Macro & FICC Research

Reflections

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20 questions and answers about bitcoin hype and the future

Last year, the value of the cryptocurrency known as bitcoin rose by 360% and in January a new record price was set: over USD 40,000. Although bitcoin has been around for more than 10 years, there are still many question marks surrounding the currency and its future. What has driven its price higher right now, and is there any way of knowing how much a bitcoin should be worth? Are bitcoins and cryptocurrencies really just a big bubble? Or is bitcoin, on the contrary, a currency that can eventually take over completely, replacing traditional currencies? I will try to answer these and many other questions in this analysis.

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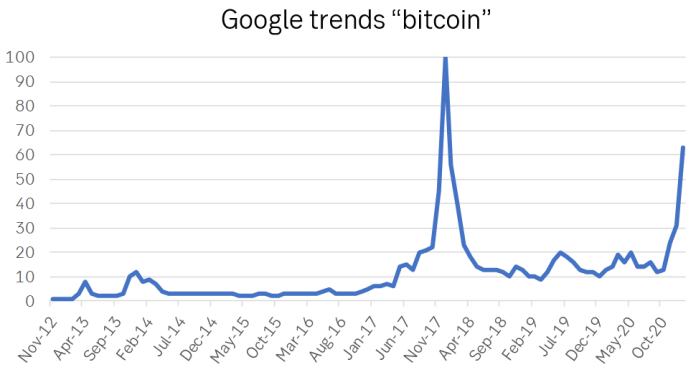
1. Why has the price of bitcoin climbed so much this past year?
The financial market recovery has generally been strong since the sharp decline at the beginning of the COVID-19 crisis last spring. One important driver has been that governments around the world have put in place strong stimulus packages to soften the impact of the pandemic, while central banks have financed their stimulus measures by printing new money. Record-low interest rates and bond yields, combined with growing optimism, have led many investors to look for assets with higher returns, even though this also implies greater risks. Bitcoin has benefited both from the increased risk appetite of investors and the concern many of them feel that central bank money printing will erode the value of traditional currencies.

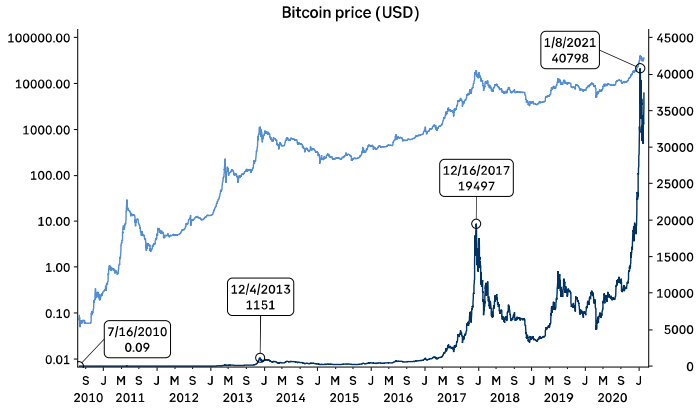
But other, more practical, factors have also come into play. Large, well-established payment companies such as PayPal have started allowing their customers to make bitcoin payments, thereby increasing people's interest in bitcoin and making it easier to buy them. Cryptocurrencies have also gradually become more widely accepted as an investment asset. Last year, one of the world's most successful hedge fund managers, Paul Tudor Jones, said he had invested in bitcoin. The world's largest asset manager, BlackRock, recently announced that it will open up for investments in cryptocurrencies. In addition, there are now many financial instruments, such as a functioning futures market for bitcoin as well as mutual funds and other investment products that focus on cryptocurrencies. These developments have helped to increase interest among professional investors, although most of the money still comes from private individuals. To summarise, we might explain the rise of bitcoin over the past year as being due to favourable market conditions and increased acceptance of cryptocurrencies as an asset class.

How should we view today's bitcoin hype, compared to 2017?
Despite new record-high prices, there is still not quite as much hype about bitcoin as in late 2017. One way to illustrate this is by looking at how many people in the world googled "bitcoin". As shown below, interest increased sharply during this past autumn, but we have still not reached the peak levels from 2017.



