



Bitcoin

Bitcoin (abbreviation: **BTC**; sign: **₿**) is the first decentralized cryptocurrency. Based on a free-market ideology, bitcoin was invented in 2008 by Satoshi Nakamoto, an unknown person.^[5] Use of bitcoin as a currency began in 2009,^[6] with the release of its open-source implementation.^{[7]:ch. 1} In 2021, El Salvador adopted it as legal tender.^[4] It is mostly seen as an investment and has been described by some scholars as an economic bubble.^[8] As bitcoin is pseudonymous, its use by criminals has attracted the attention of regulators, leading to its ban by several countries as of 2021.^[9]

Nodes in the peer-to-peer bitcoin network verify transactions through cryptography and record them in a public distributed ledger, called a blockchain, without central oversight. Consensus between nodes is achieved using a computationally intensive process based on proof of work, called mining, that secures the bitcoin blockchain. Mining consumes large quantities of electricity and has been criticized for its environmental impact.^[10]

History

Background

Before bitcoin, several digital cash technologies were released, starting with David Chaum's ecash in the 1980s.^[11] The idea that solutions to computational puzzles could have some value was first proposed by cryptographers Cynthia Dwork and Moni Naor in 1992.^{[12][11]} The concept was independently rediscovered by Adam Back who developed Hashcash, a proof-of-work scheme for spam control in 1997.^[11] The first proposals for distributed digital scarcity-based cryptocurrencies came from cypherpunks Wei Dai (b-money) and Nick Szabo (bit gold) in 1998.^[13] In 2004, Hal Finney developed the first currency based

Bitcoin



Official logo from bitcoin.org

Denominations	
Plural	Bitcoins
Symbol	₿ (Unicode: U+20BF ₿ BITCOIN SIGN) ^[1]
Code	BTC
Precision	10 ^{−8}
Subunits	
1/1000	Millibitcoin
1/1 000 000	Microbitcoin
1/100 000 000	Satoshi ^{[a][2]}
Development	
Original author(s)	<u>Satoshi Nakamoto</u>
White paper	" <u>Bitcoin: A Peer-to-Peer Electronic Cash System</u> " (https://bitcoin.org/bitcoin.pdf)
Implementation(s)	<u>Bitcoin Core</u>
Initial release	0.1.0 / 9 January 2009
Latest release	28.0 / 4 October 2024 ^[3]
Code repository	github.com/bitcoin/bitcoin (https://github.com/bitcoin/bitcoin)
Development status	Active
Written in	C++

on reusable proof of work.^[14] These various attempts were not successful.^[11] Chaum's concept required centralized control and no banks wanted to sign on, Hashcash had no protection against double-spending, while b-money and bit gold were not resistant to Sybil attacks.^[11]

2008–2009: Creation

The domain name *bitcoin.org* was registered on 18 August 2008.^[15] On 31 October 2008, a link to a white paper authored by Satoshi Nakamoto titled *Bitcoin: A Peer-to-Peer Electronic Cash System* was posted to a cryptography mailing list.^[16] Nakamoto implemented the bitcoin software as open-source code and released it in January 2009.^[6] Nakamoto's identity remains unknown.^[5] According to computer scientist Arvind Narayanan, all individual components of bitcoin originated in earlier academic literature.^[11] Nakamoto's innovation was their complex interplay resulting in the first decentralized, Sybil resistant, Byzantine fault tolerant digital cash system, that would eventually be referred to as the first blockchain.^{[11][17]} Nakamoto's paper was not peer reviewed and was initially ignored by academics, who argued that it could not work.^[11]


On 3 January 2009, the bitcoin network was created when Nakamoto mined the starting block of the chain, known as the *genesis block*.^[18] Embedded in this block was the text "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks", which is the date and headline of an issue of *The Times* newspaper.^[6] Nine days later, Hal Finney received the first bitcoin transaction: ten bitcoins from Nakamoto.^[19] Wei Dai and Nick Szabo were also early supporters.^[18] On May 22, 2010, the first known commercial transaction using bitcoin occurred when programmer Laszlo Hanyecz bought two Papa John's pizzas for ₧10,000, in what would later be celebrated as "Bitcoin Pizza Day".^[20]

2010–2012: Early growth

Blockchain analysts estimate that Nakamoto had mined about one million bitcoins^[21] before

Source model	<u>Free and open-source software</u>
License	<u>MIT License</u>
Ledger	
Ledger start	3 January 2009
Timestamping scheme	<u>Proof of work</u> (partial hash inversion)
Hash function	<u>SHA-256</u> (two rounds)
Issuance schedule	Decentralized (block reward) Initially ₧50 per block, halved every 210,000 blocks
Block reward	₧3.125 (as of 2024)
Block time	10 minutes
Circulating supply	₧19,591,231 (as of 6 January 2024)
Supply limit	₧21,000,000 ^[b]
Valuation	
Exchange rate	Floating
Demographics	
Official user(s)	<u>El Salvador</u> ^[4]
Website	
Website	<u>bitcoin.org</u> (https://bitcoin.org)

External image

 Cover page of *The Times* 3 January 2009 showing the headline used in the genesis block (<https://www.thetimes03jan2009.com/wp-content/uploads/2015/03/genesis-block-newspaper-bitcoin.jpg>)



Bitcoin logos made by Satoshi Nakamoto in 2009 (left) and 2010 (right).

disappearing in 2010 when he handed the network alert key and control of the code repository over to Gavin Andresen. Andresen later became lead developer at the Bitcoin Foundation,^{[22][23]} an organization founded in September 2012 to promote bitcoin.^[24]

After early "proof-of-concept" transactions, the first major users of bitcoin were black markets, such as the dark web Silk Road. During its 30 months of existence, beginning in February 2011, Silk Road exclusively accepted bitcoins as payment, transacting \$9.9 million, worth about \$214 million.^{[25]:222}

