



## The Future of Payments: Series 2

# Part III. Bitcoins: Can the Tinkerbell Effect Become a Self-Fulfilling Prophecy?

#PositiveImpact

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# Summary

- Bitcoin's market cap of \$1 trillion makes it too important to ignore. Big players who buy and sell bitcoins have considerable market-moving power. As long as asset managers and companies continue to enter the market, Bitcoin prices could continue to rise.
- But bitcoin transactions and tradability are still limited. And the real debate is whether rising valuations alone can be reason enough for bitcoin to evolve into an asset class, or whether its illiquidity is an obstacle.
- Bitcoin's value will continue to rise and fall depending on what people believe it is worth. This is sometimes called the *Tinkerbelle Effect* — a recognised economic term stating that the more people believe in something, the likelier it is to happen based on Peter Pan's assertion that Tinkerbelle exists because children believe she exists.
- Central banks and governments understand that cryptocurrencies are here to stay, so they are expected to start regulating crypto-assets late this year or early next year. They are also speeding up research on their own Central Bank Digital Currencies (CBDCs) and launching pilots. Click [here](#) for more details.
- In the medium to long run, due to very strong network effects, there will likely be little room for using cryptocurrencies as a widespread means of payment. The regulatory landscape related to CBDCs, current cryptocurrency projects, and future efforts (e.g. Libra/Diem by Facebook) is still uncertain.

## In the short term, Bitcoin is here to stay and its value will remain volatile

- We estimate that less than 30% of transactional activity in bitcoins is related to payment for goods and services, with the rest largely used as a financial investment.
- As an investment asset, Bitcoin liquidity remains low. In 2020, 28mn bitcoins changed hands (150% of total bitcoins in circulation), compared to 40bn shares of Apple (270% of its total shares in circulation).
- Due to its still limited tradability, Bitcoin is expected to remain ultra-volatile; a few additional large purchases or market exits could significantly impact the supply-demand equilibrium.
- The root causes of Bitcoin's volatility include: small tactical asset allocations and the entries and exits of large asset managers.

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"It is frightfully difficult to know much about the fairies, and almost the only thing for certain is that there are fairies wherever there are children."

— J.M. Barrie, "Peter Pan"

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"It is not a speculative investment even though it is being used as such by other people. As Bitcoin network grows, the value of Bitcoin grows. As people move into Bitcoin for payments and receipts, they stop using US Dollars, Euros and Chinese Yuan, which in the long term devalues these currencies."

— Eric Schmidt, Executive Chairman of Google

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## In the long term, Bitcoin, like Tesla, will have to transform potential into results to sustain its value proposition

- Tesla's current market capitalisation is \$665 billion (as of 03/12/2021), which is almost five times the market cap of Ford and GM combined. That's remarkable because GM sold around 8 times as many cars as Tesla in 2020, while Ford sold more than 5 times as many. The ratio of market-cap to vehicle sold by Tesla and Ford shows that the current value of Tesla is 63 times that of Ford.
- Tesla's valuation is pricing in a significant market shift toward electric cars, leading to the hypothesis that Tesla will remain an absolute leader in that market.
- Similarly, Bitcoin's total value is \$1,075 billion (as of 03/15/2021), which is around 102% of the yen in circulation, 65% of the euros, 53% of the USD, and 904% more than the GBP. Yet, the average number of bitcoins exchanged daily in USD is equivalent to only 0.05% of the yen and 0.06% of the GBP.
- Bitcoin's current valuation is pricing in a shift toward cross-border digital currencies; the hypothesis is that Bitcoin, as the leader, will benefit from network effects and become an important means of payment in the future.
- Tesla is five years older than Bitcoin and has always sparked robust debates between people who see it as a soon-to-die fad and those who see it as the future of the car. Market sentiment has started to shift significantly in the last 18 months as Tesla delivered early results, such as Model 3, at scale.
- The next two or three years should be a turning point for Bitcoin; consensus about its future may emerge as people monitor digital currency developments. For more details, see [Part II. When digital currencies become mainstream](#).

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"The world ultimately will have a single currency; the internet will have a single currency. I personally believe that it will be Bitcoin."

— Jack Dorsey co-founder and CEO of Twitter

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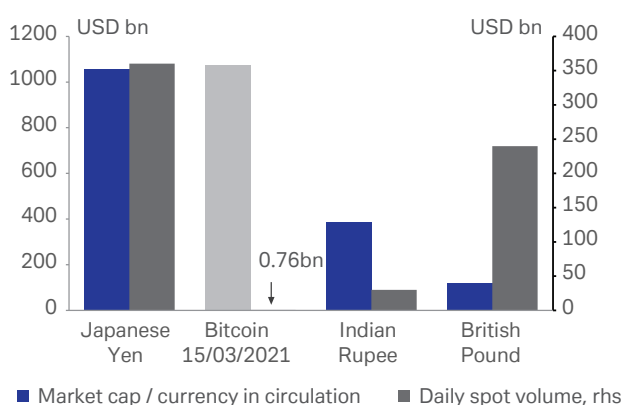
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"Stay away from it. It's a mirage, basically."

— Warren Buffet, CEO of Berkshire Hathaway

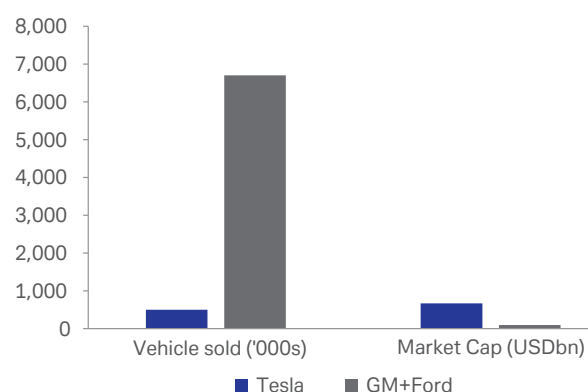
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Currency in circulation and daily trading volume



Sources: Deutsche Bank, BIS, Bloomberg Finance LP, Blockchain.com  
 Note: currency in circulation at the end of 2020. Currency volume data is from BIS Triennial FX survey (daily average volume in April 2019) and Bitcoin as of Feb 2021.

Tesla vs. General Motors and Ford



Source: Bloomberg Finance LP, Statista, Deutsche Bank.  
 Note: Vehicles sold data is for 2020 and Market cap as of March 12, 2021.

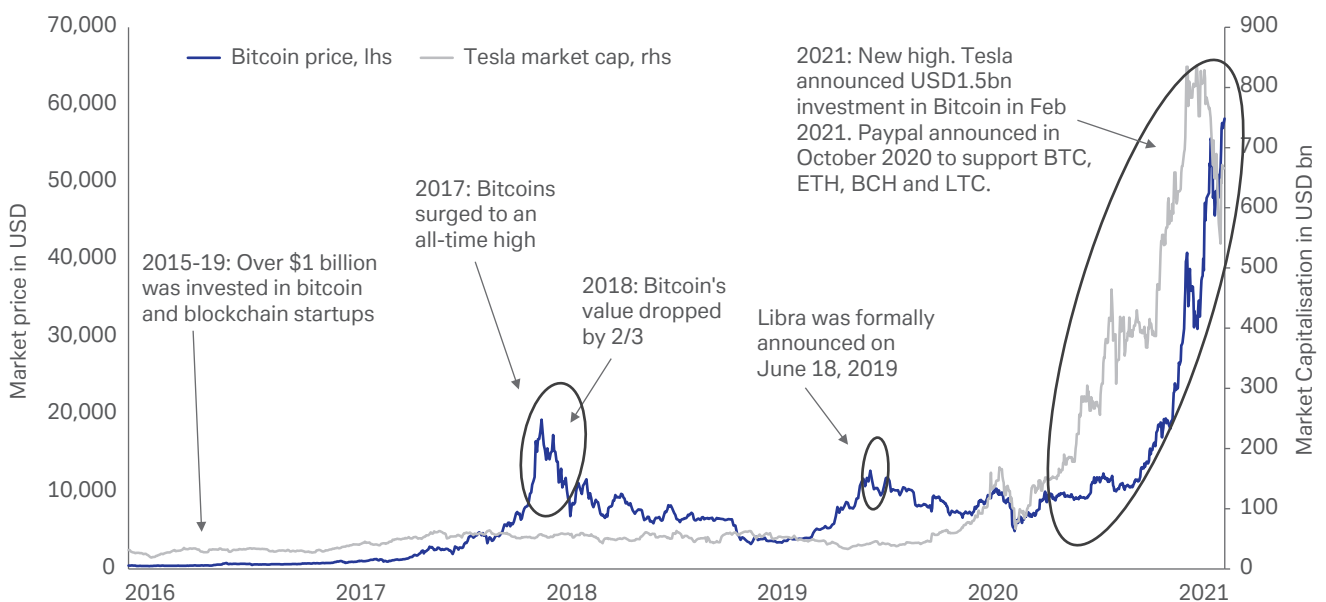


# 1. Lay of the Land

## Bitcoin should continue to rise

At the beginning of 2017, bitcoin prices were below \$1,000 per coin. In December of the same year, bitcoin reached nearly \$20,000. Then came the fall and by February 2018, the price had dropped to \$7,000. In a year only, prices surged from \$4,900 in March 2020 to hit a new high of \$60,000 last Saturday. One of the most important factors driving bitcoin's increased demand was the entrance of hedge funds and other institutional investors.

