

The rise of Bitcoin

Global financial markets

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- The price of Bitcoin has skyrocketed in recent months. From a low of USD 4,000 in mid-March last year, the price of the world's first and most famous cryptocurrency has risen by nearly 900%, despite a nearly 30% correction recently. This dramatic increase has understandably raised interest from investors across the globe.
- In this report, we explore some of the questions we're currently discussing with our clients. The focus here is on Bitcoin, but we will also touch on other cryptocurrencies and central bank digital currencies (CBDCs).



Source: Unsplash, André François McKenzie.

Question 1: Should I buy?

Many clients are asking whether they should invest in Bitcoin and other cryptocurrencies. Our general guidance is this: While we wouldn't rule out further price increases, we're somewhat skeptical of any essential real-world use cases, which makes it hard to estimate a fair value for Bitcoin and other cryptocurrencies. We are also cognizant of the real risk of one losing one's entire investment. Investors in cryptocurrencies must therefore limit the size of their investments to an amount they can afford to lose. We also suggest thinking about an exit strategy.

Indeed, prices could continue to climb in the near term given strong price momentum, the potential for further institutional adoption, huge media and social media attention, and the mindset that limited supply will translate into higher prices. But there is nothing stopping future cryptocurrencies—whether launched by a private initiative or by public authorities—from overtaking Bitcoin and other current cryptocurrencies in popularity. The entry barriers to this market are low, as is evident from the more than 4,000 cryptocurrencies currently listed on coinmarketcap.com. Early success does not guarantee future success. Netscape and Myspace are examples of network applications that

enjoyed widespread popularity but eventually disappeared. There is little in our view to stop a cryptocurrency's price from going to zero when a better designed version is launched or if regulatory changes stifle sentiment.

Last, we note an increase in regulatory attention, following the surge in prices and market capitalization. In the UK, the FCA (Financial Conduct Authority) decided to ban the sale of certain crypto-derivatives to retail consumers, and we wouldn't be surprised if regulators elsewhere soon follow suit. As cryptocurrencies have become a much bigger asset class in 2020, the impact they can have on financial stability has grown, which makes them more relevant for regulators. As we discuss in more detail below, regulatory changes can weigh on prices (Question 6).

Question 2: Who is buying?

Anecdotal evidence suggests institutional investors are buying more than in 2017, when Bitcoin exceeded USD 20,000 for the first time. In a December article, the *Financial Times* described 2020 as the "year Bitcoin went institutional," highlighting the growing acceptance of cryptocurrencies by mainstream asset managers. Regulation that permits offering products and custody solutions, as well

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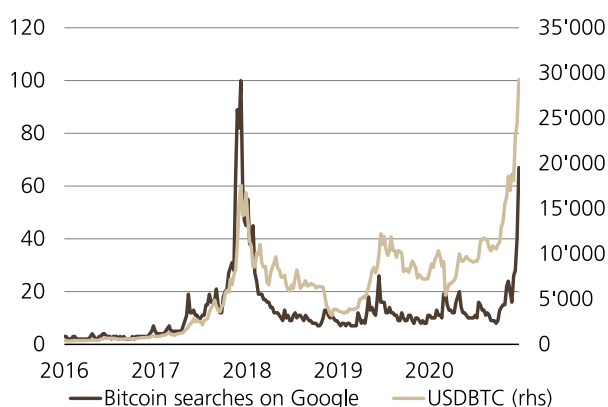
as the central clearing of cryptocurrencies, have helped instill confidence and pique investor interest in cryptocurrencies. According to Nasdaq.com, Guggenheim Funds Trust filed an amendment with the US Securities and Exchange Commission to allow one of its funds to gain exposure to Bitcoin by investing up to 10% (roughly equivalent to USD 500mn) of the fund's net asset value in Bitcoin-related products. The *Wall Street Journal* reported in December that Massachusetts Mutual Life Insurance Co. had bought USD 100mn of the cryptocurrency. Earlier in 2020, Paul Tudor Jones, a successful hedge fund manager, said that one of his funds may invest "a low-single-digit percentage" of its assets in Bitcoin futures.