2013–2014: First regulatory actions

In March 2013, the US Financial Crimes Enforcement Network (FinCEN) established regulatory guidelines for "decentralized virtual currencies" such as bitcoin, classifying American bitcoin miners who sell their generated bitcoins as money services businesses, subject to registration and other legal obligations.^[26] In May 2013, US authorities seized the unregistered exchange Mt. Gox.^[27] In June 2013, the US Drug Enforcement Administration seized \$11.02 from a man attempting to use them to buy illegal substances. This marked the first time a government agency had seized bitcoins.^[28] The FBI seized about \$30,000 in October 2013 from Silk Road, following the arrest of its founder Ross Ulbricht.^[29]

In December 2013, the People's Bank of China prohibited Chinese financial institutions from using bitcoin.^[30] After the announcement, the value of bitcoin dropped,^[31] and Baidu no longer accepted bitcoins for certain services.^[32] Buying real-world goods with any virtual currency had been illegal in China since at least 2009.^[33]

2015–2019

Research produced by the University of Cambridge estimated that in 2017, there were 2.9 to 5.8 million unique users using a cryptocurrency wallet, most of them using bitcoin.^[34] In August 2017, the SegWit software upgrade was activated. Segwit was intended to support the Lightning Network as well as improve scalability.^[35] SegWit opponents, who supported larger blocks as a scalability solution, forked to create Bitcoin Cash, one of many forks of bitcoin.^[36]

In December 2017, the first futures on bitcoin was introduced by the Chicago Mercantile Exchange (CME).^[37]

In February 2018, the price crashed after China imposed a complete ban on bitcoin trading.^[38] The percentage of bitcoin trading in the Chinese renminbi fell from over 90% in September 2017 to less than 1% in June 2018.^[39] During the same year, bitcoin prices were negatively affected by several hacks or thefts from cryptocurrency exchanges.^[40]

2020–present

In 2020, some major companies and institutions started to acquire bitcoin: MicroStrategy invested \$250 million in bitcoin as a treasury reserve asset,^[42] Square, Inc., \$50 million,^[43] and MassMutual, \$100 million.^[44] In November 2020, PayPal added support for bitcoin in the US.^[45]

In February 2021, bitcoin's market capitalization reached \$1 trillion for the first time.^[46] In November 2021, the Taproot soft-fork upgrade was activated, adding support for Schnorr signatures, improved functionality of smart contracts and Lightning Network.^[47] Before, bitcoin only used a custom elliptic

curve with the ECDSA algorithm to produce signatures.^{[48]:101} In September 2021, bitcoin became legal tender in El Salvador, alongside the US dollar.^[4] In October 2021, the first bitcoin futures exchange-traded fund (ETF), called BITO, from ProShares was approved by the SEC and listed on the CME.^[49]



Bitcoin price^[41]

December 1, 2014 -

December 4, 2024

In May and June 2022, the bitcoin price fell following the collapses of TerraUSD, a stablecoin,^[50] and the Celsius Network, a cryptocurrency loan company.^{[51][52]}

In 2023, ordinals—non-fungible tokens (NFTs)—on bitcoin, went live.^[53] As of June 2023, River Financial estimated that bitcoin had 81.7 million users, about 1% of the global population.^[54] In January 2024, the first 11 US spot bitcoin ETFs began trading, offering direct exposure to bitcoin for the first time on American stock exchanges.^{[55][56]} In December 2024, bitcoin price reached \$100,000 for the first time, as US president-elect Donald Trump promised to make the US the "crypto capital of the planet" and to stockpile bitcoin.^[57] The same month, BlackRock, the world's largest asset manager, recommended investors to allocate up to 2% of their portfolio to bitcoin.^[58]

Design

Units and divisibility

The unit of account of the bitcoin system is the *bitcoin*. It is most commonly represented with the symbol ₿^[1] and the currency code BTC. However, the BTC code does not conform to ISO 4217 as BT is the country code of Bhutan,^[59] and ISO 4217 requires the first letter used in global commodities to be 'X'.^[59] XBT, a code that conforms to ISO 4217 though not officially part of it,^[59] is used by Bloomberg L.P.^[60]

No uniform capitalization convention exists; some sources use *Bitcoin*, capitalized, to refer to the technology and network, and *bitcoin*, lowercase, for the unit of account.^[61] The Cambridge Advanced Learner's Dictionary and the Oxford Advanced Learner's Dictionary use the capitalized and lowercase variants without distinction.^{[62][63]}

One bitcoin is divisible to eight decimal places.^{[7]:ch. 5} Units for smaller amounts of bitcoin are the millibitcoin (mBTC), equal to $\frac{1}{1000}$ bitcoin, and the satoshi^[a] (sat), representing $\frac{1}{100\,000\,000}$ (one hundred millionth) bitcoin, the smallest amount possible.^[2] 100,000 satoshis are one mBTC.^[64]

Blockchain

As a decentralized system, bitcoin operates without a central authority or single administrator,^[65] so that anyone can create a new bitcoin address and transact without needing any approval.^{[7]:ch. 1} This is accomplished through a specialized distributed ledger called a *blockchain* that records bitcoin transactions.^[66]

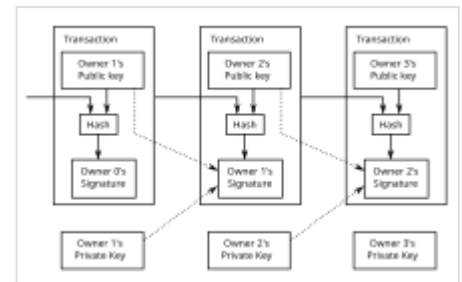
The blockchain is implemented as an ordered list of *blocks*. Each block contains a SHA-256 hash of the previous block,^[66] chaining them in chronological order.^{[7]:ch. 7[66]} The blockchain is maintained by a peer-to-peer network.^{[25]:215–219} Individual blocks, public addresses, and transactions within blocks are

public information, and can be examined using a blockchain explorer.^[67]