### Bitcoin continues to rise

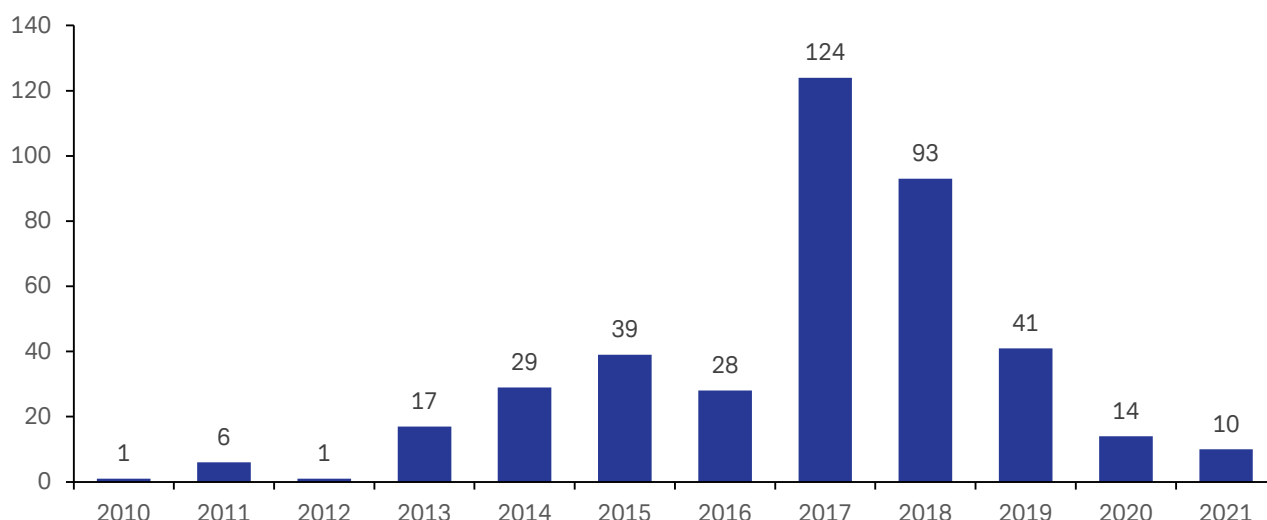


Source: Bloomberg Finance LP, Deutsche Bank.

Every year, people declare Bitcoin (and Tesla) as dead or dying. Since 2010, Bitcoin has been declared dead about 400 times. The number of such proclamations peaked in 2017, but the trend has been decreasing; 2020 saw the fewest Bitcoin obituary predictions in eight years.



## Yearly Bitcoin 'Obituaries' approximate count



Source: 99Bitcoins, Deutsche Bank. Note: approximate count of yearly bitcoin "obituaries".

## What is a cryptocurrency?

A cryptocurrency is a digital "asset" that uses peer-to-peer networking. It is decentralised and widely accessible. Bitcoin, like many other cryptocurrencies, is privately operated; it is not issued by a central bank, government, economy, or territory. The asset is a digital "token" with no backing or intrinsic value.

The concept of cryptocurrency started around 30 years ago when DigiCash created the first worldwide virtual currency. It went bankrupt in 1998, less than 10 years after its creation. The most famous cryptocurrency, Bitcoin, was invented in 2008 by a developer using the pseudonym of Satoshi Nakamoto. Since 2011, cryptocurrencies have gained momentum from investors and captured media attention, particularly after Bitcoin prices rose dramatically in 2013. Following Bitcoin, many new cryptocurrency companies have been created, including Litecoin (2011), Ripple (2012), Ethereum (2015), and Bitcoin Cash (2017).

In total, there are over 5,000 cryptocurrencies worldwide, but Bitcoin by far tops the ranking of cryptocurrencies in terms of market cap. Bitcoin's current market cap is over four times higher than the second-most-traded cryptocurrency, Ethereum. Most cryptocurrencies work the same way, with limited supply.

## Most cryptocurrencies work the same way, with limited supply

Cryptocurrency	Release	Current market cap (USDmn)	Quantity of tokens issued (mn)	Maximum amount of tokens issued (mn)
Bitcoin	2009	1,074,598	18	21
Ethereum	2015	207,791	112	Not limited
Cardano	2017	32,996	31,100	45,000
Binance Coin	2017	39,808	154	170
Tether	2015	38,528	30,300	NA
Polkadot	2017	33,316	1,000	NA
XRP	2012	19,765	44,000	100,000
Litecoin	2011	14,005	65	84
Chainlink	2017	11,525	405	1,000
Dogecoin	2013	7,276	118,000	5,200 per year perpetually

Source: Deutsche Bank, Wikipedia, various websites. Note: as of March 15, 2021.

## What are the specificities of Bitcoin?

Bitcoin is the most widespread and successful cryptocurrency. It is the first blockchain-based cryptocurrency in the world. “Miners” use cryptographic code to process large quantities of data to earn coins. The underlying algorithm fixes the maximum quantity of bitcoins to 21 million tokens, and so far an estimated 18.7 million are in circulation. It is estimated that the full amount of 21 million bitcoins will be mined by 2140.

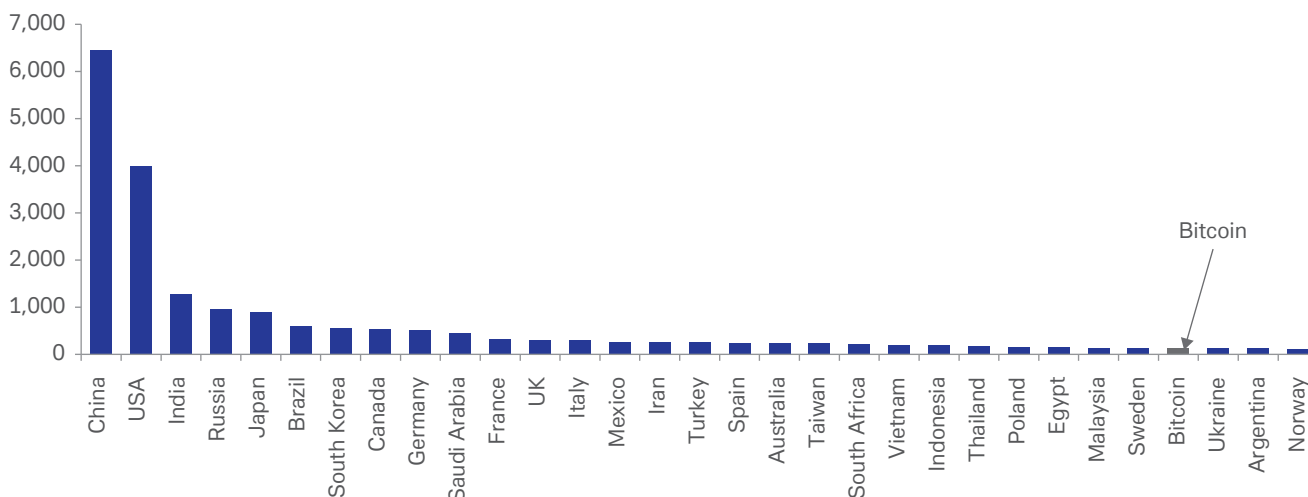
All mining operations start with the blockchain. A miner’s goal is to add individual blocks to the blockchain by solving sophisticated mathematical problems. This requires enormous computational and electrical power. While many miners compete to add each new block, the miner who solves the problem actually adds the block—along with its approved transactions—to the blockchain. Currently, the miner receives a reward of 6.25 bitcoins for each new added block. This reward value went into effect on May 11, 2020. It is worth noting that the reward is cut in half roughly every four years. Furthermore, Bitcoin is designed to adjust the difficulty required to mine one block every 14 days (or every 2,016 blocks mined).

An important concern that could hinder widespread use of cryptocurrencies is related to energy consumption. Although Bitcoins’ liquidity remains low and very few bitcoins are exchanged per day, mining bitcoins require a tremendous amount of energy. As of early 2021, Bitcoin’s annual electricity consumption puts it at the edge of being the equivalent of a top 30 country. In one year, it uses around the same electricity as the entire population of Pakistan (c.217m people) and in the developed world more than the Netherlands Holland’s (c.17.5m people).<sup>1</sup>

Energy use increases proportionally with the cryptocurrency’s market valuation. As such, numerous alarms have been warning us about the environmental impact caused by cryptocurrency energy consumption. However, capital currently engaged in the cryptocurrency market could be used to develop green technological advancements. This is called a “positive externality”; that is, technological innovation in the financial sector that drives innovation in the energy sector.