We also see evidence that retail investors have become more active again. More people are searching for information on cryptocurrencies on the internet (Fig. 1). The number of transactions and digital wallets is on the rise, and the topic is trending on social media. Publicly available data from blockchain.com, the world's leading bitcoin wallet provider, shows 10 million new wallets created in the past three months, as many as were created in the prior year. New users appear to have been attracted by rising prices. It also shows a significant increase in the number of addresses used (roughly equivalent to daily users), likely indicative of an increase in trading activity.

While still underdeveloped, the open interest in the Bitcoin futures market has also increased more than threefold since October. With 95% of coins held by just 2.5% of addresses (note that one user can also have multiple addresses), the potential for price squeezes should be evident.

Fig. 1: Trending on Google

Searches on Google for "bitcoin" and BTCUSD exchange rate, weekly data



Source: UBS, Bloomberg, 10 January 2021

Cryptocurrencies have also been in the news due to growing mainstream adoption. For instance, some payment service providers have started to offer digital currencies. PayPal's decision to feature Bitcoin, Ethereum, Bitcoin Cash, and Litecoin will allow accountholders in the US to buy, hold and sell these cryptocurrencies. In 2021, the company plans to expand its offerings to Venmo and select international markets. PayPal has been granted a conditional BitLicense by the New York State Department of Financial Services.

It is worth noting that all these transactions will be settled in fiat currency. This means that cryptocurrencies will simply become another funding source inside your PayPal wallet. While this may increase the utility of cryptocurrencies, it doesn't address concerns around volatility, costs, and the speed of transactions. It also doesn't necessarily increase demand for the coins offered on the platform on a sustained basis.

Question 3: Why are people buying?

There are many reasons why people invest in cryptocurrencies. Here, we highlight three:

An attractive investment opportunity: Some investors see their Bitcoin investment as part of a broader strategy to position for new opportunities in an increasingly digital world. Some investors, for example, believe that the decentralized Bitcoin network could become a competitor to the established global settlement system, moving international transactions away from US dollars, euros, or yuans into cryptocurrencies. The lack of an essential use case is often seen as a temporary shortcoming that will be resolved at some point, resulting in broader real-world adoption of cryptocurrencies. And if not, Bitcoin might eventually become a collectible as the world's first cryptocurrency. The history of the internet is frequently suggested as a parallel: It began with just a few tech geeks tinkering around, and rapidly expanded to become a ubiquitous presence in modern society. But it took broader market access through home computers and modems for retail and consumer use cases to be developed.

As discussed in Question 1, one risk to consider here is that private coins can be easily replaced with new ones that offer the same services at lower costs, transact faster, have a lower environmental impact, or are simply more convenient to use. So while Bitcoin may be in vogue now, it may yield to another more popular coin in the future.

A hedge against depreciating fiat currency: A second reason relates to unorthodox central bank policies for over a decade. Some investors fear that the use of

central bank money to fund emergency expenditure programs will eventually result in high inflation or even hyperinflation, eroding the purchasing power of their currencies. Cryptocurrencies, thanks to their limited supply, are seen as alternative stores of wealth, similar to precious metals, commodities, or other real assets, that are beyond the reach of public authorities and can be moved quickly at comparatively low cost.

One possible caveat to this argument is that while the supply of an individual token might be limited, the supply of cryptocurrencies as an asset class is infinite. Cryptocurrencies are also highly exposed to regulation, as the experience of Libra illustrates (see Question 1 and Question 6). This suggests that they are neither shielded from regulatory changes, nor immune to inflation-like wipeouts of their price.

FOMO: The large price increases in recent months has awakened animal spirits—or, put differently, FOMO (i.e., fear of missing out). For younger investors, the endorsements by “next-generation” entrepreneurs with significant social media reach—like Jack Dorsey and Elon Musk—and the skepticism of “last-generation” managers—like Warren Buffett and Jamie Dimon—who may be seen as out of touch, are viewed as bullish cues. No matter which generation you belong to, it is worth remembering that ever since the tulip mania in the 17th century, price bubbles have been driven mainly by speculative intentions. History suggests that when buyers only buy an asset because they expect to sell it at a higher price, this eventually results in dramatic corrections.

In addition, there is a separate discussion of whether cryptocurrencies add value in a portfolio context. We address this point in Question 5 below.