Nodes validate and broadcast transactions, each maintaining a copy of the blockchain for ownership verification.^[68] A new block is created every 10 minutes on average, updating the blockchain across all nodes without central oversight. This process tracks bitcoin spending, ensuring each bitcoin is spent only once. Unlike a traditional ledger that tracks physical currency, bitcoins exist digitally as unspent outputs of transactions.^{[7]:ch. 5}

Addresses and transactions

In the blockchain, bitcoins are linked to specific addresses that are hashes of a public key. Creating an address involves generating a random private key and then computing the corresponding address. This process is almost instant, but the reverse (finding the private key for a given address) is nearly impossible.^{[7]:ch. 4} Publishing a bitcoin address does not risk its private key, and it is extremely unlikely to accidentally generate a used key with funds. To use bitcoins, owners need their private key to digitally sign transactions, which are verified by the network using the public key, keeping the private key secret.^{[7]:ch. 5}



Simplified chain of ownership. In practice, a transaction can have more than one input and more than one output.^[69]

Bitcoin transactions use a Forth-like scripting language,^{[7]:ch. 5} involving one or more inputs and outputs. When sending bitcoins, a user specifies the recipients' addresses and the amount for each output. This allows sending bitcoins to several recipients in a single transaction. To prevent double-spending, each input must refer to a previous unspent output in the blockchain.^[69] Using multiple inputs is similar to using multiple coins in a cash transaction. As in a cash transaction, the sum of inputs can exceed the intended sum of payments. In such a case, an additional output can return the change back to the payer.^[69] Unallocated input satoshis in the transaction become the transaction fee.^[69]

Losing a private key means losing access to the bitcoins, with no other proof of ownership accepted by the protocol.^[25] For instance, in 2013, a user lost ₿7,500, valued at US\$7.5 million, by accidentally discarding a hard drive with the private key.^[70] It is estimated that around 20% of all bitcoins are lost.^[71] The private key must also be kept secret as its exposure, such as through a data breach, can lead to theft of the associated bitcoins.^{[7]:ch. 10}^[72] As of December 2017, approximately ₿980,000 had been stolen from cryptocurrency exchanges.^[73]

Mining

The mining process in bitcoin involves maintaining the blockchain through computer processing power. Miners group and broadcast new transactions into blocks, which are then verified by the network.^[66] Each block must contain a proof of work (PoW) to be accepted,^[66] involving finding a nonce number that, combined with the block content, produces a hash numerically smaller than the network's *difficulty target*.^{[7]:ch. 8} This PoW is simple to verify but hard to generate, requiring many attempts.^{[7]:ch. 8} PoW forms the basis of bitcoin's consensus mechanism.^[74]

The difficulty of generating a block is deterministically adjusted based on the mining power on the network by changing the difficulty target, which is recalibrated every 2,016 blocks (approximately two weeks) to maintain an average time of ten minutes between new blocks. The process requires significant computational power and specialized hardware.^{[7]:ch. 8}^[75]



Bitcoin mining facility with large amounts of mining hardware

Miners who successfully find a new block can collect transaction fees from the included transactions and a set reward in bitcoins.^[76] To claim this reward, a special transaction called a *coinbase* is included in the block, with the miner as the payee. All bitcoins in existence have been created through this type of transaction.^{[7]:ch. 8} This reward is halved every 210,000 blocks until \$21 million,^[b] with new bitcoin issuance slated to end around 2140. Afterward, miners will only earn from transaction fees. These fees are determined by the transaction's size and the amount of data stored, measured in satoshis per byte.^{[77][69][7]:ch. 8}

The proof of work system and the chaining of blocks make blockchain modifications very difficult, as altering one block requires changing all subsequent blocks. As more blocks are added, modifying older blocks becomes increasingly challenging.^{[78][66]} In case of disagreement, nodes trust the longest chain, which required the greatest amount of effort to produce.^[74] To tamper or censor the ledger, one needs to control the majority of the global hashrate.^[74] The high cost required to reach this level of computational power secures the bitcoin blockchain.^[74]

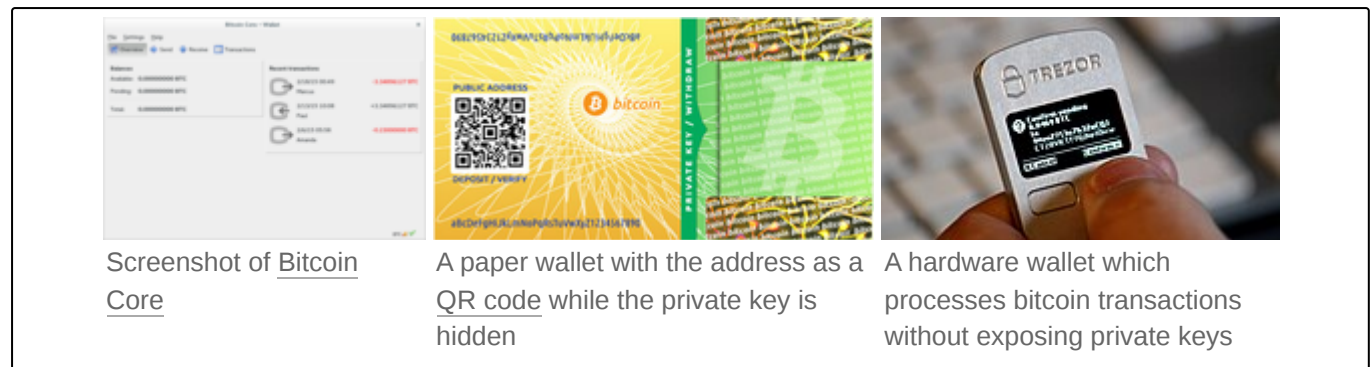
Bitcoin mining's environmental impact is controversial and has attracted the attention of regulators, leading to restrictions or incentives in various jurisdictions.^[79] As of 2022, a non-peer-reviewed study by the Cambridge Centre for Alternative Finance (CCAF) estimated that bitcoin mining represented 0.4% of global electricity consumption.^[80] Another 2022 non-peer-reviewed commentary published in *Joule* estimated that bitcoin mining was responsible for 0.2% of world greenhouse gas emissions.^[81] About half of the electricity used is generated through fossil fuels.^[82] Moreover, mining hardware's short lifespan results in electronic waste.^[83] The amount of electrical energy consumed, and the e-waste generated, is comparable to that of Greece and the Netherlands, respectively.^{[83][81]}