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### Annual electricity consumption (TWh/ year)



Source: University of Cambridge Bitcoin Electricity Consumption index. Deutsche Bank. Note: National energy use in TWh.

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<sup>1</sup> For more details, please see [Thematic Research: DB CoTD: Bitcoin and ESG...](#)

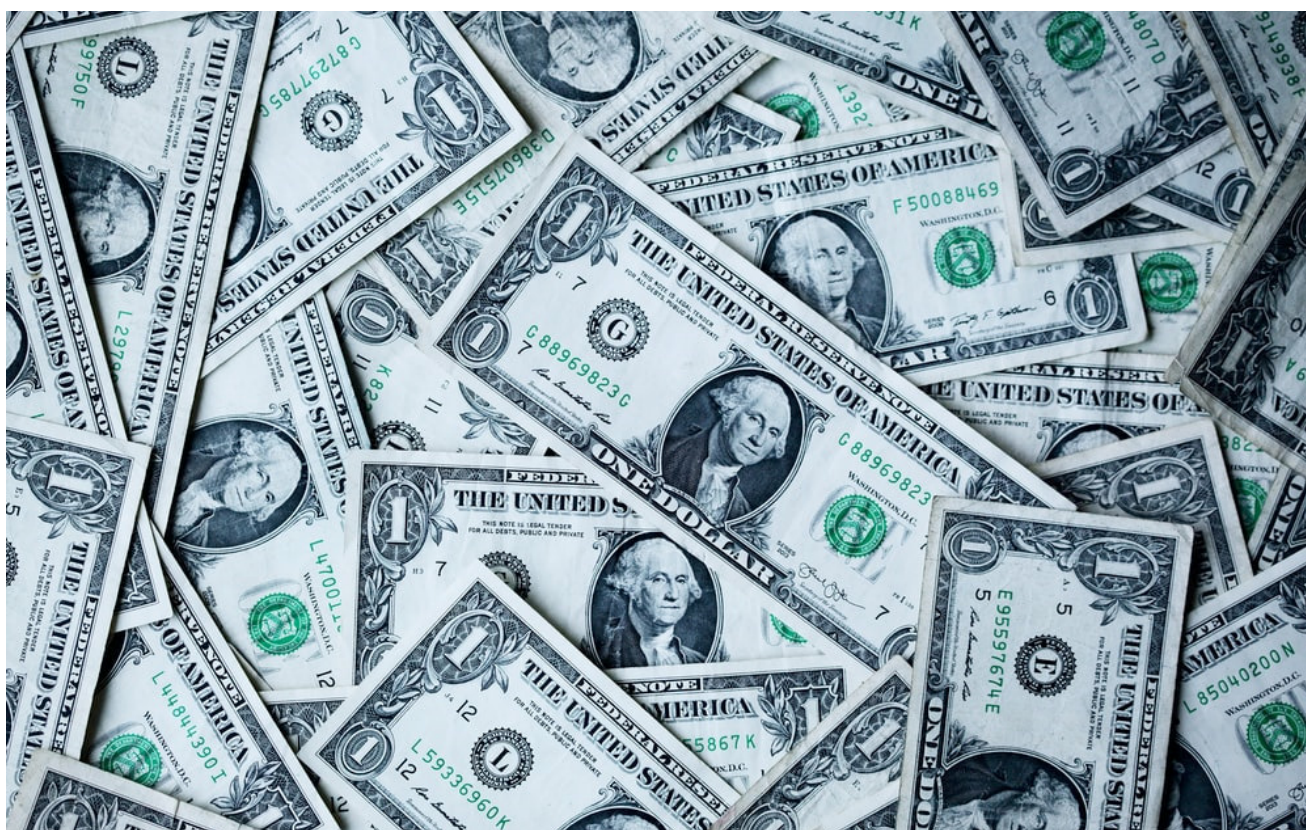


## What are the key drivers of the currency price?

As for any other assets, the pricing of traditional currencies is ultimately driven by demand and supply.<sup>2</sup> The demand for and supply of a currency can be “read” based on a country’s balance-of-payments position, which acts as a kind of accounting statement for how much money is flowing in versus how much is flowing out of the country. The balance of payments is split into two broad accounts: the current account (which captures trade in goods and services, income payments) and the capital account (FDI, portfolio flows and other flows like loans and trade credits). In simple terms, if more money is coming into China to buy Chinese goods or Chinese bonds, relative to the amount of money leaving China, that drives up the price of the CNY. So it is just about demand and supply, and this approach makes it easy to compare to other assets.

The key difference between Bitcoin and currencies today is on the supply side. Supply of Bitcoin is fixed, while in many fiat currencies central banks control the supply and have been increasing it in recent years via their QE programs. Higher supply of one currency relative to others should theoretically drive down the price of that currency in the long run. Of course one needs to account for how the demand to hold assets in these currencies changes as well (if demand to hold USD starts to decline or stagnate even as the Fed continues to print USD, this would show up in relative USD weakness down the line).

The other differences between currencies and Bitcoin include institutional and retail investors, liquidity<sup>3</sup>, market sentiment<sup>4</sup>, miners<sup>5</sup> and technical factors.<sup>6</sup> In the next section, we conduct a basic microeconomic analysis to understand supply, demand, and liquidity.



2 If there is more demand for Currency X, then it goes up in price (appreciates relative to other currencies) and vice versa.

3 ~78% of Bitcoin supply is illiquid, with some going into escrow for borrowing/lending. This might put upward pressure on the Bitcoin price, but illiquid funds are more sensitive to market changes, potentially adding more volatility.

4 With the rise of social media as a source of information for investors, platforms (e.g. Twitter and Reddit) will influence the demand for Bitcoins, as the recent case of the STONKS proved. This might create pump/dump cycles in the short term and add volatility that might keep more serious investors away, adding some downward pressure on the price. Studies have shown that the power of social networks to concentrate the market is not well understood, therefore, there are motives to believe that signals coming from social networks are highly unreliable. For more, please click this link

5 Even though there is little evidence that energy prices and hashrates do not significantly influence the price, they can generate signals when they take market positions. For example, since the last days of December 2020, miners stopped selling and started accumulating. This can be interpreted as a bullish position by the market and consistent with recent moves by big mining companies such as Shanghai Yitang Data Technology, Riot Blockchain, Marathon Patent Group and even NVIDIA, which reported increased revenue coming from Ethereum miners in Q4 2020.

6 When applied to technical trading, Deep Learning models tend to be more accurate, perform better and bring better information to the markets, potentially reducing volatility and/or allowing concentration in several experienced early entrants. All this could favor the entrance of institutional investors and banks that could have bullish implications.

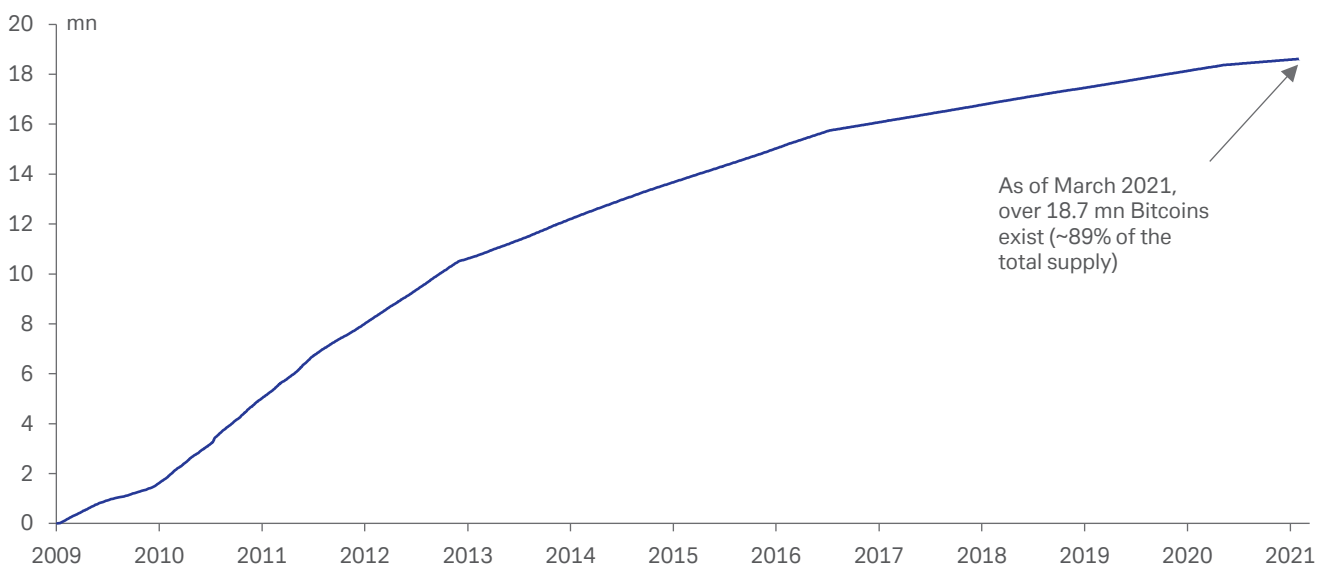


## 2. Understanding the Drivers of Value

### Bitcoin supply

The pre-programmed, finite supply of all bitcoins determines the value of each bitcoin. The maximum number of bitcoins that will ever exist is just under 21 million. That number is expected to be reached in about 2140. Today, over 18.7 million bitcoins have been mined. About 89% of the total supply of Bitcoin is in circulation, and the supply is unlikely to increase dramatically in the near term. Interestingly, it seems that the supply of bitcoin has remained steady, independent of market value.