Question 4: Is it a bubble?

To assess whether Bitcoin is in a bubble or not, we find it useful first to acknowledge the challenges around determining its intrinsic value. The key reason why we find it challenging to come up with a valuation model is simply that Bitcoin and other cryptocurrencies don’t yet have future cash flows that we can discount.

Various models have been proposed to overcome this challenge. We will not discuss them in this report but refer interested readers to a recent publication from the CFA Institute (Cryptoassets: The Guide to Bitcoin, Blockchain, and Cryptocurrency for Investment Professionals, Matt Houghan and David Lawant, 7 January 2021). What the

proposed models have in common is that, in one form or another, they all rely on a narrative around future use cases.

Network-based frameworks implicitly need to assume that the number of users will increase further to justify rising prices. This is the effect, as stated by Metcalfe's law, that the value of a network is proportional to the square of the number of its users. Frameworks that rely on the addressable market (i.e., payments, digital contracts, or cryptocurrencies’ possible function as a store of wealth) rely on the assumption that users will indeed switch partly to cryptocurrencies for these use cases. Models that rely on marginal costs of production assume that there will certainly be a buyer at this price to absorb the supply of new units.

To be clear, we're neither claiming that these narratives are right or wrong; we're simply stating that the view you subscribe to determines the fair value you choose. This makes these frameworks much less credible than those applied to traditional assets. Of course, being academically sound and defensible, in all fairness, doesn’t necessarily lead to accurate forecasts. Nevertheless, the inapplicability of traditional valuation models to Bitcoin means that its fair value estimates are extremely widely dispersed, ranging from near zero to USD 400,000, as Scott MinerD recently suggested.

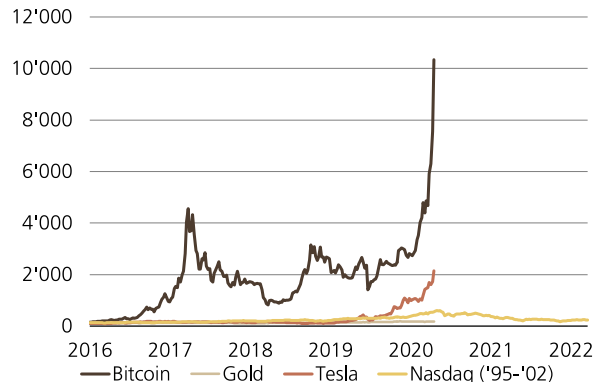
Whether you believe this is a bubble depends on your view of which narratives will become true. In our view, that's a tricky call to make, and ultimately only time will tell.

But shifting from this longer-term consideration to a more tactical horizon, we acknowledge that the price increases in recent weeks have been extreme by every standard we can think of (Fig. 2).

Charles P. Kindleberger's book, *Manias, Panics and Crashes – A History of Financial Crises*, suggests a few criteria that are indicative of the buildup of an asset price bubble. The market for cryptocurrencies fulfills quite a few of these at the moment. Kindleberger's studies suggest that rapid price increases are indicative of market participants discounting future rapid price appreciation, a pattern frequently observed during the buildup of an asset bubble. His work also suggests that new participants entering the market can be indicative of a bubble. Finally, there is also the “this time is different” narrative that Kindleberger identified as an indicator of an asset price bubble.

Fig. 2: Dwarfing all else

Price indexes for Bitcoin, gold, Tesla, and Nasdaq; weekly data, January 2016 = 100 for Bitcoin, gold and Tesla; for Nasdaq, we use the sample period between January 1995 (indexed to 100) and January 2002, but display it in Fig. 2 such that January 1995 corresponds to January 2016



Source: UBS, Bloomberg, 12 January 2021

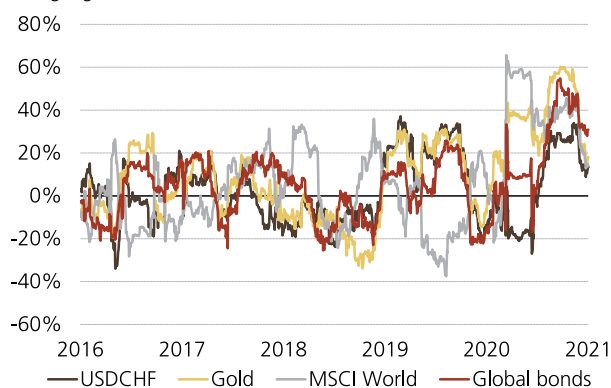
Question 5: Can Bitcoin and other cryptocurrencies help to diversify portfolios?