Privacy and fungibility

Bitcoin is pseudonymous, with funds linked to addresses, not real-world identities. While the owners of these addresses are not directly identified, all transactions are public on the blockchain. Patterns of use, like spending coins from multiple inputs, can hint at a common owner. Public data can sometimes be matched with known address owners.^[84] Bitcoin exchanges might also need to collect personal data as per legal requirements.^[85] For enhanced privacy, users can generate a new address for each transaction.^[86]

In the bitcoin network, each bitcoin is treated equally, ensuring basic fungibility. However, users and applications can choose to differentiate between bitcoins. While wallets and software treat all bitcoins the same, each bitcoin's transaction history is recorded on the blockchain. This public record allows for chain analysis, where users can identify and potentially reject bitcoins from controversial sources.^[87] For example, in 2012, Mt. Gox froze accounts containing bitcoins identified as stolen.^[88]

Wallets



Bitcoin wallets were the first cryptocurrency wallets, enabling users to store the information necessary to transact bitcoins.^{[89][7]:ch. 1, glossary} The first wallet program, simply named *Bitcoin*, and sometimes referred to as the *Satoshi client*, was released in 2009 by Nakamoto as open-source software.^[6] Bitcoin Core is among the best known clients. Forks of Bitcoin Core exist such as Bitcoin Unlimited.^[90] Wallets can be full clients, with a full copy of the blockchain to check the validity of mined blocks,^{[7]:ch. 1} or lightweight clients, just to send and receive transactions without a local copy of the entire blockchain.^[91] Third-party internet services called online wallets store users' credentials on their servers, making them susceptible of hacks.^[92] Cold storage protects bitcoins from such hacks by keeping private keys offline, either through specialized hardware wallets or paper printouts.^{[93][7]:ch. 4}

Scalability and decentralization challenges

Nakamoto limited the block size to one megabyte.^[94] The limited block size and frequency can lead to delayed processing of transactions, increased fees and a bitcoin scalability problem.^[95] The Lightning Network, second-layer routing network, is a potential scaling solution.^{[7]:ch. 8}

Research shows a trend towards centralization in bitcoin as miners join pools for stable income.^{[25]:215,219–222[96]:3} If a single miner or pool controls more than 50% of the hashing power, it would allow them to censor transactions and double-spend coins.^[65] In 2014, mining pool Ghash.io reached 51% mining power, causing safety concerns, but later voluntarily capped its power at 39.99% for the benefit of the whole network.^[97] A few entities also dominate other parts of the ecosystem such as the client software, online wallets, and simplified payment verification (SPV) clients.^[65]

Economics and usage

Bitcoin's theoretical roots and ideology

According to the European Central Bank, the decentralization of money offered by bitcoin has its theoretical roots in the Austrian school of economics, especially with Friedrich Hayek's *The Denationalisation of Money*, in which he advocates a complete free market in the production, distribution and management of money to end the monopoly of central banks.^{[98]:22} Sociologist Nigel Dodd argues that the essence of the bitcoin ideology is to remove money from social, as well as governmental, control.^[99] *The Economist* describes bitcoin as "a techno-anarchist project to create an online version of cash, a way for people to transact without the possibility of interference from malicious governments or banks".^[100] These philosophical ideas initially attracted libertarians and anarchists.^[101] Economist Paul Krugman argues that cryptocurrencies like bitcoin are only used by bank skeptics and criminals.^[102]

Recognition as a currency and legal status

Money serves three purposes: a store of value, a medium of exchange, and a unit of account.^[103]

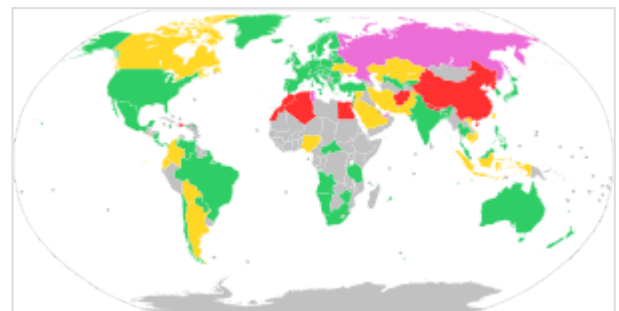
According to *The Economist* in 2014, bitcoin functions best as a medium of exchange.^[103] In 2015,

The Economist noted that bitcoins had three qualities useful in a currency: they are "hard to earn, limited in supply and easy to verify".^[104] However, a 2018 assessment by *The Economist* stated that cryptocurrencies met none of these three criteria.^[100]

Per some researchers, as of 2015, bitcoin functions more as a payment system than as a currency.^[25] In 2014, economist Robert J. Shiller wrote that bitcoin

has potential as a unit of account for measuring the relative value of goods, as with Chile's Unidad de Fomento, but that "Bitcoin in its present form... doesn't really solve any sensible economic problem".^[105] François R. Velde, Senior Economist at the Chicago Fed, described bitcoin as "an elegant solution to the problem of creating a digital currency".^[106] David Andolfatto, Vice President at the Federal Reserve Bank of St. Louis, stated that bitcoin is a threat to the establishment, which he argues is a good thing for the Federal Reserve System and other central banks, because it prompts these institutions to operate sound policies.^[107]

The legal status of bitcoin varies substantially from one jurisdiction to another. Because of its decentralized nature and its global presence, regulating bitcoin is difficult. However, the use of bitcoin can be criminalized, and shutting down exchanges and the peer-to-peer economy in a given country would constitute a de facto ban.^[108] The use of bitcoin by criminals has attracted the attention of financial regulators, legislative bodies, and law enforcement.^[109] Nobel-prize winning economist Joseph Stiglitz says that bitcoin's anonymity encourages money laundering and other crimes.^[110] This is the



