



“Everydays: The First 5000 Days” by digital artist Beeple sold at Christie’s for \$69mm in cryptocurrency.



The Digital Version of this Letter Is For Sale

In a game against the Houston Rockets earlier this year, Lakers forward LeBron James grabbed a defensive rebound with his left hand and flung the ball downcourt to teammate Kentavious Caldwell-Pope for an easy layup. It was remarkable in one sense but completely routine in another, just one of thousands of assists James has amassed over his illustrious NBA career. For most fans, it was merely another example of his brilliance on the basketball court, another chance to watch a master effortlessly working his craft. But for a new breed of collector, the assist represented something completely different: Opportunity. At a cost of \$5500, a person with the username Roguetrader21 bought a non-fungible token (NFT) of this highlight minted by a new video-collectibles site called NBA Top Shot, one of a growing number of platforms selling digital items that in many cases can be downloaded and enjoyed for free.

NFTs are digital assets encrypted with a unique signature for identification on a network of computers called a blockchain, a distributed ledger allowing for a secure and transparent record of ownership for a digital asset – any digital asset. Owners of NFTs would argue that in the same way a perfect replica of the Mona Lisa is different from owning Da Vinci's original, there's a difference between owning a free version and a blockchain-verified version. Given the market that has developed around NFTs, plenty of others agree. Twitter CEO Jack Dorsey auctioned off an NFT of his first tweet for the equivalent of \$2.9 million. The NFT of a popular retro cat video called Nyan Cat recently sold for the equivalent of \$560,000. And in March, Sotheby's held an auction for an NFT of a digital artwork called *Everydays—The First 5000 Days* by an artist named Mike "Beeple" Winkelmann that sold for the equivalent of \$69 million, a staggering sum and the third-most expensive work ever by a living artist. The word "equivalent" in each of these cases is important because none of these items were purchased with cash; they were all purchased with "ether," which along with Bitcoin is among the most popular forms of a relatively new type of payment called cryptocurrency.

Cryptocurrency, or "crypto," is really a misnomer, though. While a small portion of crypto is spent on goods and services, most owners have used crypto purely as an asset for speculation. And over the last year, this enthusiasm has multiplied exponentially, driving an increase in virtually all crypto assets. Hysteria and FOMO – "fear of missing out" – are not new elements in the financial world, but the meteoric rise of an asset with no real value outside of the collective faith of its owners, along with little demonstrated history to preserve that faith, makes this time appear to be a bit different. Divining the future of crypto is an impossible task, but understanding its evolution and the risks it poses are essential for investors who may be considering adding crypto exposure alongside more traditional assets, those that haven't been generated by a sophisticated computer program and have a measurable basis for valuation.



The Currency Paradox

For most people, money means currency, a means of payment and a medium of exchange – dollars, pounds, yen, euros, drachmae, naira, bolivianos, rubles, etc. Pick a country, it has a currency, and that currency is what's commonly considered money. Its value is essentially derived from society's collective faith in its durability and stability. It takes time to establish, but once the foundation has been poured and given time to harden, it's really hard to destroy, even with cracks that may appear from time to time. Money is actually not that dissimilar from religion. Anyone intent on starting a religion would have a hard time competing with institutions that have thousands of years of history behind them and the collective acceptance of millions of adherents. There's a spiritual infrastructure designed around houses of worship that creates a formidable barrier to entry, just as there's an economic infrastructure designed around local currency that is well-established and accepted as a means for exchanging goods and services.

One of the defining features of money is that it's clear and countable, and what makes it useable is an intuitive sense of its value and a strong level of confidence in its stability. Someone carrying a ten-dollar bill knows they have plenty of money for a sandwich but not nearly enough for an iPhone, and for them to spend that money on a sandwich, they have to be confident that ten dollars won't be enough for that iPhone anytime soon. This stability is vital for a currency to have practical utility. Few would spend money if they thought it was going to be worth a lot more in a relatively short amount of time, and fewer still would accept it if they thought it was going to be worth a lot less. These conditions wouldn't facilitate commerce at all; they would grind it to a halt. This is why crypto is failing in its original intent, and part of the reason the most notable of all crypto assets has seen its value explode.

The Bitcoin Paradox

There are countless stories of people spending bitcoin when it was a near-worthless currency, but one of the more prominent is the story of Laszlo Hanyecz. On May 18, 2010, Hanyecz posted a message in an online forum offering bitcoins for pizza. Hanyecz said on the forum that he "just thought it would be interesting if he could say that he paid for a pizza in bitcoins." A few days later someone took him up on his offer, and the exchange was made, with Hanyecz sending along the equivalent of around \$41. Today, those bitcoins that Hanyecz spent – a total of 10,000 for two pizzas – are worth more than a half billion dollars.