3. Isn't bitcoin just a big bubble or a pyramid scheme?
Dismissing cryptocurrencies as a big bubble and describing them as a modern variant of the Dutch tulip mania of 1637 are wrong. Nor are they a pyramid scheme. The latter is always characterised by promises of a large increase in value for everyone who buys. For those who buy bitcoin, there has never been any guarantee of what its value will be in the future. Instead this is determined entirely by supply and demand, the same as for all other assets traded in a free market. Although the phenomenon itself is not a bubble, bitcoin and other cryptocurrencies – just like other assets that are subject to a lot of speculation from time to time – can be greatly overvalued, with a subsequent price crash as a result. This has happened several times during bitcoin's more than 10-year history. Although there has been a price surge over the past year, the fastest and most explosive price increases took place during the early years of bitcoin. In percentage terms, the increases have

been less dramatic from 2014 onward, as seen in the slope of the light blue logarithmic price curve in the chart below.



4. Can we calculate what a bitcoin ought to be worth?

Put simply, the answer is No. I will try to explain why. Traditional assets such as equities, bonds or real estate have an intrinsic rate of return that can be used to calculate a reasonable value in relation to what other assets cost. A bond provides a yield that can be used to calculate its price. A reasonable value for a share is based on the size of the future profits you believe the company will earn, while the value of a property can be estimated based on the rental income you receive. For assets that have no such intrinsic rate of return, it is harder to calculate a reasonable value. Commodities have no intrinsic rate of return, but for many you can still get a good idea of how both supply and demand will evolve. Anyone who makes oil price forecasts knows roughly how much oil can be produced in the world and what global demand will look like, given assumptions about economic growth etc. It is trickier to price a metal like gold, which has very limited industrial use. Gold derives almost all of its value from the metal being used as a unit to price other assets. Gold is not just a metal and a commodity; it is, above all, a currency. A currency must be rare, durable, easy to transport, divisible and difficult to counterfeit, and its price must be reasonably stable over time.

What, then actually determines how much gold should cost? Put simply, it is the overall assessment by investors of the outlook for other assets. For example, if investors are worried that other assets have become too expensive, they will sell some of their "overvalued" assets and instead buy more gold. Increased financial or political risks usually lead to higher gold prices, because they make investors think that other assets may be too expensive, given how uncertain the situation has become. If the market believes that the value of ordinary currencies will be eroded because central banks print too much new money, the gold price will go up. Bitcoin gets its value in exactly the same way and is actually designed to function as a virtual variant of physical gold. Parallels to gold can be drawn in many ways, including limited quantity, ease of movement, difficulty in counterfeiting, divisibility and the virtual mining (see question 8 on mining) that must be performed to extract new bitcoins.

When it comes to estimating a reasonable price, bitcoin has the disadvantage of only having existed for 10 years, whereas gold has been used as a currency for several thousand years. This short history makes it much more difficult to predict what role bitcoin will play in the future, and this is absolutely crucial for what it will cost. All price forecasts must be based on assumptions about how widespread and heavily used bitcoin will be. Let us illustrate with a hypothetical example. Assume that in the future, bitcoin entirely replaces physical gold as a store of value. If you distribute the value of all gold across the bitcoins in the market today, the value of one bitcoin would end up at about USD 630,000, while gold would instead be almost worthless. The problem, of course, is that this assumption is not especially reasonable. Assuming instead that many countries will choose to ban bitcoin or to regulate cryptocurrencies in ways that would make them significantly less attractive to own, it would instead have the opposite effect on the price.

Although it is hard to make price forecasts, this does not deter many people from trying anyway. One widely used forecasting method is technical analysis. Technical analysis is based on trying to predict future price trends by discerning the patterns in which prices have moved historically. Technical analysis is a proven forecasting method in financial markets and has long been used for many different types of assets, especially currencies. Whether it works in the long run is controversial. Most people use technical analysis more to try predicting very short-term movements than to try estimating a long-term value.