Legal status of bitcoin

- **Legal tender** (bitcoin is officially recognized as a medium of exchange)
- **Permissive** (legal to use bitcoin, with minimal or no restrictions)
- **Restricted** (some legal restrictions on the usage of bitcoin)
- **Contentious** (interpretation of old laws, but bitcoin is not directly prohibited)
- **Prohibited** (full or partial prohibition on the use of bitcoin)
- **No data** (no information available)

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main justification behind bitcoin bans.^[9] As of November 2021, nine countries applied an absolute ban (Algeria, Bangladesh, China, Egypt, Iraq, Morocco, Nepal, Qatar, and Tunisia) while another 42 countries had an implicit ban.^[111] Bitcoin is only legal tender in El Salvador.^[4]

Use for payments

As of 2018, bitcoin is rarely used in transactions with merchants,^[112] but it is popular to purchase illegal goods online.^{[113][114]} Prices are not usually quoted in bitcoin and trades involve conversions into fiat currencies.^[25] Commonly cited reasons for not using bitcoin include high costs, the inability to process chargebacks, high price volatility, long transaction times, and transaction fees (especially for small purchases).^{[112][115]} *Bloomberg* reported that bitcoin was being used for large-item purchases on the site Overstock.com and for cross-border payments to freelancers.^[116] As of 2015, there was little sign of bitcoin use in international remittances despite high fees charged by banks and Western Union who compete in this market.^{[25][117]} Despite associated risks and costs, in 2022, a growing use of bitcoin, alongside cash and cards, was reported in restaurant business.^[118]



Café in Delft accepting Bitcoin

In September 2021, the Bitcoin Law made bitcoin legal tender in El Salvador, alongside the US dollar.^[4] The adoption has been criticized internationally and within El Salvador.^{[4][119]} In 2022, the International Monetary Fund (IMF) urged El Salvador to reverse its decision.^[120] As of 2022, the use of Bitcoin in El Salvador remains low: 80% of businesses refused to accept it.^[121] In April 2022, the Central African Republic (CAR) adopted bitcoin as legal tender alongside the CFA franc,^[122] but repealed the reform one year later.^[123]

Bitcoin is also used by some governments. For instance, the Iranian government initially opposed cryptocurrencies, but later saw them as an opportunity to circumvent sanctions.^[124] Since 2020, Iran has required local bitcoin miners to sell bitcoin to the Central Bank of Iran, allowing the central bank to use it for imports.^[125] Some constituent states also accept tax payments in bitcoin, including Colorado (US)^[126] and Zug (Switzerland).^[127] As of 2023, the US government owned more than \$5 billion worth of seized bitcoin.^{[128][129]}

Use for investment and status as an economic bubble

As of 2018, the overwhelming majority of bitcoin transactions took place on cryptocurrency exchanges.^[112] Since 2014, regulated bitcoin funds also allow exposure to the asset or to futures as an investment.^{[130][131]} Bitcoin is used as a store of value.^{[132][133]} individuals and companies such as the Winklevoss twins^[134] and Elon Musk's companies SpaceX and Tesla have massively invested in bitcoin.^{[135][136]} Bitcoin wealth is highly concentrated, with 0.01% holding 27% of in-circulation currency, as of 2021.^[137] As of September 2023, El Salvador had \$76.5 million worth of bitcoin in its international reserves.^[138]

In 2018, research published in the *Journal of Monetary Economics* concluded that price manipulation occurred during the Mt. Gox bitcoin theft and that the market remained vulnerable to manipulation.^[139] Research published in *The Journal of Finance* also suggested that trading associated with increases in the

amount of the Tether cryptocurrency and associated trading at the Bitfinex exchange accounted for about half of the price increase in bitcoin in late 2017.^{[140][141]}

Bitcoin, along with other cryptocurrencies, has been described as an economic bubble by several economists, including Nobel Prize in Economics laureates, such as Joseph Stiglitz,^[142] James Heckman,^[8] and Paul Krugman.^[102] Another recipient of the prize, Robert Shiller, argues that bitcoin is rather a fad that may become an asset class. He describes its price growth as an "epidemic", driven by contagious narratives.^[143] In 2024, Jean Tirole, also Nobel laureate, described bitcoin as a "pure bubble" as its intrinsic value is zero. According to him, some bubbles are long-lasting such as gold and fiat currencies, and it's impossible to predict whether bitcoin will collapse like other financial bubbles or become the new gold.^[144] The same year, Federal Reserve Chair Jerome Powell described bitcoin as a digital competitor to gold but not to the dollar as he argued it is a highly volatile speculative asset not used as a form of payment.^[145]



Government website with El Salvador reserves

According to research published in the *International Review of Financial Analysis* in 2018, bitcoin as an asset is highly volatile and does not behave like any other conventional asset.^[146] According to one 2022 analysis published in *The Journal of Alternative Investments*, bitcoin was less volatile than oil, silver, US Treasuries, and 190 stocks in the S&P 500 during and after the 2020 stock market crash.^[147] The term *hodl* was created in December 2013 for holding bitcoin rather than selling it during periods of volatility.^{[148][149]}

Other economists, investors, and the central bank of Estonia have described bitcoin as a potential Ponzi scheme.^{[150][151][152]} Legal scholar Eric Posner disagrees, however, as "a real Ponzi scheme takes fraud; bitcoin, by contrast, seems more like a collective delusion".^[153] A 2014 World Bank report also concluded that bitcoin was not a deliberate Ponzi scheme.^[154]

See also

- Alternative currency
- List of cryptocurrencies

Notes

- Named after Satoshi Nakamoto
- The exact number is ₮20,999,999.9769.^{[7]:ch. 8}

References

- "Unicode 10.0.0" (<https://www.unicode.org/versions/Unicode10.0.0/>). Unicode Consortium.