This is an important question, because diversification has become a key argument for investors to add cryptocurrencies to their portfolios.

While empirical evidence is mixed, Bitcoin has had an overall low correlation to a wide range of other asset classes (Fig. 3), including bonds, stocks, the Swiss franc (here shown versus the US dollar), and gold. Interestingly, correlations spiked substantially in 2020 with the outbreak of the pandemic, but have normalized since.

Fig. 3: Often, but not always, on its own

Correlation between Bitcoin and other asset classes, based on 3-month rolling log returns



Source: UBS, Bloomberg, as of 10 January 2021

This low correlation, if maintained, can indeed help to diversify a financial portfolio. However, a low correlation to other asset classes is not a sufficient reason alone to add

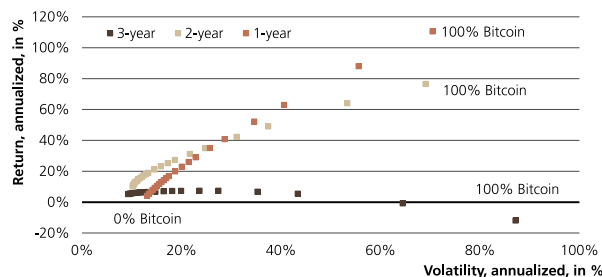
Bitcoin to a portfolio. Investors also need to look at risk-adjusted returns to determine whether they are sufficiently compensated for taking a risk.

The historical evidence on this is mixed: Had you held Bitcoin during a period of sharply rising prices, the overall risk-reward of the portfolio would indeed have increased. But during periods of less extreme increases—and of course stagnating or declining prices—this hasn't been the case (Fig. 4).

So, the question of whether to add Bitcoin or other cryptocurrencies to a portfolio can only be answered, in our view, if we have overcome the challenge of deriving a credible estimate for its future fair value (as discussed in Question 4). At this point, we find it hard to have high conviction in such a number.

Fig. 4: Only useful for portfolio diversification if prices rise fast enough

Annualized return and volatility of a portfolio with exposure to Bitcoin; we use monthly log returns between January 2018 and December 2020 over a 1-year, 2-year, and 3-year investment horizon and rebalance the portfolio on a monthly basis



Source: UBS, Bloomberg, 10 January 2021

Question 6: What could cause a reversal of current trends?

We provide some arguments why people are buying cryptocurrencies above. Here, we provide three arguments why people could start to sell:

Sentiment shifts: Most cryptocurrencies are notoriously volatile, and the increase in institutional participation may be making things worse. While demand would increase and volatility ease should corporations hold Bitcoin for business purposes, the opposite is true when institutions gain exposure for speculative purposes. Empirical evidence from other asset classes suggests that higher participation by institutional investors could increase volatility due to their more opportunistic investment approach.

Competition: Cryptocurrency prices are sensitive to new supply. This might sound counterintuitive given the often limited supply for each currency. However, since they are not legal tender in any jurisdiction, they may at some point be replaced by other digital currencies with better features. These features could include being faster, cheaper, more environmentally friendly, or gaining government backing (see Fig. 7 and Question 9). The entry barriers to this market are low, as demonstrated by the thousands of different coins launched so far. At the time of writing, coinmarketcap.com lists more than 4,000 different units. On the other hand, it's worth pointing out that building "trust" and securing broad acceptance might take years for new cryptocurrencies and puts the threat from a low entry barrier into perspective. Using another parallel from the internet, it would probably be much easier to replicate the code behind YouTube or Facebook than to convince the current users of these applications to shift from one platform to a new one. Among the buyers of cryptocurrencies, Bitcoin enjoys the reputation of being the "gold standard," the first, most famous, and by far most successful cryptocurrency.

