changes. This can be observed from UK house prices. What would happen to prices of houses if mortgages ceased to exist?

The fourth is that the asset becomes the subject of speculative activity. More accurately, given that all assets are subject to an amount of speculation all the time, the amount of speculative activity relating to the asset *changes*.

Of course, none of these characteristics operate in isolation. They are all subject to feedback loops both positive (e.g. Apple's stock price rises; it is able to issue more equity cheaply which it uses to strengthen its market position) and negative (e.g. the quantity of any asset is rarely fixed and high prices beget new supply). Overlaid on all these are two further considerations: human psychology, and disequilibrium. This latter is particularly important: if demand rises but sellers are slow to respond either from hoarding behaviour or simple inaction then the price of an asset should become increasingly volatile and overshoot its ultimate price derived from quantity theory considerations alone.

Any discussion regarding the price of Bitcoin must address each of these areas. There are two that can easily be excluded. The first is fundamental worth. This is zero and unchanging.

⁶ The parallels to the latter are surprisingly powerful. Rai stones which were used as money were very heavy and it was impractical to move them when a transaction took place; instead their ownership and transactions were recorded in oral history, much like transactions on the blockchain.

⁷ As I can attest from a childhood spending many hours scouring for them in the rockpools of South Devon. Fittingly they were used as "chips" in the family poker game.

The second we can, for the time being at least, exclude its acceptability as collateral. Its price is too volatile to allow people to borrow money against it.⁸

That leaves us with two things to consider: *investor demand* and *speculation*.

Speculation or Investor Demand

Can we discern what is driving the price of Bitcoin? Is it “true” investor demand or “pure” speculation? Is it possible to distinguish between the two? The short answer to the latter is “no”, but the market does offer us some clues as to what is going on. Proponents of Bitcoin cite its virtues as providing protection against monetary debasement and fiscal incontinence and that rising investor concern is driving investors to seek refuge in Bitcoin. If true, then we should expect other “refuge” assets to be rising alongside Bitcoin. The two most obvious are gold and index linked bonds. Others might include commodities and productive real assets, such as farmland. Gold and index linked bonds have performed well in recent years, but have completely decoupled from Bitcoin. The chart of bitcoin looks more like that of Tesla than it does a safe haven asset and has all the appearance of a speculative frenzy. That said, if it is subject to a speculative frenzy there is one material difference between the buying behaviour of Bitcoin and previous manias. Normally manias are characterised by early investment from “smart money” followed by institutional money and finally by retail money which arrives, to its cost, shortly before the bubble bursts. In the case of Bitcoin, the institutional money is only just arriving now. This should be supportive of the Bitcoin price.

This raises the possibility that the explanation for the current negative correlation between Gold and Bitcoin is that we are seeing institutional flows out of Gold and into Bitcoin. This is plausible, given that the stock of gold is roughly 30x greater than Bitcoin. A small shift in allocation, and associated disequilibrium, should result in high prices and high volatility. However, the future price of Bitcoin could be much lower once these flows are complete and equilibrium re-established.

This may satisfactorily explain the recent price action consistent with some group of investors believing that Bitcoin is a safe haven asset. This gives rise to the next and more fundamental question; will this status endure?

Peering into the future

In the summer of 1969, a young physicist called John Richard Gott III was standing in front of the Berlin Wall. He was pondering how long the wall would last. He made the assumption that there was nothing “special” about his visit, he stood in front of it at some random point in the wall’s history. He went further:

So if I divide the Wall’s total history, from the beginning to the end, into four quarters, and I’m located randomly somewhere in there, there’s a fifty-percent chance that I’m in the middle two quarters—that means, not in the first quarter and not in the fourth quarter.

Let’s suppose that I’m at the beginning of that middle fifty percent. In that case, one-quarter of the Wall’s ultimate history has passed, and there are three-quarters left in the future. In that case, the future’s

⁸ This was substantially true in early 2021, it definitely isn’t true now: there is now a proliferation of derivatives and leveraged crypto based investments.

three times as long as the past. On the other hand, if I'm at the other end, then three-quarters have happened already, and there's one-quarter left in the future. In that case, the future is one-third as long as the past.

Using this logic, he estimated that the wall would come down some time between 1979 and 1993. This turned out not to be a bad guess. He called this the Copernican Principle⁹ since, just as Copernicus showed that our place in the universe wasn't special, Gott simply applied this concept to time. It turns out that the Copernican principle has wide utility. Gott used it to calculate the length of "runs" of Broadway shows with remarkable accuracy.

Gott's approach can be described as naïve, but it's very naivety reveals a deeper truth – things that have endured for a long time must have some fundamental quality which means they are likely to endure further. As Nassim Taleb put it, "In general, the older the technology, not only the longer it is expected to last but the more certainty I can attach to such statement".

Bitcoin is – in monetary terms – in its infancy. The Copernican Principle suggests that extreme caution should be used before assuming that it's value will endure. It also means that the longer Bitcoin is seen by others as a store of wealth, the more rational it becomes to own it. Counterintuitively, in the future it might be a "better" investment than it is today, even at a much higher price.

History does not seem to be on Bitcoin's side. We are not aware of any private currency – except those that are extensively tethered to an existing fiat currency – which has been successful: where success is defined as holding its value in real terms for a considerable period. Fiat currencies exist and endure precisely because they are instruments of state coercion. Private currencies do the opposite – they seek to undermine the power of the state. At a minimum, they will not enjoy state support. At worst they may be legislated out of existence.