Another way to use price history that many bitcoin enthusiasts seem to like is to simply model a statistical correlation for how the price should change – based on the historical trend. One well-publicised model is called the S2F (stock-to-flow) model. Put simply, it assumes that there is a stable correlation between the continuously declining extraction of new bitcoins and the price trend. One problem with the S2F model is that it also predicts that the price of bitcoin will eventually climb towards infinity once all bitcoins have been "mined" more than 100 years from now.

5. Who started bitcoin?

Bitcoin was started in March 2009 by an anonymous person or group of people using the name Satoshi Nakamoto. By inventing blockchain technology, Nakamoto succeeded in solving the problem that a digital currency could previously be copied easily and thus be spent multiple times, in about the same way as if someone counterfeits banknotes by printing copies of the original banknote. The first known purchase using bitcoin occurred in May 2010 when a person offered 10,000 bitcoins to anyone who could arrange for the delivery of two pizzas to his home. At that time, this assigned one bitcoin a value of about USD 0.0015. At todays bitcoin prices the pizzas would cost nearly USD 380 million!

6. How big is the market for bitcoin?
The total value of all bitcoins now outstanding (early February 2021) is USD 700 billion. This figure can be compared to the value of all physical gold in the world, which is nearly USD 9.5 trillion. In other words, in just over a decade bitcoin has reached more than 7% of the value of all gold. Daily transaction volume is harder to estimate, among other things because some marketplaces tend to exaggerate their volume figures for marketing purposes. According to CoinMarketCap, a market data supplier, daily bitcoin volume was about USD 60 billion in early February 2021, while other estimates of true volume end up far lower. According to Nomics, another market data supplier, actual volume is around USD 12 billion. By way of comparison, daily trading in physical gold amounted to USD 145 billion at the end of 2019, while daily volume on the broad US equity index S&P 500 was around USD 150 billion.[i]

7. How many cryptocurrencies are there?
Aside from bitcoin, today there are more than 4,000 other cryptocurrencies. New ones are being created every week, while others disappear. During the hype period of three years ago, there were just over 1,300 cryptocurrencies. The overall cryptocurrency market is valued at more than USD 1 trillion, of which bitcoin accounts for about two thirds. The next largest is Ethereum, with a market value of about USD 165 billion.

8. What is "mining"?
"Mining" is the method most cryptocurrencies use in order to maintain the security of the blockchain on which the currency is based. The actual mining process is too complex to describe here, but put simply, new bitcoins are created by computers that use random guesses to try to find solutions to a complicated cryptographic problem that is needed to verify and add a new block of transactions to bitcoin's blockchain. The computer that finds the solution to a new block first is rewarded with a number of new bitcoins, taken from the bitcoins that have not yet been mined. In addition to being rewarded in the form of new bitcoins, the miner also receives the transaction fees paid by users who have carried out the transactions included in the block. The difficulty of the cryptographic problems that computers are supposed to solve is automatically adjusted by the algorithm in such a way that an average of one block is mined per ten minutes. In this way, the bitcoin algorithm automatically compensates for the fact that computers are becoming faster and for the increasing or decreasing number of miners. In bitcoin's infancy, the problems were substantially easier to solve, since there were fewer miners and they were using ordinary home computers. Today such equipment cannot possibly compete, and bitcoin is mined by computers with special chips (application-specific integrated circuits or ASICs) that have been developed to solve the cryptographic problems in bitcoin's blockchain. Thousands of such computers are often gathered into large computer centres for industrial bitcoin mining, but private individuals can also join pools and compete in mining.

9. Is it true that bitcoin wastes a lot of energy?
It is quite correct that all the computers around the world that are working to try to solve bitcoin's cryptographic problems consume a lot of electricity. Last year the bitcoin network consumed 77 TWh of electricity, which more than the whole of Austria.[ii] At the same time, it is wrong to regard this as completely wasted energy. The mining process is what continuously guarantees the integrity of the blockchain and ensures than no one can sell their bitcoins to two or more people simultaneously. In that sense, we can view the cost of electricity as a cost for keeping the network secure. Today most bitcoins are mined in northern China because electricity prices there are low, making the "mines" there more efficient. Iceland is another favourite among miners for the same reason. The higher the price of bitcoin is, the more mines it will be profitable to start up. Here, too, we can draw parallels to traditional commodity production, whether it is about mining gold, copper, coal or something else. If the price of the commodity goes up, even costlier deposits will become profitable to exploit. Energy consumption is a growing problem, however, and some cryptocurrencies have announced a transition to other methods for maintaining their security.