- 20 June 2017. Archived (<https://web.archive.org/web/20170620130342/http://www.unicode.org/versions/Unicode10.0.0/>) from the original on 20 June 2017. Retrieved 20 June 2017.
2. Bradbury, Danny (November 2013). "The problem with Bitcoin" (<https://linkinghub.elsevier.com/retrieve/pii/S1361372313701015>). *Computer Fraud & Security*. **2013** (11): 5–8. doi:10.1016/S1361-3723(13)70101-5 (<https://doi.org/10.1016%2FS1361-3723%2813%2970101-5>). ISSN 1361-3723 (<https://search.worldcat.org/issn/1361-3723>). Archived (<https://web.archive.org/web/20230118052355/https://linkinghub.elsevier.com/retrieve/pii/S1361372313701015>) from the original on 18 January 2023. Retrieved 25 November 2023.
 3. "Bitcoin Core 28.0 released" (<https://bitcoincore.org/en/2024/10/02/release-28.0/>). 2 October 2024. Archived (<https://web.archive.org/web/20241005063435/https://bitcoincore.org/en/2024/10/02/release-28.0/>) from the original on 5 October 2024. Retrieved 5 October 2024.
 4. "El Salvador's dangerous gamble on bitcoin" (<https://www.ft.com/content/c257a925-c864-4495-9149-d8956d786310>). The editorial board. *Financial Times*. 7 September 2021. Archived (<https://web.archive.org/web/20210907081627/https://www.ft.com/content/c257a925-c864-4495-9149-d8956d786310>) from the original on 7 September 2021. Retrieved 7 September 2021.
 5. S., L. (2 November 2015). "Who is Satoshi Nakamoto?" (<https://www.economist.com/the-economist-explains/2015/11/02/who-is-satoshi-nakamoto>). *The Economist*. Archived (<https://web.archive.org/web/20201122172929/https://www.economist.com/the-economist-explains/2015/11/02/who-is-satoshi-nakamoto>) from the original on 22 November 2020. Retrieved 21 November 2023.
 6. Davis, Joshua (10 October 2011). "The Crypto-Currency: Bitcoin and its mysterious inventor" (<https://www.newyorker.com/magazine/2011/10/10/the-crypto-currency>). *The New Yorker*. Archived (<https://web.archive.org/web/20141101014157/http://www.newyorker.com/magazine/2011/10/10/the-crypto-currency>) from the original on 1 November 2014. Retrieved 31 October 2014.
 7. Antonopoulos, Andreas M. (2014). *Mastering Bitcoin: Unlocking Digital Crypto-Currencies*. O'Reilly Media. ISBN 978-1-4493-7404-4.
 8. Wolff-Mann, Ethan (27 April 2018). "'Only good for drug dealers': More Nobel prize winners snub bitcoin" (<https://finance.yahoo.com/news/good-drug-dealers-nobel-prize-winners-snob-bitcoin-184903784.html>). *Yahoo Finance*. Archived (<https://web.archive.org/web/20180612141128/https://finance.yahoo.com/news/good-drug-dealers-nobel-prize-winners-snob-bitcoin-184903784.html>) from the original on 12 June 2018. Retrieved 7 June 2018.
 9. Sun Yin, Hao Hua; Langenheldt, Klaus; Harlev, Mikkel; Mukkamala, Raghava Rao; Vatrapi, Ravi (2 January 2019). "Regulating Cryptocurrencies: A Supervised Machine Learning Approach to De-Anonymizing the Bitcoin Blockchain" (<https://www.researchgate.net/publication/332118587>). *Journal of Management Information Systems*. **36** (1): 65. doi:10.1080/07421222.2018.1550550 (<https://doi.org/10.1080%2F07421222.2018.1550550>). ISSN 0742-1222 (<https://search.worldcat.org/issn/0742-1222>). S2CID 132398387 (<https://api.semanticscholar.org/CorpusID:132398387>). Archived (https://web.archive.org/web/20240421113631/https://www.researchgate.net/publication/332118587_Regulating_Cryptocurrencies_A_Supervised_Machine_Learning_Approach_to_De-Anonymizing_the_Bitcoin_Blockchain) from the original on 21 April 2024. Retrieved 29 November 2023.
 10. Huang, Jon; O'Neill, Claire; Tabuchi, Hiroko (3 September 2021). "Bitcoin Uses More Electricity Than Many Countries. How Is That Possible?" (<https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html>). *The New York Times*. ISSN 0362-4331 (<https://search.worldcat.org/issn/0362-4331>). Archived (<https://web.archive.org/web/20230217105559/https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html>) from the original on 17 February 2023. Retrieved 26 October 2022.