While there are many crypto assets running on different blockchains, Bitcoin is by far the most popular. It was originally conceptualized as an alternative cash system not subject to any financial intermediary or policy-making authority, a "purely peer-to-peer version of electronic cash (that) would allow online payments to be sent directly from one party to another without going through a financial institution."¹ Two parties could transact directly, without an intermediary like a bank or other financial institution involved. It was created in 2008 by

¹ "Bitcoin: A Peer-to-Peer Electronic Cash System" Satoshi Nakamoto, 2008.



Satoshi Nakamoto, whose identity (or identities – many have speculated that Nakamoto is actually multiple people) remains unknown. All transactions are verified and recorded on a blockchain comprising high-powered computers, many of which are involved in the bitcoin mining process. It was a system created in part as a response to the malfeasance of central authorities, as evidenced by Bitcoin's genesis block – the beginning of the blockchain – which contains the text: "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks."²

When the Bitcoin light was dimmer, the interest from Wall Street was modest at best. There was a general recognition that blockchain technology had real-world applications, but many shared the sentiment of JP Morgan CEO James Dimon, who called Bitcoin a fraud that would eventually blow up.³ Fast-forward to today, where the light of Bitcoin has brightened and the moths of the Street have swarmed. JP Morgan now has a current price target of \$146,000, with a weak disclaimer that this is conditional on the volatility of Bitcoin converging with that of gold over the long term. JP Morgan is certainly not alone at the Kool-Aid stand. Predictions for the price of Bitcoin going forward are all over the map, but the one thing almost all have in common is this: A number much, much higher than the price today.

Central to the Bitcoin price appreciation story is scarcity. One of Bitcoin's features is that by design the supply is limited, with the protocol stipulating that mining will be halved after 210,000 blocks are mined (which occurs approximately every four years) and continue only until 21 million coins have been issued (circa 2140), putting a hard cap on circulation and theoretically avoiding the pitfalls of central policy-making authorities that have a virtually unlimited ability to increase the float of their currency, and thus fan the flames of inflation. This scarcity has of course motivated owners to hold onto their coins, not use them as originally intended. According to analytics firm Glassnode, nearly 80% of Bitcoin's supply is illiquid, held by long-term investors who won't sell. But the real circulation is strained by issues unique to crypto – the inability of owners to access an asset they own. Of the existing 18.5 million bitcoins, around 20% appear to be in lost or otherwise stranded wallets.⁴ Crypto wallets require passwords, and there are many owners who accumulated crypto when it was near worthless and have since misplaced or forgotten their password. Unlike systems managed by intermediaries, there's no way to simply reset it. The contents will remain locked forever.

Of course, it's hard to blame bitcoin owners for undermining the intent of the system by not using the coins as intended. Using a scarce asset for currency when the alternative is using the more stable, traditional, and universal currency system wouldn't seem to make much sense at this point. In the US, it would seem that most bitcoin owners have concluded that dollars actually work well enough as a currency for making purchases. The scarcity is not only driving bitcoin owners to hold onto their coins, but it's also driving massive interest in acquiring more coins through large-scale mining, an intensive process requiring immense amounts of computing power in order to be successful. As the price is driven higher, the

² This was a direct reference to the front-page headline that day in The Times, a UK newspaper.

³ "Jamie Dimon: Bitcoin is a fraud that's 'worse than tulip bulbs'" Yahoo! Finance, Sept 12 2017.

⁴ "Lost Passwords Lock Millionaires Out of Their Bitcoin Fortunes" New York Times, Jan 12 2021.



competition to mine coins has increased, which has meant an increasing amount of computer power being brought online to mine the dwindling supply. While mining for bitcoin does not seem as harmful as mining for precious metals, the truth is that it has a substantial environmental impact, and is now an active contributor to a global problem that's only worsening.

The Tesla Paradox

In a tweet (how else?) on March 5, Elon Musk announced that Tesla would now be accepting bitcoin as payment for new cars, with the official notice submitted to investors and the SEC in a financial filing: "In January 2021, we updated our investment policy to provide us with more flexibility to further diversify and maximize returns on our cash that is not required to maintain adequate operating liquidity. As part of the policy, we may invest a portion of such cash in certain specified alternative reserve assets. Thereafter, we invested an aggregate \$1.50 billion in bitcoin under this policy."⁵

On the surface this seems perfectly reasonable. An innovator in automobiles would be accepting an innovation in payments, with the currency a sensible one given its value equivalent (one bitcoin is roughly equal to one Tesla, give or take). But Tesla's product is not just cars. Tesla is about mitigating climate change by shifting automobile consumption away from the environmentally harmful gas-powered engine, which makes it entirely hypocritical for the company to accept the crypto asset given Bitcoin's impact on the environment.