10. Is it entirely certain that the number of bitcoins is limited?
A basic requirement to ensure that bitcoin will function as a currency is that the quantity of bitcoins that can be created is limited. It will never be possible to extract more than 21 million bitcoins. One common misconception is that this is a number that is written into the bitcoin algorithm and that someone could change it to something else, making it possible to create more bitcoins. This is not the case. Instead the limitation comes from the fact that the number of new bitcoins in each block that is mined is halved every four years. At first, each block contained 50 new bitcoins. In 2012 the number was halved to 25 and so on. Since 2020, each block has contained 6.25 new bitcoins. The number will continue to halve every four years and not until more than 100 years from now, in 2140, is the last bitcoin expected to be mined. This continuous halving means that new production will gradually approach zero, so there will never be more than 21 million bitcoins.

11. How many bitcoins are there in the market today?
To date, 18.6 million bitcoins have been mined, but of these, it is estimated that some 3.7 million (today worth over USD 140 billion) were lost forever in the early years when bitcoin was almost worthless and many people were thus not so careful about saving their code keys and hard drives. So there are roughly 15 million bitcoins in the market today and another 2.4 million left to extract.

12. Do we know who owns all bitcoins?
How many bitcoins there are in each of the 200 million electronic wallets created during the history of bitcoin is public information. So are all the historical transactions made between all wallets. However, there is no register of who owns each wallet and anyone can create one or more electronic wallets completely anonymously. One person may own many wallets, or a cryptocurrency exchange that stores bitcoins for many customers can lump together customers' bitcoins in one wallet. This makes it difficult to estimate how many people own bitcoins. A study published in the spring of 2019 showed that 11% of Americans owned bitcoin or some other cryptocurrency. Other estimates made in various ways tend to concur that somewhere around 100 million people own bitcoins today[iii]. So we are still talking about less than 1.5% of the world's population.

13. What is a stablecoin?

The third largest cryptocurrency today is tether, which has a market capitalisation of USD 28 billion. The difference between tether and other cryptocurrencies is that it has a fixed exchange rate of 1: 1 against the US dollar. Tether is used by those who speculate in cryptocurrencies as a way to exit the crypto market if they expect a decline in cryptocurrencies, without having to make a cumbersome transaction to switch back to regular dollars again. The fact that tether has a fixed link to the dollar also means that it works better as a means of payment for goods and services than other cryptocurrencies, whose value can change a lot in a short time. Tether has been the subject of some speculation as to whether the company behind the currency actually has enough US dollars to back all tether it has issued at 1:1. An investigation of the company by the New York Attorney General's office is under way.

14. Is the Riksbank's e-krona a cryptocurrency like bitcoin?

Independent cryptocurrencies like bitcoin are not the only ones that claim to be the payment medium of the future. Central banks, too, have realised that digital currencies will be needed in order to remain competitive. The Swedish Riksbank has far-reaching plans to launch its own digital currency, the e-krona, as an alternative to cash. The Riksbank is concerned about how cash is disappearing in Sweden and that only a few years from now, it will no longer be accepted as a means of payment by most businesses. The Riksbank seems to be leaning towards designing the initial version of the e-krona in such a way that you will have a virtual wallet or card where you keep your e-kronor, not an account. However, e-kronor will not be anonymous in the way that cash or cryptocurrencies are. Unlike bitcoin, for obvious reasons the e-krona will be unable to make payments outside Sweden's borders. The Riksbank is currently studying various technical solutions for the e-krona. It is not certain that the e-krona will be based on blockchain technology like bitcoin and most other cryptocurrencies.