Number of Bitcoins in circulation worldwide



Source: Blockchain, Deutsche Bank.

If the current mining rate continues, the percentage of total bitcoins in circulation will remain on a plateau of about 89% for several years. Another 10% will likely be discovered by 2028, at which point 20mn bitcoins will have been discovered. The last 1 million will be mined slowly — likely before 2140. At that point, the Bitcoin system will become a transaction-only system. Importantly, Bitcoin transactions are not intermediated by a bank or clearing party. This can make individual transactions very cheap, but the overall cost of implementing a network can be extremely expensive because of the computing and energy costs of some validation processes.

Bitcoin is one of the oldest cryptocurrencies and thus the most well-known. But the broader crypto category is booming because of Bitcoin's limited supply and because most bitcoins are already in circulation.

At present, about 800 cryptocurrencies have gone public via ICOs (initial coin offering). Currently there are three active ICOs—PolkaFoundry, Launchpool and Inverse. Another 16 will start this month like Casper, Convergence and Tidal Finance. And another 69 are in the pipeline.



## ICOs of some recently closed offerings

Project	Headquarters	Category	Raised	Month	ICO Price	Market Price as on March 15, 2021	Market Cap (mn)
SafePal	China	Platform	\$5,000,000	Feb-21	\$0.10	\$2.6	\$282
Razor Network	Singapore	Network	\$9,000,000	Feb-21	\$0.53	\$0.6	\$26
Poolz	Israel	Protocol	\$70,000	Jan-21	\$0.70	\$21.3	\$14
YOP	UK	Platform	\$60,600	Jan-21	\$0.05	\$1.9	\$19
CUDOS	UK	Network	\$4,100,000	Jan-21	\$0.01	\$0.1	\$19
DAO Maker	US	Blockchain Service	\$7,800,000	Jan-21	\$0.10	\$4.3	\$71
BiFi	Korea	Defi	\$80,000	Dec-20	\$0.01	\$0.1	\$3
Exeedme	US	Platform	\$75,000	Dec-20	\$0.05	\$1.3	\$37
Fire Protocol	Seychelles	Platform	\$1,100,000	Dec-20	\$0.10	\$0.9	\$4
Whiteheart	NA	Protocol	\$3,300,000	Dec-20	\$1,081	\$3,927	\$35

Source: icodrops.com, coinmarketcap, Deutsche Bank.

Bitcoin's success has fueled demand for other cryptocurrencies, at least as investment assets. We believe there could be an externality effect. Most likely, there will only be space for a handful of these cryptocurrencies, and few will ever be used as a means of payment. We also wonder whether cannibalisation between these cryptocurrencies might occur.

## Bitcoin demand

Initially Bitcoin and other cryptocurrencies were used for illicit purposes (e.g., trafficking, tax evasion, money laundering). Now it is different because Bitcoin transactions are a lot harder to hide: in 2019, just over 2% of the activity in the cryptocurrency space was linked to illicit activity; and in 2020 it was down to only 0.3%. Bitcoin has become a large market and is therefore more carefully scrutinized. Law enforcement agencies are using the blockchain to track down suspected criminals and the flows of digital money.<sup>7</sup>

Cryptocurrencies are based on protocols that greatly benefit from network effects. As more people use it, the more valuable it becomes. The same is true for Bitcoin.

Early Bitcoin investors were extremely wealthy individuals from the tech space, libertarians and small family offices.<sup>8</sup> It's widely believed that the first real-world Bitcoin transaction was made in May 2010 by programmer Laszlo Hanyecz. Hanyecz spent 10,000 bitcoins on two Papa John's pizzas; those pizzas would now be worth around \$600 million these days.

## Top 5 investors and companies

Company Name	Activity	Investment (USDmn)
Grayscale Investments	Asset management	7,400
Massachusetts Mutual Life Insurance	Insurance	100
SkyBridge Capital	Alternative investments	182
3iQ	Crypto-asset portfolio manager	128
ETC Group Bitcoin ETP	Develops digital asset backed securities	80

Source: Bit2buzz, Deutsche bank.

<sup>7</sup> Criminals Thought Bitcoin Was the Perfect Hiding Place, but They Thought Wrong

<sup>8</sup> The top 5 Bitcoin individuals investors are: (i) Cameron and Tyler Winklevoss who are believed to be the first bitcoin billionaires, reportedly holding about 100,000 coins; (ii) Dan Morehead who launched the first cryptocurrency fund in the U.S. when bitcoin was trading for \$65 each; (iii) Michael Novogratz who is the famously bullish bitcoin investor who predicted a \$40,000 price a month before it began a year-long collapse; (iv) Barry Silbert who is the founder of Digital Currency Group, which has made more than 125 blockchain-related investments.

Bitcoin is now another treasury-management tool. Recently, a few publicly traded companies have started converting cash in their treasuries into Bitcoin as an alternative store-of-value. For example, in August 2020, MicroStrategy, a business analytics company, converted \$425 million worth of cash in its treasury to Bitcoin. "Company leaders believe that Bitcoin "as the world's most widely-adopted cryptocurrency, is a dependable store of value" and they "continue to believe Bitcoin will provide the opportunity for better returns and preserve the value of our capital over time, compared to holding cash."<sup>9</sup>

Square then made a \$50 million purchase. Several other companies have followed suit, reinforcing the confidence in Bitcoin as a store-of-value and safe-haven asset. On February 8, 2021, Tesla said it had invested \$1.5 billion in Bitcoin and that the company would also soon accept Bitcoin as a form of payment for its vehicles. In February 2021, in Switzerland, the Canton of Zug started accepting tax payments in Bitcoin.

#### Publicly traded companies holding bitcoins

Company Name	Activity	# of BTC	Investment (USDmn)	Approximate value in early March 2021 (USDmn)
MicroStrategy Inc.	Application software	91,326	2,211 @ \$ 24,210	\$ 3,690mn (67%)
Tesla Inc.	Electric vehicles and components	47,000	1,500 @ 31,915	\$ 2,580mn (72%)
Ruffer Investment Company Ltd.	Investment company	45,000	744 @ \$ 16,539	\$ 1,044mn (40%)
Galaxy Digital Holdings	Institutional brokerage	16,402	134 @ \$ 8,170	\$ 851mn (535%)
Square Inc.	Payments	8,027	220 @ \$ 27,408	\$ 224mn (11%)
Marathon Patent Group Inc.	IP company	4,813	150 @ \$ 31,166	\$ 250mn (67%)
Hut 8 Mining Corp	Cryptocurrency mining	3,012	37 @ \$ 12,904	\$ 148mn (302%)
Voyager Digital Ltd.	Crypto-currency brokerage	1,239	8 @ \$ 6,398	\$ 64mn (711%)
Riot Blockchain Inc.	Digital currency	1,175	7 @ \$ 6,128	\$ 61mn (747%)
Bit Digital Inc.	Bitcoin mining	950	10 @ \$ 10,616	\$ 33mn (226%)
Coin Citadel Inc.	Mining Digital Assets	513	0.2 @ \$ 359	\$ 27mn (14,343%)
Cypherpunk Holdings Inc.	Investment company	277	2 @ \$ 5,895	\$ 17mn (938%)
Advanced Bitcoin Technologies AG	Specialty software products development	254	2 @ \$ 8,345	\$ 14mn (595%)
DigitalX	Digital payment systems	215	0.9 @ \$ 4,069	\$ 12mn (1,075%)
Hive Blockchain	Cryptocurrency mining firm	211	NA	\$ 8mn
Argo Blockchain	Crypto asset mining	209	1 @ \$ 6,411	\$ 12mn (788%)
Fortress Technologies Inc.	Industrial equipment	163	NA	\$ 9mn
BIGG Digital Assets Inc.	Application software	145	1 @ \$ 7,392	\$ 13mn (1,075%)
NexTech	Application software.	130	4 @ \$ 30,722	\$ 4.2mn (5%)
Neptune Digital Assets Corp.	Blockchain company	75	NA	\$ 4mn
FRMO Corp.	Financial risk management	63	NA	\$ 4mn

Source: Cryptotips.eu

<sup>9</sup> MicroStrategy Announces Over \$1B in Total Bitcoin Purchases in 2020



## Bitcoins: an accepted means of payment? Not yet there!

Overall, given the volatility of bitcoins, most merchants are not keen to accept cryptocurrencies as a payment method.<sup>10</sup> According to a 2020 survey by HSB, 36% of small-medium businesses in the US accept Bitcoin (including Wikipedia, Microsoft, and AT&T).<sup>11</sup> But once we see some stability in the market, the use of crypto for the exchange of goods and services could normalise. Before that, the risks for both merchants and payment providers outweigh the benefits. Usually, settlement is not in real time. This provides merchants with a guarantee of a certain payout (amount); the lack of that timeliness can be tricky for payment providers (they would need high risk provisions or could have transactions end in losses).