In March, Bank of America's global commodity research team published a fairly scathing report on the asset's environmental footprint, using Tesla's \$1.5b investment as the basis for impact. It noted that an investment of that size has the carbon equivalent of almost two million cars, with "a single bitcoin purchase at a price of ~\$50,000 generating a carbon footprint of 270 tons, the equivalent of 60 ICE [petrol/diesel] cars."⁶ The Bitcoin blockchain is incredibly power-hungry, and the higher the price goes, the worse the environmental impact, as the primary source of electricity for all of this mining has not been renewables. The Bank of America report noted that 75% of the network's computer power is based in China, with half of that based in the province of Xinjiang, where 80% of power comes from coal.

Digiconomist, a research platform dedicated to exposing the unintended consequences of digital trends, provides useful comparison metrics for the annualized total footprint of the Bitcoin network, as well as the footprint for single transactions. It has estimated that the annualized carbon footprint is equal to that of Switzerland and the electrical energy consumption comparable to Finland. A single transaction is equivalent to the carbon footprint of nearly 840,000 Visa transactions, while the electrical energy is equivalent to the power consumption of an average US household over 27.33 days. It has also estimated that at the current price, the entire network could consume close to the same amount of energy consumed by all data centers globally, many of which have switched to renewables for power.

⁵ Tesla Form 10-K Filing, Fiscal Year ended Dec 31 2020.

⁶ "Tesla's bitcoin investment has carbon footprint of 1.8 million cars" Yahoo Finance, March 17 2021.



What makes these numbers particularly mind-blowing is that those data centers serve billions of people globally, while Bitcoin serves very few, and without any real societal benefit. While it's possible that some of these power needs will be served by renewables in the future, that's hardly the case today. Miners are looking for cheap sources of power, and that's led them to some of the highest-pollution sources. As the price of Bitcoin rises, the incentives for larger mining operations increase, with significant environmental implications to follow.

The Risks of Ownership

Bitcoin has gone through a variety of boom-and-bust cycles, and there could certainly be more on the way. The question for investors is whether a bust could occur that won't be followed by a boom. While there are many risks with owning an asset like this, three in particular are noteworthy given how quickly they could erode its value.

Government Intervention

Cryptocurrency presents a potential threat to governments, which use their fiat currency as a tool for executing fiscal and monetary policy, and some may not look kindly upon crypto, even if it's not being used by most owners as a currency. That's the case today in India, where some officials have called crypto a Ponzi scheme. In 2018, the government forbid banks from dealing in cryptocurrencies altogether, although in March 2020, India's Supreme Court struck down this order, prompting investors to pile into the market. The court ordered the government to take a position and draft a law on the matter, and that's exactly what they're doing. The government is reportedly planning to propose a law banning crypto outright, fining anyone trading cryptocurrency in the country or even holding digital assets.⁷

This would seem an extreme position for the US government to take, but what seems increasingly more likely is the full-scale adoption of "stablecoin," digital currency that's pegged 1:1 on the US dollar. This currency is already in use today. USD Coin ("USDC") is a stablecoin already garnering credibility, with Visa recently announcing that it's piloting a program that would allow it to settle transactions over Ethereum, one of the most actively used open-source blockchains.⁸ In order to make sure that the value of USDC remains stable, USDC partners keep USD on bank accounts every time they issue new tokens. Those accounts are audited to make sure that there is as much USDC in circulation as there are US dollars in those accounts.

"Like other crypto assets, stablecoins present some flexibility when it comes to sending, receiving, and storing value. You don't need a bank account and everything can be easily programmable. And you don't need to support legacy systems, integrate with banks, and pay transaction fees to other financial institutions."⁹ The idea of one digital dollar exchanged 1:1 is a much more accessible concept, and if Bitcoin loses its limited utility as a currency – where it still maintains some measure of value – its utility as an asset could be undermined.

⁷ "India to propose cryptocurrency ban, penalizing miners, traders" – Reuters, March 14 2021.

⁸ Settlement in this case refers to the daily exchange of funds between Visa's issuing and acquiring partners over the VisaNet to exchange value for cleared and settled transactions.

⁹ "Visa supports transaction settlement with USDC stablecoin" TechCrunch, March 29 2021.



In China, the central bank is already issuing a digital yuan (pegged 1:1 with paper money) and is unlikely to support any crypto asset with the potential to wrest the control that comes with managing a state-run currency.