Regulation: The risk of regulatory change is also crucial. Aside from Libra, the digital currency project launched by Facebook, cryptocurrencies haven't received significant attention from authorities and regulators in recent years. This might change with the rise of institutional participation and the increase in market capitalization. Regulators might see the more widespread institutional exposure to cryptocurrencies as a risk to financial stability, resulting in new regulations like higher capital requirements. In the UK, the FCA (Financial Conduct Authority) decided to ban the sale of certain crypto-derivatives to retail consumers, and we wouldn't be surprised if regulator elsewhere would follow suit. In combination with existing concerns around market manipulations and the possibility that some cryptocurrencies are used to finance criminal activities, the risk of regulatory measures will likely rise and potentially undermine the demand for decentralized coins. In December, the Securities and Exchange Commission announced that it had filed action against Ripple Labs Inc. and some of its executives, alleging that they raised more than USD 1.3bn through ongoing unregistered digital asset securities offerings. Ripple Labs Inc. is the company that stands behind Ripple, a real-time gross settlement system, currency exchange, and remittance network. Following the announcement, the price of Ripple dropped by nearly 70% versus the US dollar, though it has recovered some of those losses since then. Environmental concerns might also become a topic of regulatory attention, as the mining of some cryptocurrencies, for example Bitcoin, uses a lot of energy. Some tax authorities may also choose to treat it as an

investment, allowing them to tax capital gains. In this sense, cryptocurrencies could become victims of their own success.

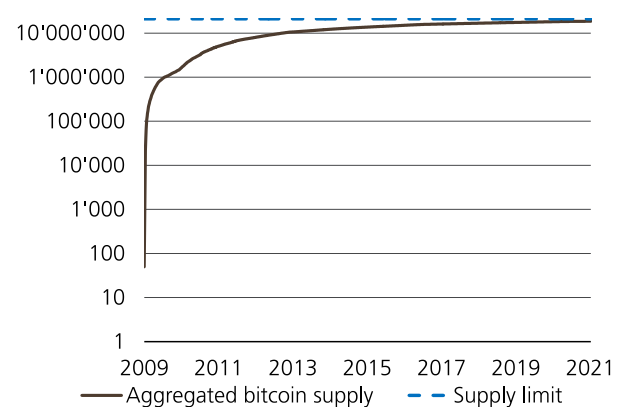
Question 7: Will the volatility of Bitcoin and other cryptocurrencies subside over time?

Bitcoin's supply is limited to 21 million units. The reward for creating new Bitcoin (often referred to as mining) decreases over time, as predetermined in its protocol (Fig. 5). Some investors see the lack of a centralized authority with the right to manage supply, for example a central bank, as the key value proposition that decentralized cryptocurrencies offer compared to their fiat peers.

However, the limited and highly inelastic supply also exacerbates volatility. As long as the demand for cryptocurrencies is exposed to fluctuation, either because of shifts in sentiment that affect speculative demand or business cycle fluctuations that affect demand for digital payment services, programmable money, or stores of wealth, the volatility of Bitcoin and other cryptocurrencies is likely to remain elevated when compared to most legal tenders and traditional stores of wealth.

Fig. 5: Supply growth falls rapidly as fewer new blocks are added to the Bitcoin blockchain

Aggregated bitcoin supply since inception and supply ceiling, values shown in logarithmic scale



Source: UBS, Blockchain.com, 10 January 2021

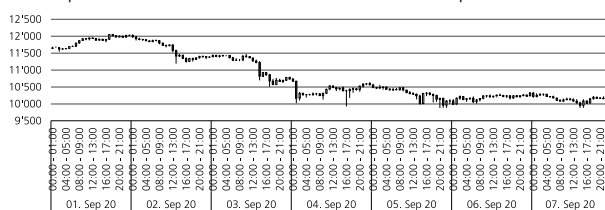
In this context, it is important to note that more widespread use of Bitcoin and other cryptocurrencies may not necessarily reduce volatility. Volatility will only decline if demand growth starts to slow and ultimately converges with supply growth, but such an equilibrium might be far from stable. For example, as prices slide, speculative investors—who tend to be trend-following—might start to reduce their positions. This could cause an even sharper price reversal, resulting in elevated volatility.