11. Narayanan, Arvind; Clark, Jeremy (27 November 2017). "Bitcoin's academic pedigree" (<https://queue.acm.org/detail.cfm?id=3136559>). *Communications of the ACM*. **60** (12): 36–45. doi:10.1145/3132259 (<https://doi.org/10.1145%2F3132259>). ISSN 0001-0782 (<https://search.worldcat.org/issn/0001-0782>). S2CID 6425116 (<https://api.semanticscholar.org/CorpusID:6425116>). Archived (<https://web.archive.org/web/20231014120907/https://queue.acm.org/detail.cfm?id=3136559>) from the original on 14 October 2023. Retrieved 22 November 2023.
12. Dwork, Cynthia; Naor, Moni (1993), Brickell, Ernest F. (ed.), "Pricing via Processing or Combatting Junk Mail" (http://link.springer.com/10.1007/3-540-48071-4_10), *Advances in Cryptology — CRYPTO' 92*, vol. 740, Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 139–147, doi:10.1007/3-540-48071-4_10 (https://doi.org/10.1007%2F3-540-48071-4_10), ISBN 978-3-540-57340-1, retrieved 2 January 2025
13. Tschorsch, Florian; Scheuermann, Bjorn (2 March 2016). "Bitcoin and Beyond: A Technical Survey on Decentralized Digital Currencies" (<https://ieeexplore.ieee.org/document/7423672>). *IEEE Communications Surveys & Tutorials*. **18** (3): 2084–2123. doi:10.1109/COMST.2016.2535718 (<https://doi.org/10.1109%2FCOMST.2016.2535718>). ISSN 1553-877X (<https://search.worldcat.org/issn/1553-877X>). S2CID 5115101 (<https://api.semanticscholar.org/CorpusID:5115101>). Archived (<https://web.archive.org/web/20231119025114/http://ieeexplore.ieee.org/document/7423672>) from the original on 19 November 2023. Retrieved 23 November 2023.
14. Judmayer, Aljosha; Stifter, Nicholas; Krombholz, Katharina; Weippl, Edgar (2017). "History of Cryptographic Currencies" (https://link.springer.com/10.1007/978-3-031-02352-1_3). *Blocks and Chains* (<https://link.springer.com/book/10.1007/978-3-031-02352-1>). Synthesis Lectures on Information Security, Privacy, and Trust. Springer. pp. 15–18. doi:10.1007/978-3-031-02352-1_3 (https://doi.org/10.1007%2F978-3-031-02352-1_3). ISBN 978-3-031-01224-2. Archived (<https://web.archive.org/web/20231122135006/https://link.springer.com/book/10.1007/978-3-031-02352-1>) from the original on 22 November 2023. Retrieved 22 November 2023.
15. Bernard, Zoë (2 December 2017). "Everything you need to know about Bitcoin, its mysterious origins, and the many alleged identities of its creator" (<http://www.businessinsider.com/bitcoin-history-cryptocurrency-satoshi-nakamoto-2017-12>). *Business Insider*. Archived (<https://web.archive.org/web/20180615010015/http://www.businessinsider.com/bitcoin-history-cryptocurrency-satoshi-nakamoto-2017-12>) from the original on 15 June 2018. Retrieved 15 June 2018.
16. Finley, Klint (31 October 2018). "After 10 Years, Bitcoin Has Changed Everything—And Nothing" (<https://www.wired.com/story/after-10-years-bitcoin-changed-everything-nothing/>). *Wired*. Archived (<https://web.archive.org/web/20181105070656/https://www.wired.com/story/after-10-years-bitcoin-changed-everything-nothing/>) from the original on 5 November 2018. Retrieved 9 November 2018.
17. Economist Staff (31 October 2015). "Blockchains: The great chain of being sure about things" (<https://www.economist.com/news/briefing/21677228-technology-behind-bitcoin-lets-people-who-do-not-know-or-trust-each-other-build-dependable>). *The Economist*. Archived (<https://web.archive.org/web/20160703000844/http://www.economist.com/news/briefing/21677228-technology-behind-bitcoin-lets-people-who-do-not-know-or-trust-each-other-build-dependable>) from the original on 3 July 2016. Retrieved 18 June 2016.
18. Wallace, Benjamin (23 November 2011). "The Rise and Fall of Bitcoin" (<https://www.wired.com/2011/11/mf-bitcoin/>). *Wired*. Archived (https://web.archive.org/web/20131031043919/http://www.wired.com/magazine/2011/11/mf_bitcoin) from the original on 31 October 2013. Retrieved 13 October 2012.

19. Popper, Nathaniel (30 August 2014). "Hal Finney, Cryptographer and Bitcoin Pioneer, Dies at 58" (<https://www.nytimes.com/2014/08/31/business/hal-finney-cryptographer-and-bitcoin-pioneer-dies-at-58.html>). *The New York Times*. Archived (<https://web.archive.org/web/20140903162835/http://www.nytimes.com/2014/08/31/business/hal-finney-cryptographer-and-bitcoin-pioneer-dies-at-58.html>) from the original on 3 September 2014. Retrieved 2 September 2014.
20. Cooper, Anderson (16 May 2019). "Meet the man who spent millions worth of bitcoin on pizza" (<https://www.cbsnews.com/news/meet-the-man-who-spent-millions-worth-of-bitcoin-on-pizza-60-minutes-2019-05-16>). *CBS News*. Archived (<https://web.archive.org/web/20211208180706/https://www.cbsnews.com/news/meet-the-man-who-spent-millions-worth-of-bitcoin-on-pizza-60-minutes-2019-05-16/>) from the original on 8 December 2021. Retrieved 8 December 2021.
21. McMillan, Robert. "Who Owns the World's Biggest Bitcoin Wallet? The FBI" (<https://www.wired.com/2013/12/fbi-wallet/>). *Wired*. Archived (<https://web.archive.org/web/20161021221609/https://www.wired.com/2013/12/fbi-wallet/>) from the original on 21 October 2016. Retrieved 7 October 2016.
22. Simonite, Tom (15 August 2014). "Meet Gavin Andresen, the most powerful person in the world of Bitcoin" (<https://www.technologyreview.com/2014/08/15/12784/the-man-who-really-built-bitcoin>). *MIT Technology Review*. Archived (<https://web.archive.org/web/20231122163924/https://www.technologyreview.com/2014/08/15/12784/the-man-who-really-built-bitcoin>) from the original on 22 November 2023. Retrieved 22 November 2023.
23. Odell, Matt (21 September 2015). "A Solution To Bitcoin's Governance Problem" (<https://techcrunch.com/2015/09/21/a-solution-to-bitcoins-governance-problem/>). *TechCrunch*. Archived (<https://web.archive.org/web/20160126051521/http://techcrunch.com/2015/09/21/a-solution-to-bitcoins-governance-problem/>) from the original on 26 January 2016. Retrieved 24 January 2016.
24. Bustillos, Maria (1 April 2013). "The Bitcoin Boom" (<https://www.newyorker.com/tech/elements/the-bitcoin-boom>). *The New Yorker*. Archived (<https://web.archive.org/web/20180702064450/https://www.newyorker.com/tech/elements/the-bitcoin-boom>) from the original on 2 July 2018. Retrieved 30 July 2018.
25. Rainer Böhme; Nicolas Christin; Benjamin Edelman; Tyler Moore (2015). "Bitcoin: Economics, Technology, and Governance" (<https://doi.org/10.1257%2Fjep.29.2.213>). *Journal of Economic Perspectives*. **29** (2): 213–238. doi:10.1257/jep.29.2.213 (<https://doi.org/10.1257%2Fjep.29.2.213>). ISSN 0895-3309 (<https://search.worldcat.org/issn/0895-3309>).
26. Lee, Timothy B. (19 March 2013). "US regulator Bitcoin Exchanges Must Comply With Money Laundering Laws" (<https://arstechnica.com/tech-policy/2013/03/us-regulator-bitcoin-exchanges-must-comply-with-money-laundering-laws/>). *Ars Technica*. Archived (<https://web.archive.org/web/20131021203745/http://arstechnica.com/tech-policy/2013/03/us-regulator-bitcoin-exchanges-must-comply-with-money-laundering-laws/>) from the original on 21 October 2013. Retrieved 28 July 2017.
27. Dillet, Romain. "Feds Seize Assets From Mt. Gox's Dwolla Account, Accuse It Of Violating Money Transfer Regulations" (<https://techcrunch.com/2013/05/16/mt-gox-dwolla-account-money-seizure/>). *TechCrunch*. Archived (<https://web.archive.org/web/20131009161856/http://techcrunch.com/2013/05/16/mt-gox-dwolla-account-money-seizure/>) from the original on 9 October 2013. Retrieved 15 May 2013.
28. Sampson, Tim (2013). "U.S. government makes its first-ever Bitcoin seizure" (<http://www.dailydot.com/business/11-bitcoins-seized-government-dea/>). *The Daily Dot*. Archived (<https://web.archive.org/web/20130712010826/http://www.dailydot.com/business/11-bitcoins-seized-government-dea/>) from the original on 12 July 2013. Retrieved 15 October 2013.
29. Hill, Kashmir. "The FBI's Plan For The Millions Worth Of Bitcoins Seized From Silk Road" (<https://www.forbes.com/sites/kashmirhill/2013/10/04/fbi-silk-road-bitcoin-seizure/>). *Forbes*. Archived (<https://web.archive.org/web/20140502154935/http://www.forbes.com/sites/kashmirhill/2013/10/04/fbi-silk-road-bitcoin-seizure/>) from the original on 2 May 2014.