15. Facebook's Diem (formerly Libra)

In 2019 Facebook launched its Libra project. The idea was to offer a form of stablecoin that would have a fixed exchange rate against a basket of widely used currencies including the US dollar, the euro and the yen. Since its value would be stable, it would be of no interest as an investment and would be used only as a means of payment. The enormously wide distribution that the libra might have gained if it had been offered to billions of users by the companies that – in addition to Facebook – were part of the Libra Association, made politicians in both the US and Europe slam on the brakes, and the project was delayed. Now this group of companies instead plans to launch a slimmed-down version of the currency, under the name diem, in early 2021. Diem will only be linked to the dollar, but the ambition is to create corresponding diem variants for other currencies and ultimately a diem linked to a basket, just like the original libra concept.

16. Can you use bitcoins to shop for goods?

In the future, will it be possible to use bitcoin to buy a coffee or pay for groceries? This is of course one of the big questions both for those who own bitcoins and for those who are considering buying them. Much of the future potential increase in value that bitcoin owners are hoping for is based on bitcoin becoming more widespread and starting to be used by many more people than today. But there are many challenges to such success. One Achilles heel for the blockchain technology on which bitcoin is based is that it is slow compared to other payment solutions. Today's bitcoin network does not have the capacity needed to handle all the transactions that would be required for bitcoin to function as a global means of payment for billions of people. Bitcoin's blockchain currently handles a maximum of 7 transactions per second, and it takes at least ten minutes for a transaction to be confirmed. This can be compared to VISA's payment system, which despite being 30 years old can handle 1,700 transactions per second. Technical development work to speed up payment processing for bitcoin and other cryptocurrencies is ongoing. Various solutions have been proposed, but even today the problem has not been solved. The fact that capacity is so low at the same time as more people are using bitcoin has pushed up the costs of getting a transaction completed. In late January 2021 it was around USD 15. This amount does not matter in the case of large transfers but makes it impossible to use bitcoin for small everyday payments. The problem of slow transaction speed will only increase, since the number of electronic payments is forecast to grow. In 2019, more than 700 billion electronic payments occurred worldwide[iv]. The number will only grow in the future as a result of economic development and the replacement of cash with electronic payments. In addition, more and more devices in our homes will be connected to the internet ("the internet of things") and must be able to make micropayments for various kinds of services.

17. Is bitcoin used by criminals?

Bitcoin and other cryptocurrencies have undoubtedly made things easier for criminals. Although bitcoin transactions can be traced, this is difficult and resource-intensive. Moreover, some cryptocurrencies are specially designed to ensure that transactions will be untraceable. For criminals it is far easier than to use cash or try to take advantage of weaknesses in the global banking system, especially when moving money between countries. Although cryptocurrencies are used in criminal activities, they represent a small fraction of all transactions. According to the blockchain analytics firm Chainalysis, only 0.34% of bitcoin flows during 2020 could be connected to known illegal services (a downturn from 2.1% in 2019). However, there is sizeable under-reprting in these statistics, since Chainalysis cannot identify flows originating from such activities as money laundering and tax evasion.

18. Will cryptocurrencies be regulated?

The need for regulation has been a recurring issue for cryptocurrencies. The fact that bitcoin was started as a protest against the financial system after the global financial crisis has led many enthusiasts to see all forms of regulation as a threat. At the same time, cryptocurrency trading and commerce must be regulated if the market is to continue to grow and eventually become an integral element of the financial system. Regulations are needed not only to prevent the use of cryptocurrencies for illegal activities but also to strengthen consumer protection and

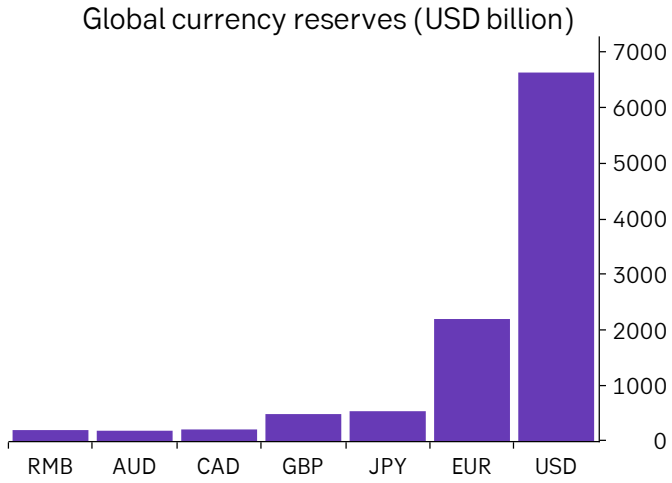
to create predictability for the companies operating in the cryptocurrency industry. This issue has also become increasingly acute in line with the rapidly growing trend towards issuing stablecoins. They have the potential to be used by many more people, and in the long run they can thus pose a threat to financial stability. In 2020, the European Union unveiled a proposal for a common EU regulation for the cryptocurrency market.