### Companies accepting bitcoins

Major companies	Retail stores	Small and medium businesses	Sports and gaming companies
<ul style="list-style-type: none"> <li>– Wikipedia</li> <li>– Microsoft</li> <li>– AT&amp;T</li> <li>– Virgin Galactic</li> <li>– Norwegian Air</li> <li>– Namecheap</li> <li>– CheapAir</li> <li>– Gyft</li> <li>– The Internet Archive</li> <li>– The Pirate Bay</li> <li>– 4Chan</li> <li>– Mega.nz</li> <li>– ExpressVPN</li> <li>– Intuit</li> <li>– Paypal</li> <li>– SimplePay (Nigeria)</li> <li>– T-Mobile (Poland)</li> </ul>	<ul style="list-style-type: none"> <li>– Burger King (some outlets)</li> <li>– KFC Canada for a limited time</li> <li>– Overstock</li> <li>– Subway</li> <li>– Twitch</li> <li>– Pizza Hut (Venezuela)</li> <li>– NewEgg</li> <li>– Purse.io (allows shopping on Amazon with bitcoin)</li> <li>– PizzaForCoins.com (Domino's Pizza has signed up with them)</li> <li>– eGifter.com (allows shopping for brands like GAP, GameStop and JC Penney)</li> <li>– Curryupnow.com (meal can be ordered from 12 restaurants in San Francisco)</li> <li>– Dish Network (America)</li> <li>– Euro-Pacific (a precious metal dealer)</li> <li>– CEX (a shop in Glasgow, Scotland)</li> <li>– PSP Mollie</li> <li>– ShopJoy (an Australian retailer)</li> <li>– Grooveshark (USA)</li> <li>– MIT Coop Store (MIT student bookstore)</li> <li>– SFU bookstore (Simon Fraser University in Vancouver, Canada)</li> <li>– Famsa (a Mexico retailer)</li> <li>– Shopify.com</li> <li>– mspinc.com</li> <li>– Rakuten (Japan)</li> </ul>	<ul style="list-style-type: none"> <li>– Alza (Czech online retailer)</li> <li>– Alternative Airlines</li> <li>– Bitcoin,Travel</li> <li>– Pembury Tavern (a pub in London)</li> <li>– Old Fitzroy (a pub in Sydney)</li> <li>– The Pink Cow (a dinner in Tokyo)</li> <li>– EZTV (Torrents TV shows provider)</li> <li>– Lumfile</li> <li>– Etsy Vendors</li> <li>– Bitcoincoffee.com</li> <li>– Grass Hill Alpacas (a local farm in Haydenville, MA)</li> <li>– Jeffersons Store (a streetwear clothing store in Bergenfield, NJ)</li> <li>– A Class Limousine (Newark, NJ)</li> <li>– Suntimes.com (a Chicago newspaper)</li> <li>– Crowdtilt.com</li> <li>– Meuseum of the Coastal Bend (Victoria, Texas)</li> <li>– RE/MAX London</li> <li>– Amagi Metals (precious metal furnisher)</li> <li>– Foodler (North American restaurant delivery company)</li> <li>– Save the Children (global charity organisation)</li> <li>– NCR Silver (point of sales systems)</li> </ul>	<ul style="list-style-type: none"> <li>– Miami Dolphins</li> <li>– Dallas Mavericks</li> <li>– Benfica (sports club in Lisbon Portugal)</li> <li>– San Jose Earthquakes</li> <li>– Green Man Gaming (popular digital game reseller)</li> <li>– Zynga (mobile gaming)</li> <li>– Humblebundle.com (Indie game site)</li> <li>– BigFishGames.com</li> </ul>

Sources: Deutsche Bank, 99 Bitcoins website, various other websites.

<sup>10</sup> For example, Adyen – a payment provider perceived as working with the most tech-savvy companies in the world – does not see cryptocurrencies as a payment method yet; it does not see the demand from its customers (merchants). However, neo-banks are promoting the trade of crypto on their platforms and make it increasingly easier for consumers to engage in trading crypto. At some point, they may be able to offer spending those currencies through the cards they issue (possibly through any of the networks, but given the engagement of V/M/A in crypto already, it is more likely to be in a collaboration with these two).

<sup>11</sup> Who Accepts Bitcoins in 2021? List of 20+ Major Companies

That said, digital payment providers such as Square have started implementing cryptocurrencies in their services, facilitating the adoption of cryptocurrency payments by their client bases (e.g., e-commerce companies). And consumers might still use PayPal, Visa, Mastercard, or any other provider to own/trade the asset – but again, mainly for investment.

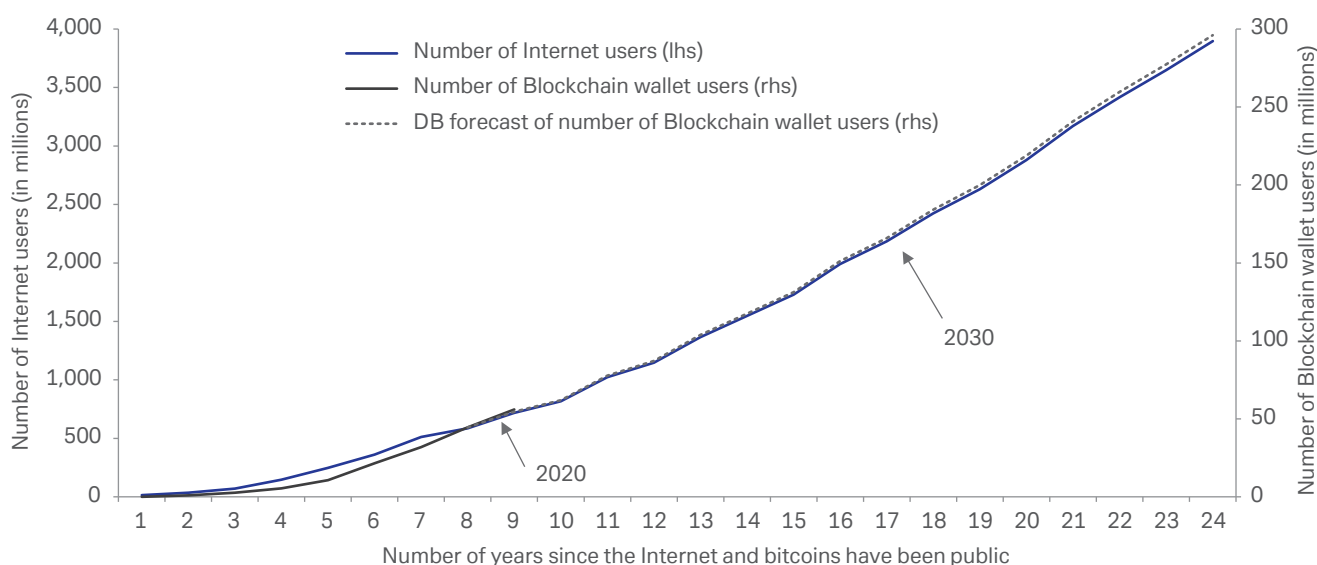
In late October, PayPal officially announced that it will add cryptocurrency capability to its wallets. PayPal saw strong early adoption of cryptocurrencies with an early waiting list that was larger than anticipated in the US, which is now open to everyone in the US. The company plans to expand the rollout internationally and to the rest of its platform, including Venmo, in the first half of 2021. PayPal plans to allow users to complete transactions for goods and services with digital currency in early 2021. This is a big development for the adoption of cryptocurrency as a means of payment because PayPal is one of the biggest payment providers in the world. PayPal services are used by over 300 million customers worldwide. Twenty-eight million stores now accept PayPal as a payment method.

Visa and Mastercard are also pivoting to cryptocurrency. Visa CEO Alfred Kelly stated his view in May 2020 that digital currency backed by fiat will be an emerging payment technology. His statement came as Visa filed a patent for a “digital fiat currency.” This filing points to a CBDC use case. Visa also partnered with Circle in December to let card issuers integrate USDC payment capability. Mastercard jumped on the bandwagon in July, when the company announced a card deal with Wired, thereby expanding its crypto efforts. Wired’s multicurrency Mastercard debit card will allow users to buy, hold, exchange, and sell up to 18 traditional currencies and cryptocurrencies, while also allowing for free international ATM withdrawals up to a certain amount. Mastercard also launched a customisable CBDC testing platform in September.