Loss of Faith

Bitcoin is an asset based more on behavioral analysis, not financial analysis, and that introduces an additional amount of instability risk. If Elon Musk wakes up tomorrow morning with a crisis of confidence over the hypocrisy of paying for a Tesla with bitcoin, and drops a tweet that says “bitcoin bad for environment. Selling everything I have,” all of a sudden the crypto asset could drop precipitously. The fact of the matter is that most people still view digital assets as worthless and will always pay for things with currency they know and recognize and can reliably value. The idea of sticking money under the mattress is metaphoric but also grounded in human nature, to touch and feel and hold. There’s no physical manifestation of Bitcoin other than the currencies it can be exchanged for, and that is a difficult concept to universally embrace. Hype and scarcity are powerful forces, and when combined and placed in a financial market context, they can become rocket fuel. While this can be a powerful force for propulsion, it also has the potential to explode.

Technology Failure, Theft, and the 51% Attack

People are flawed, and technology is created by people. As soon as technology-based structures are built, there are individuals looking to exploit their vulnerabilities. And most systems have them. As any asset increases in value, incentive for theft increases as well, and while the Bitcoin blockchain was designed to be secure and redundant, it’s likely that there are efforts underway to discover its flaws. Companies routinely offer rewards to hackers who can find vulnerabilities in their software, but the reward to hackers of the blockchain could be the coins themselves. Security weaknesses have been exploited many times, including a series of incidents involving crypto exchanges Mt. Gox and Bitfinex, where well over a million coins were lost or stolen between the two. To those skilled in computer theft, an asset like crypto that can be made difficult to trace is an asset that’s tempting to steal. According to Chainalysis, in 2020 alone, close to \$400 million in bitcoin was collected through ransomware.

Of hypothetical concern is the so-called “51% attack,” where a group of miners would attempt to control more than 50% of the computing power of the blockchain network. Not only would the attackers be able to prevent new transactions from gaining confirmation, but more dangerously, it would also allow them the ability to reverse transactions that were completed while they were in control of the network, giving them the ability to double-spend coins, which the blockchain is designed to prevent. It’s the crypto equivalent of counterfeiting, and an attack of this nature could significantly undermine the security that lies at the heart of this asset. The holy grail of digital malfeasance would be the ability to change historical blocks in the chain, which would theoretically require an almost unfathomable amount of power, but



if pulled off successfully it could dismantle existing records of ownership. There's no FDIC insurance for bitcoin, and owners would have no recourse for recovery. Crypto supporters look at this as a virtual impossibility, but that viewpoint fails to appreciate that secure systems are only secure until their flaws are identified.

Investing (or Not) in the Future

It's clear at this point that there's a market for digital items, and so the NFT market is likely to persist and grow, with blockchain technology providing the backbone for ownership verification. Anything that can be viewed on a screen – even a quarterly letter from an investment advisory firm – can theoretically be monetized now, although we have our doubts as to how lucrative this will ultimately be for most collectors, who may find themselves disappointed in the resale potential of items that can be otherwise enjoyed for free. But the technology does make sense for items where proof of ownership matters, like owning the equivalent of the master recording of an album. In these cases, we can see and fully comprehend its validity, and of course the importance of the blockchain supporting it.

Despite its massive increase in price (or perhaps because of it), Bitcoin's future remains an open question. It's proven to be a failed experiment as a mainstream transactional currency, but owners are clearly unconcerned, placing their bets on it as an appreciating asset. We do understand the argument for putting a small portion of a portfolio into Bitcoin or a basket of crypto assets as essentially a call option on the world continuing to place high value on these assets, but it's hard to recommend an investment with no measurable economic basis of return, where we can't possibly provide any real insight. "Everybody is getting involved" is not an economic insight, nor is "scarcity will make it go up" or "Bitcoin is the future." All of the investments in client portfolios have some underlying way in which value can be calculated and ascribed. Crypto does not, and so anyone who makes a confident prediction on its future price is just pretending, talking their book, or (in all likelihood) both.

That text in Bitcoin's genesis block – "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks" – shows creator Satoshi Nakamoto's disdain for the institutions that got the world into such a mess, and so it's truly ironic how the establishment has twisted this anti-establishment invention and repurposed it as an asset for generating massive wealth. And that may continue. With portions of the stock market expensive and bonds paying close to nothing, it's understandable how investors have sought other assets that have the potential for appreciation. Crypto has been one of those assets, and it will continue to be as long as faith supports it. Owners of bitcoin are predicting great things for its future, but unpredictable market forces have a way of humbling hype, especially for assets whose foundations rest on it.