19. Can bitcoin replace ordinary currencies in the future?
The dream of those who own bitcoin is, of course, that one day it will assume the role of dominant global currency. Looking back in history, at first glance this does not seem entirely impossible. As recently as well into the 20th century, most countries had a gold standard and linked their own local currencies to the value of gold. So why can't bitcoin become the anchor of a global currency system, like gold 100 years ago? There are both economic and political reasons why this is unlikely.

Let us start with the economic ones. One important task for a currency is to ensure stable monetary value, i.e. that money can buy about the same amount of goods in the future as it can today[v]. In order for this to function, the amount of money in the economy needs to keep pace with growth, meaning the gradually increased production of goods and services. Using bitcoin as a global currency would introduce a strong deflationary force into the economy, since the supply of bitcoin would grow much more slowly than the economy. As a result, prices of goods and services, including people's wages and salaries, would have to fall continuously. Deflation, in turn, would lead many people to postpone a lot of consumption, because in the future the same money would buy more goods and services than today. The result would be lower demand and higher unemployment. The overly limited supply of gold in relation to economic growth during the 20th century was one important reason why the gold standard no longer functioned as a currency regime. Bitcoin would have the same problem.

There is also strong political opposition to letting bitcoin take over. In order for bitcoin to replace ordinary currencies, countries would have to agree to give up their currency monopolies. Having the exclusive right to control the supply of a currency means great power for a country. It is not only unlikely but also rather naïve to think that countries would be prepared to relinquish that power to an independent network that no one else controls. Today, the global currency system is mainly organised in such a way that local currencies, such as the Swedish krona, work in individual countries. The krona is excellent as a means of payment in Sweden, but you will have big problems if you try to use it in Australia. Then there are major global currencies that are widely accepted and work well even outside their home country. The US dollar is by far the biggest global currency and is used today in almost 90% of all global transactions. The fact that the dollar is so dominant gives the United States, which controls the supply of dollars, enormous power. Those who want to use dollars (aside from US paper money) are also totally dependent on the American banking system, making US influence even greater. You can read more about the role of the US dollar as the world's most important reserve currency here.

Neither the US, the EU, China nor any other country or region with its own currency would be interested in letting bitcoin or another cryptocurrency take over that role. The main weapon that countries have to preserve their monopolies is regulation. By restricting their usefulness or legality in various ways, cryptocurrencies can be prevented from becoming a real threat to local currency monopolies.



20. What, then, is the future of bitcoin?
Today, bitcoin is used to a fairly small extent to make payments. Instead the currency is bought and sold primarily as a financial investment. There may, of course, be exceptions in cases where payments are connected to various forms of illegal activity where anonymity is a major asset. In its role as an investment asset, bitcoin poses no more of a threat to traditional currencies than physical gold does today. Bitcoin has increasingly evolved into a commodity-based currency, just like the gold it is designed to emulate. It is common today to own gold as an investment and store of value, but no one uses gold coins as money anymore. There are many indications that this will also be the future role of bitcoin. As long as it does not threaten traditional currencies as a means of payment, governments and central banks around the world can let it live on. But the ultimate dream of all bitcoin enthusiasts – that bitcoin will one day achieve world domination in the global currency market – seems likely to remain only a dream.

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[i] Statista
[ii] Wikipedia, Statista
[iii] Bitcoin Market Journal, 2020-11-23
[iv] Capgemini World Payments Report 2020
[v] In most countries, the target is not actually stable monetary value, but 2% inflation over time, so that monetary value will decrease a little from year to year but in a predictable way.