If private currencies have a poor history, what of other objects which humans have valued in excess of their intrinsic worth? Such objects – collectibles – include art, fine wine, musical instruments, stamps, Beanie Babies and baseball cards. The financial history of such "assets" is varied but are subject to patterns which occur so frequently as to be truisms. Firstly, price booms and busts are pro-cyclical, though often with a lag to conventional financial markets. Secondly, collectibles are subject to whims of fashion and changing tastes meaning that prices fall to a fraction of their peak and remain there for decades in some instances, and permanently in others. We are not aware of any collectible that has managed to avoid cycles of boom and bust.

Bitcoin-specific issues

Bitcoin is a bearer asset but unlike a bearer bond, proof of ownership to a digital wallet is stored as a private key – nothing more than a string of 32 alpha-numeric characters. This makes Bitcoin easy to steal. In fact, "steal" is misleading; you need only make a copy of the person's private key and you are able to do with their Bitcoin what you will. Hacking is major risk for owners of Bitcoin. Hacks of exchanges happen fairly frequently. The largest of which was Bitfinex which was hacked in 2016 resulting in the loss of 120,000 BTC worth \$4.4bn at current market prices.

Then there is the risk of loss, if you lose or forget your private key then those Bitcoin are permanently inaccessible. Estimates for lost Bitcoin are as high as 3.7m / \$135bn¹⁰. The final risk

⁹ The Lindy Effect is a similar principle.

¹⁰ This figure is based on Bitcoin that hasn't "moved" in 5 years, as such it is likely to be an overestimate.

is one of control: the Bitcoin network is democratic; if 51% of miners agree that a transaction is authentic then it is deemed to be so. In theory if the Bitcoin mining community came to be majority controlled by a single body or group, they could verify any transaction that they chose. Such a “hashing attack” is less fanciful than it sounds. In 2014 a mining pool called GHash.IO briefly held 51% of the hashing power before relinquishing it to restore trust in the network. Other mining pools taking control might not be so benign. Indeed one of the so-called forks – Bitcoin Gold – has twice been hit by a malign hashing attack.

A more fundamental issue is one of supply. According to the old saw of commodities investing, “the cure for low prices is low prices”. The opposite is also just as true. While the supply of Bitcoin is finite, the supply of things that are *like Bitcoin* is infinite. Bitcoin itself has “forked” a number of times into different variants. More generally there has been a proliferation of other cryptocurrencies (Ethereum, Ripple, etc.) though as yet none has surpassed Bitcoin.

ESG

Bitcoin is nothing short of an environmental disaster. At present it is estimated to consume as much electricity as Chile and have a carbon footprint equal to the entire population of New Zealand. The reason for this is that the proof-of-work algorithm, which underpins validating new transactions on the network, involves carrying out highly intensive calculations. Bitcoin “miners” are in a race to complete the proof of work against other miners. The winner of each race (which occurs every 10 minutes or so) is awarded new coins. As the value of Bitcoin has risen, so the prize for “winning” increases and Bitcoin Miners are incentivized to deploy ever greater resources in pursuit of victory. These resources take the form of vast, air conditioned server farms.

On social issues, the primary use case of Bitcoin, outside of speculation, is for settling illegal transactions: drugs, money laundering, child pornography, terrorism, extortion and assassination. The Internet Watch Foundation (“IWF”) recently reported that they have identified a surge in websites that allow users to purchase illicit material using cryptocurrencies. Such unfortunate demand has necessitated the launch of a “crypto unit” that the IWF has assembled to work with global law enforcement agencies to tackle these crimes.

Governance is also problematic, the decentralised nature of Bitcoin has certain attractions, but equally that lack of accountability presents problems especially when coupled with the risk of a malign actor taking control of the network. It may be that there is sufficient vested interest in Bitcoin’s continued success that these risks are modest, nevertheless they are non-zero. Trading volumes of Bitcoin remain small relative to its market cap and market makers are not yet subject to the same regulatory scrutiny as in traditional markets. The risks of market manipulation are much greater. The lack of a board, central register and depositary means investors have no recourse in the event of lost Bitcoin. Examples of this include the Swansea resident who threw away a hard drive which holds the key to 7,500 Bitcoins¹¹ worth around \$275m or the CTO who has forgotten the password to his encrypted hard-drive and can no longer access a similar number¹².

In summary, it is no exaggeration to say that investing in Bitcoin is completely antithetical to the principle of ESG investing and sufficient alone to prevent us from buying it.

¹¹ [BBC News - Bitcoin: Newport man's plea to find £210m hard drive in tip](#)

¹² [BBC News - Man has two guesses to unlock bitcoin worth \\$240m](#)

Bottom line

At the heart of our investment principle is preserving client capital. We are therefore very reluctant to invest in any asset which has a high probability of large drawdowns (in Bitcoin's short life it has experienced 3 drawdowns of 80% or more). We are especially reluctant to invest in an asset where we would be incapable of explaining such a fall. Finally, we like to invest in things which provide a margin of safety. Given the fundamental worth of Bitcoin is zero, it has no margin of safety at any price. Taken together, it is not something we are prepared to buy for our clients.

*Chris Clothier, Co-Fund Manager
January 2021 (updated November 2022)*

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