Question 8: Can Bitcoin be used as a true alternative to cash?

Bitcoin was originally designed as a "peer-to-peer electronic cash system." However, its high volatility is often seen as an obstacle for real-world applications such as payments for goods and services. Large price moves happen intraday, complicating the day-to-day use of Bitcoin and other cryptocurrencies (Fig. 6). On 3 September, Bitcoin lost almost 15% of its value. The price in US dollar terms fell so sharply within an hour, that had you been in a taxi, your fare in Bitcoin could have risen by more than 5%.

Fig. 6: Bitcoin—fit for purpose?

Bitcoin price versus the US dollar between 1 and 7 September 2020



Source: UBS, Bloomberg, as of 10 January 2021

It is worth noting that other decentralized cryptocurrencies are much more stable by design, have lower transaction costs, and hence may be more suitable as cash alternatives. Examples include Bitcoin cash and Litecoin, or Tether; the latter belongs to the group of cryptocurrencies called stable coins, which are designed to minimize volatility versus the US dollar or other securities. Fig. 7 provides an overview of different types of digital currencies (for further information, please also refer to our publication 'Information technology: Understanding China's digital currency and blockchain initiatives', published on 23 April 2020).

Question 9: What are the economic differences between cryptocurrencies and central bank digital currencies?

Central banks have not ignored global technological changes. In recent years there has been more discussion about central bank digital currencies (CBDCs). Traditionally members of the public can only hold central bank-issued money in physical form (notes and coins). Digital forms of money are held via financial institutions, and the public therefore have a risk when holding money digitally. A CBDC would allow the general public to hold central bank issued money digitally, at the central bank. Economically a CBDC would be treated exactly the same way as a bank note—so USD 10 of CBDC would be worth USD 10 of physical notes or coins. It is possible to think of a CBDC as a digital bank note. The advantage is that the public would have access to a risk-free form of digital money, with a fast and

secure payment system. A CBDC could, in theory, entirely disintermediate the banking system—why hold your money digitally at a bank if you can hold it digitally at the central bank? In practice, as central banks are unlikely to want to negotiate loans to millions of borrowers, the banking system is still needed and CBDCs are likely to be designed in such a way that minimizes the loss of deposits in the banking system.

In economic terms a CBDC would differ from cryptocurrencies in some important ways. It would be possible to pay taxes in CBDC—because the CBDC is not a separate currency, but simply a different way of holding the national currency. Because of that, the central bank would still be able to control overall money supply (CBDC plus physical currency plus banking system digital currency), and could reduce overall money supply in the event that there was a decline in overall money demand. This would ensure CBDCs a stable store of value—which certain cryptocurrencies very conspicuously fail to achieve.

Interested readers can look at recent discussion papers from the Bank of England (Central Bank Digital Currency: opportunities, challenges and design, BoE, March 12, 2020) and the Bank for International Settlement (Central bank digital currencies: foundational principles and core features, BIS, October 9, 2020)

Fig. 7: Comparing digital payment solutions

	CBDC	Electronic payment	Cryptocurrencies	
			Bitcoin	Libra
Underlying account	Bank account / Digital wallet	Bank account / Digital wallet	Digital wallet	Digital wallet
Value stability	Stable	Stable	Very volatile	Relatively stable
Regulatory oversight by	Central banks	Central banks	n/a	The Libra Association
Credit backed by	Central bank	Commercial banks	n/a	The Libra Association
Clearing system	Central bank payment and clearing system; digital currency system	Central bank payment and clearing system	Private-run trading exchange/system	Trading system run by the Libra Association
Traceability	Traceable	Traceable	Traceable	Traceable
Anonymity	Controlled anonymity	Recognizable	Complete anonymity	Partial anonymity
Transaction reversibility	Reversible under certain conditions	Reversible under certain conditions	Difficult to reverse	Difficult to reverse
Transaction limit	Limit set by central bank	Subject to limits set by banks or account holders	No limit	n/a
Network connection requirements	Potentially no requirements for online	Requiring access to network	Requiring access to network	Requiring access to network
Transfer method	Point-to-point / via 3rd party	via 3rd party	Point-to-point	Point-to-point

Source: PBoC, Citi, UBS, April 2020

Appendix

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