**Consumers are starting to own bitcoins.** In the past five years, the number of blockchain wallets has multiplied by six, growing from 11 million in 2016 to 63 million in 2020. Assuming that governments back cryptocurrencies and consumers still want them, adoption rates will drive the timeline for mainstream use. More and more, online cryptocurrency concierges (e.g., The White Company) enable people to convert national currencies into a cryptocurrency and then manage their own e-wallets as they wish.

The chart below shows the adoption rates of blockchain wallets with the equivalent for internet adoption rates. We are still in the early days of blockchain wallet use, but the curves are similar after adjusting for scale. Indeed, if current trends continue, there could be 200 million blockchain wallet users in 2030.

Adoption rates of cryptocurrencies and Internet



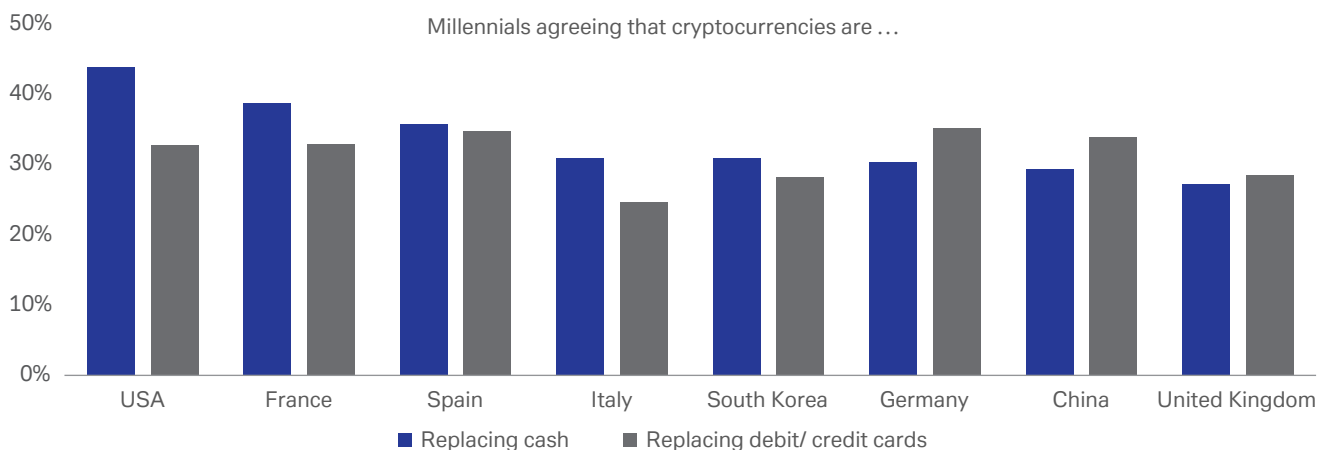
Source: Deutsche Bank forecasts, InternetWorldStats.com and Blockchain.com. We measure “adoption rate” by the number of users adopting internet and bitcoins since they went public.



Future generations may usher in mass adoption. The older people we surveyed had fears about cryptocurrencies, found them harder to understand, believed they create volatile financial bubbles (like the dotcom bust), and saw them as low-liquidity financial instruments. A third of those surveyed had no idea how cryptocurrencies work, and 40% had only a partial understanding.

By contrast, around a third of millennials believed that cryptocurrencies are replacing cash and credit/debit cards according to our exclusive survey of over 4,700 people in the United States, the United Kingdom, Germany, France, Italy, Spain and South Korea.

#### Millennials who think that cryptocurrencies are replacing cash and debit/credit cards



Source: Deutsche Bank dbDIG



### 3. Bitcoin: Commodity, Currency, or Equity?

Some people think Bitcoin is a commodity. Others think it is a currency. A few think it is a stock. Despite these opinions, bitcoin transactions and tradability are still limited. Nevertheless, its market cap is among the top ten, both as a currency and as a stock.

#### Bitcoin vs. Gold

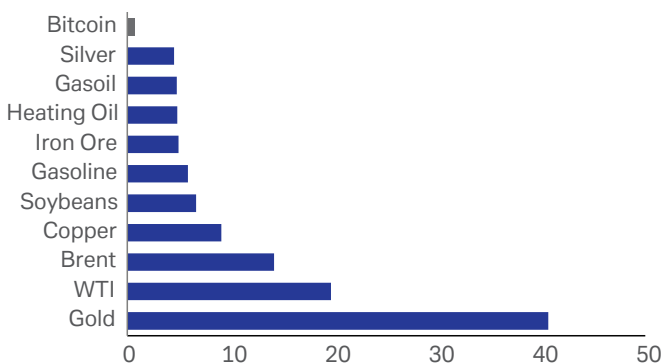
The typical comparison between bitcoin and gold also really comes mostly from the supply angle — namely that the supply of gold in the world is also theoretically fixed to whatever can be found in the ground, and it cannot be created by a central bank or government, just like bitcoin is limited to 21 million and fixed by code. To the extent that the supply of something is fixed, the marginal driver of its price becomes demand.

There is little evidence of a direct correlation between the prices of both assets. First, the value of gold relies on demand from central banks, which means that it is more directly exposed to monetary and macroeconomic policies. Second, gold prices are also affected by demand from the jewellery market.

Conversely, Bitcoin's harshest critics cite several major flaws. First, it offers no income. Second, it has no intrinsic value, even though it might be beneficial during a crisis when conspicuous consumption (and retail sales in general) are low. Third, unlike gold, demand for Bitcoin does not affect its supply. Fourth, Bitcoin electronic markets do not rely on derivatives or futures, making them more volatile.

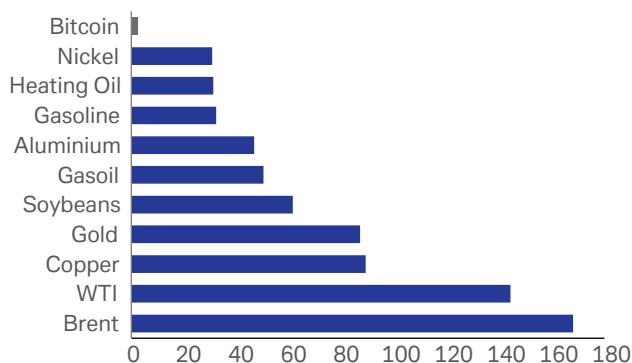
Looking at the liquidity of gold and various other commodities in comparison to bitcoins, it is fair to say that Bitcoin is an illiquid asset. Volume and open interest are the two commonly used metrics to describe the liquidity and activity of options and future contracts. "Volume" refers to the number of contracts traded in a given period, and "open interest" denotes the number of contracts that are active, or not settled. In February, the average daily volume and open interest of Bitcoin was only 1.9% and 2.8% the volume and open interest of gold, respectively.

Daily volume (in USD billion)

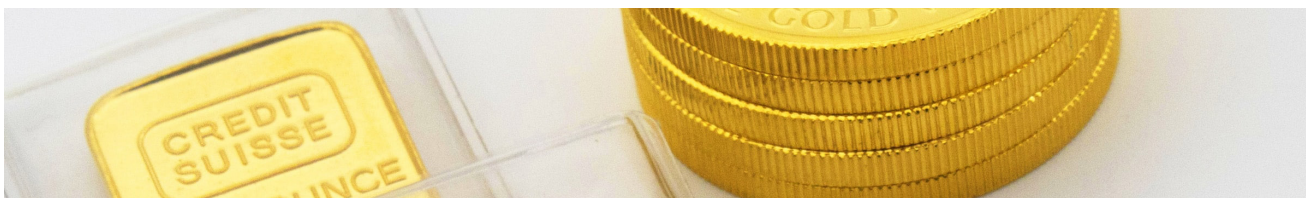


Source: Bloomberg Finance LP. Note: Average daily volume over February 2021.

Open interest (in USD billion)



Source: Bloomberg Finance LP. Note: Average open interest over February 2021.





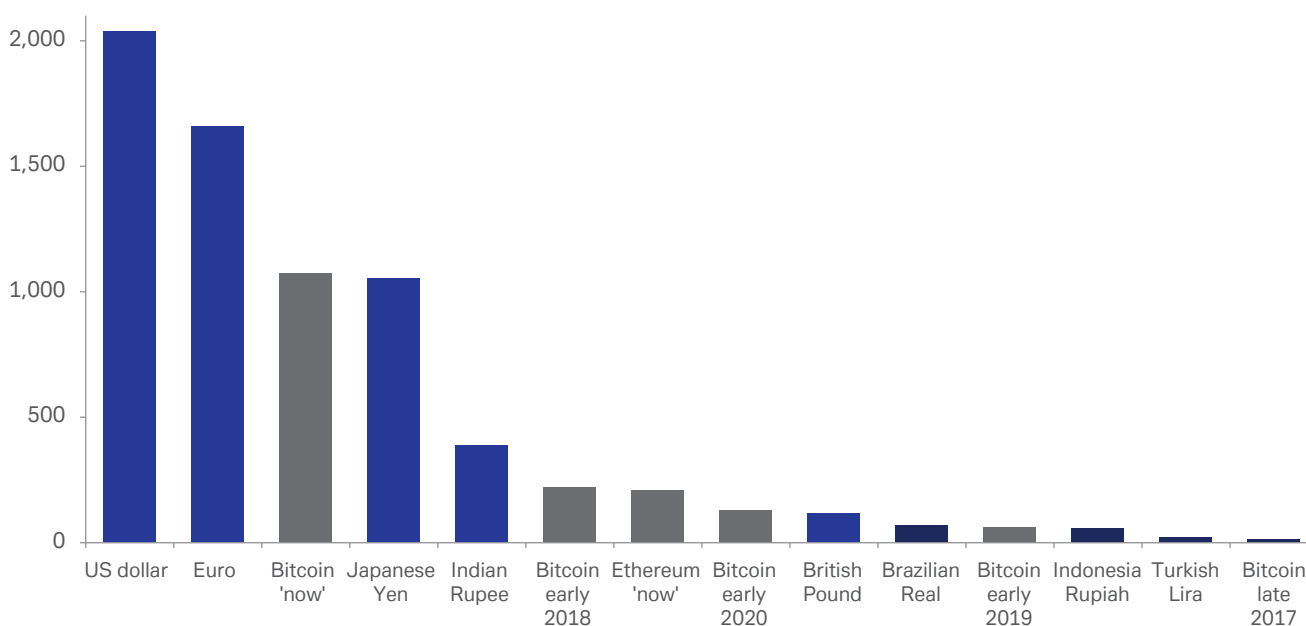
## Bitcoin vs. Currencies

Bitcoins and fiat currencies are different types of assets. First, while the supply of bitcoins is fixed, this is not the case with traditional currencies. Second, fiat currencies not only are backed by an entire government but are also legal tender – it is a legal obligation to accept them as a means of payment – which is not the case for any private cryptocurrency. Third, dollar-backed instruments such as TIPS are used as long-term, low-risk assets, whereas Bitcoin can only be used as a hedge against inflation. Fourth, Bitcoin's systemic risk is low. Any causality is unidirectional; that is, the value of the US dollar can directly influence the price of Bitcoin but not the other way around.

The US dollar currency index is usually inversely correlated with the price of Bitcoin. The nature of this correlation is still unclear. At this point, it is not even clear if the rise in yields is having any direct effect on the price of Bitcoin.

In terms of total currency in circulation, Bitcoin is the third-largest in the world, after the US dollar and the euro. This is mainly due to the vast increase in Bitcoin's value recently. In early 2019, Bitcoin represented "only" 3% of the US dollars in circulation, but in February 2021 it surged beyond 40% of the US dollars in circulation.

Total value of currency in circulation in USD billion

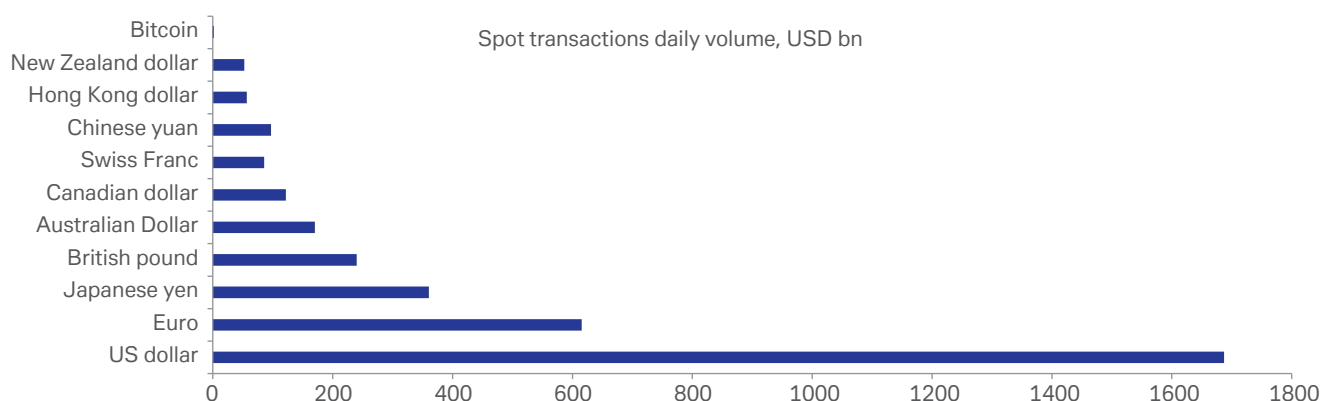


Source: Bloomberg Finance LP, coinmarketcap, Deutsche Bank. Note: for Bitcoin, we took the current market price as of 03/15/2021, 01/01/2018, 01/01/2020 and 01/01/2019. Note: the conclusions would change dramatically if we looked at monetary base, or M1 or M2 to define the universe of USD in existence. Just the amount of cash/coins printed appears small as it does not include all the assets held in USD in deposits at banks.

Bitcoin transactions are growing, but not as exponentially as its market cap. Currently, Bitcoin transactions average about 0.5 billion per day, which is minuscule. This is only 0.02% of the euro and 0.009% of transactions in dollars. The average daily traded value for USD is 5.8 trillion and for the euro is 2.1 trillion, according to the 2019 BIS triennial FX survey. Thus, Bitcoin is comparable to the smallest currencies. Bitcoin's liquidity is much closer to the Thai baht.



## Daily volume (in USD billion)

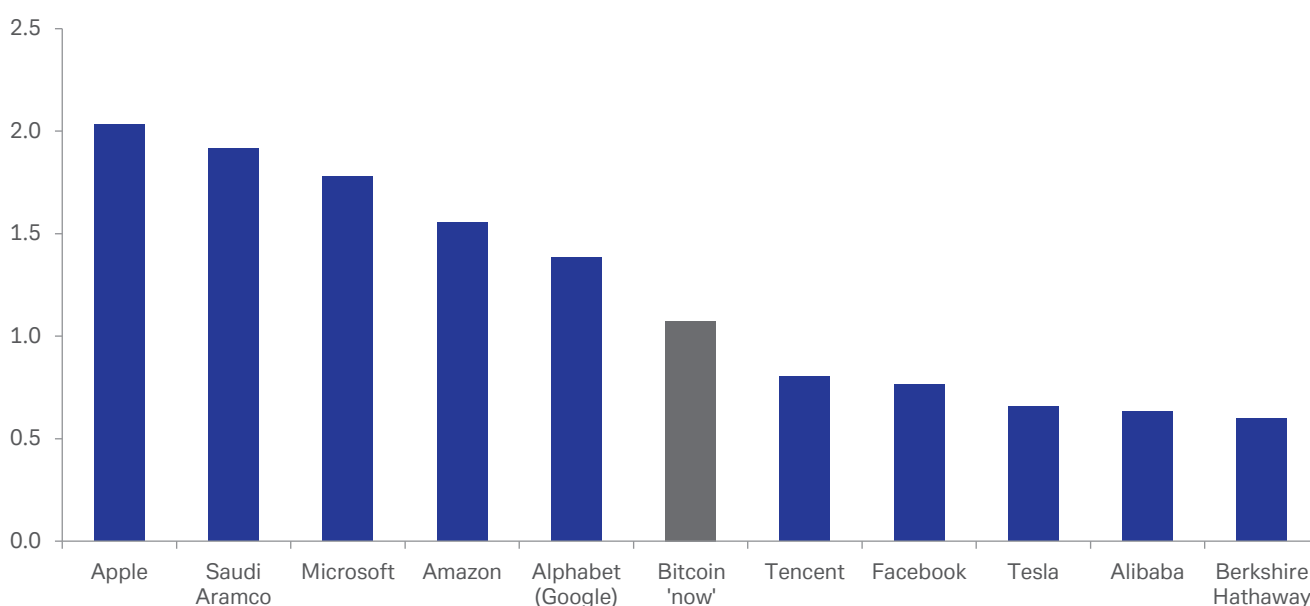


Source: Deutsche Bank, BIS, Blockchain. Note: Currency data is from BIS Triennial FX survey daily average volume in April 2019 and Bitcoin as of Feb 2021.

## Bitcoin vs. Equities

If we look at the market cap of its stocks, Bitcoin is today ranked sixth—between Alphabet and Tencent, and bigger than Facebook.

## Largest companies by market cap (USD trillion)



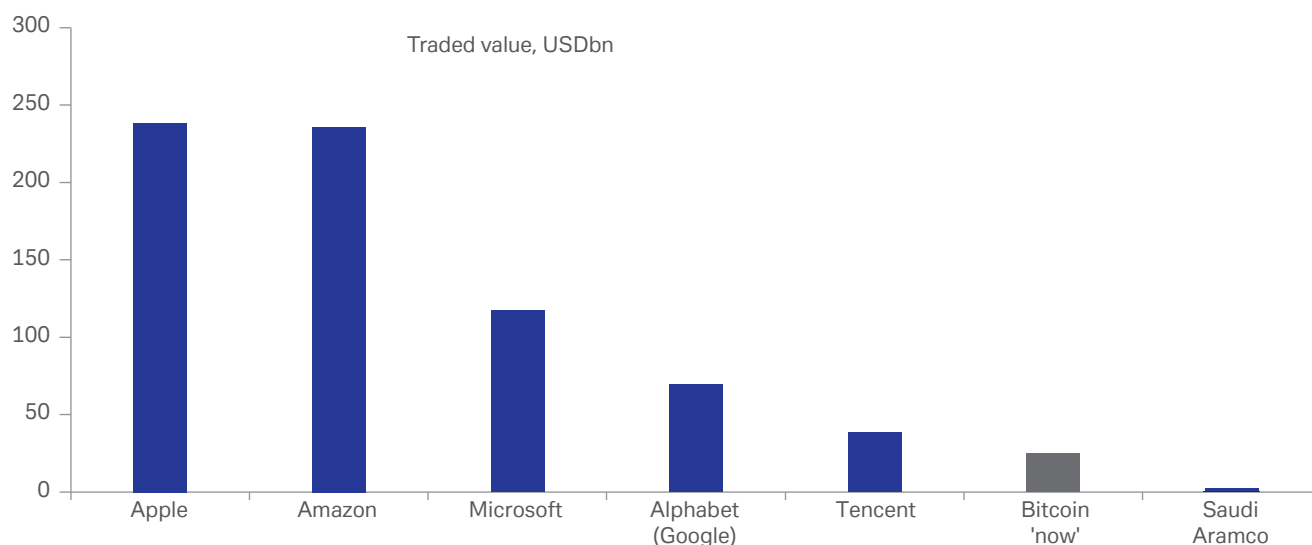
Source: Bloomberg Finance LP, Coinmarketcap, Deutsche Bank.

However, despite Bitcoin's large capitalisation, very few bitcoins change hands. As we discussed in the previous section, just \$0.5 billion worth of bitcoins are traded daily. This is only a fraction of all stock trading.

Looking at exchanges in February 2021, we attempted to benchmark Bitcoin's liquidity against different stocks. We calculated the number of stocks traded in February divided by the total number of stocks in circulation and found that the liquidity of Bitcoin is like that of a Fortune 100 stock.

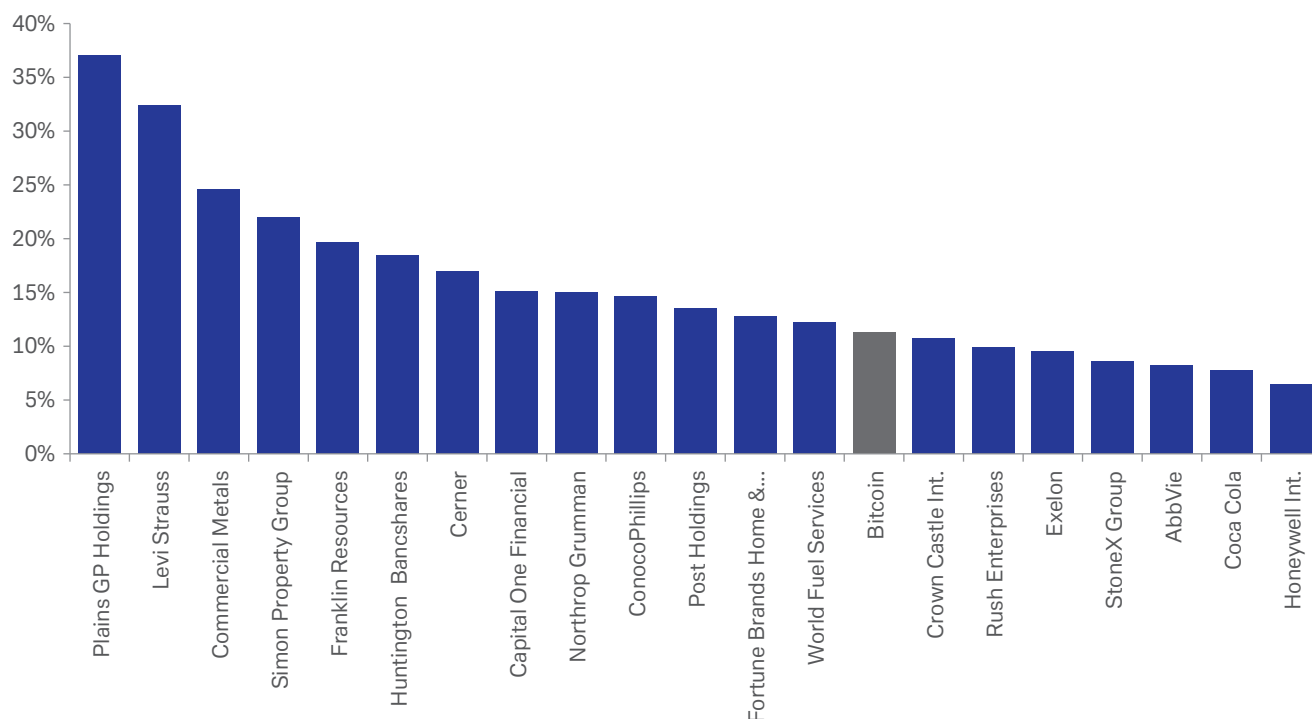


## Trading value of stocks in February 2021 (ranking by market cap)



Source: Bloomberg Finance LP, Coinmarketcap, Deutsche Bank.

## Volume traded in February/total outstanding



Source: Bloomberg Finance LP, Bitcoinity, Deutsche Bank

## Conclusion: Will market sentiment move Bitcoin into the mainstream?

Bitcoin's market cap of \$1 trillion, and scope for a continued rise in prices, makes it too important to ignore. And central banks and governments understand that Bitcoin and other cryptocurrencies are here to stay. Thus, governments are expected to start regulating them late this year or early next year.

But transactions and tradability have still not evolved. The real heart of the comparison of Bitcoin vs. FX vs. gold is supply. And the real debate is whether rising valuations alone can be the reason for Bitcoin to evolve into an asset class, or whether its illiquidity is an obstacle.

So, will cryptocurrencies become a mainstream means of payment? The race is fierce. Bitcoin remains an illiquid asset rarely used as a means of payment. Facebook's strategy for Libra (renamed Diem) is based on a different approach, one that is centered on consumer adoption and real usage of money.

Facebook's strategy (revised last year from its 2019 initial version) has shifted. The company now places more emphasis on reducing the cost of payment transactions rather than competing with governments or creating a parallel means of payment. Facebook, with nearly 2.8 billion users (one-third of the world's population), now has the potential to compete with traditional online payment platforms and propel digital currencies into the mainstream.

Importantly, small changes in investors' overall perceptions about Bitcoin can have a large impact on its price, especially because relatively few bitcoins are in circulation. So, if several pension funds or large asset managers with trillions of dollars decide to allocate a few basis points of their portfolios in a cryptocurrency, it can have a very large impact.

In the medium to long run, due to strong network effects, there will be little room for digital currencies to gain widespread use as a means of payment. The landscape is still uncertain between existing (e.g. Bitcoin) and forthcoming (e.g. Facebook Diem) cryptocurrencies.

The next question about Bitcoin is: Will the Tinkerbell Effect turn into a self-fulfilling prophecy? Central bankers are reacting by speeding up research and launching pilots. Among central banks, 86% are researching and developing central bank digital currencies (CBDCs). The Bahamas launched the first nationwide CBDC last October, and both Sweden and China launched pilots in early 2020. In the long run, central banks are unlikely to give up their monopolies. And as long as governments and central banks exist and hold the power to regulate money, there will be little room for Bitcoin—as a means of payment—to replace traditional currencies.

We would like to thank Anthony Chaimowitz of dbDIG Primary Research and Apurv Chaudhari, CFA an employee of Evalueserve Pvt Ltd, a third-party provider for their contributions to this report.







## The Future of Payments: Series 1

January 2020

Part I. Cash: the Dinosaur Will Survive...For Now

Part II. Moving to Digital Wallets and the Extinction of Plastic Cards

Part III. Digital Currencies: the Ultimate Hard Power Tool



## The Future of Payments: Series 2

March 2021

Part I. Post Covid 19: What Executives Are Thinking and Doing

Part II. When digital currencies become mainstream

Part III. Bitcoins: Can the Tinkerbell Effect Become a Self-Fulfilling Prophecy?

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