30. Kelion, Leo (18 December 2013). "Bitcoin sinks after China restricts yuan exchanges" (<http://www.bbc.co.uk/news/technology-25428866>). *BBC News*. Archived (<https://web.archive.org/web/20131219214615/http://www.bbc.co.uk/news/technology-25428866>) from the original on 19 December 2013. Retrieved 20 December 2013.
31. "China bans banks from bitcoin transactions" (<https://www.smh.com.au/business/markets/currencies/china-bans-banks-from-bitcoin-transactions-20131206-2yugy.html>). *The Sydney Morning Herald*. Reuters. 6 December 2013. Archived (<https://web.archive.org/web/20140323102824/http://www.smh.com.au/business/markets/currencies/china-bans-banks-from-bitcoin-transactions-20131206-2yugy.html>) from the original on 23 March 2014. Retrieved 31 October 2014.
32. "Baidu Stops Accepting Bitcoins After China Ban" (<https://www.bloomberg.com/news/2013-12-07/baidu-stops-accepting-bitcoins-after-china-ban.html>). *Bloomberg*. New York. 7 December 2013. Archived (<https://web.archive.org/web/20131210214547/http://www.bloomberg.com/news/2013-12-07/baidu-stops-accepting-bitcoins-after-china-ban.html>) from the original on 10 December 2013. Retrieved 11 December 2013.
33. "China bars use of virtual money for trading in real goods" (<http://english.mofcom.gov.cn/aarticle/newsrelease/commonnews/200906/20090606364208.html>). English.mofcom.gov.cn. 29 June 2009. Archived (<https://web.archive.org/web/20131129184312/http://english.mofcom.gov.cn/aarticle/newsrelease/commonnews/200906/20090606364208.html>) from the original on 29 November 2013. Retrieved 10 January 2014.
34. Hileman, Garrick; Rauchs, Michel. "Global Cryptocurrency Benchmarking Study" (https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-global-cryptocurrency-benchmarking-study.pdf) (PDF). Cambridge University. Archived (https://web.archive.org/web/20170410130007/https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-global-cryptocurrency-benchmarking-study.pdf) (PDF) from the original on 10 April 2017. Retrieved 14 April 2017.
35. Vigna, Paul (21 July 2017). "Bitcoin Rallies Sharply After Vote Resolves Bitter Scaling Debate" (<https://www.wsj.com/articles/bitcoin-rallies-sharply-after-vote-resolves-bitter-scaling-debate-1500656084>). *The Wall Street Journal*. Archived (<https://web.archive.org/web/20231121164350/https://www.wsj.com/articles/bitcoin-rallies-sharply-after-vote-resolves-bitter-scaling-debate-1500656084>) from the original on 21 November 2023. Retrieved 21 November 2023.
36. Selena Larson (1 August 2017). "Bitcoin split in two, here's what that means" (<https://money.cnn.com/2017/08/01/technology/business/bitcoin-cash-new-currency/index.html>). *CNN Tech*. Cable News Network. Archived (<https://web.archive.org/web/20180227214042/https://money.cnn.com/2017/08/01/technology/business/bitcoin-cash-new-currency/index.html>) from the original on 27 February 2018. Retrieved 2 April 2018.
37. Cheng, Evelyn (17 December 2017). "Bitcoin debuts on the world's largest futures exchange, and prices fall slightly" (<https://www.cnbc.com/2017/12/17/worlds-largest-futures-exchange-set-to-launch-bitcoin-futures-sunday-night.html>). *CNBC*. Archived (<https://web.archive.org/web/20240118182719/https://www.cnbc.com/2017/12/17/worlds-largest-futures-exchange-set-to-launch-bitcoin-futures-sunday-night.html>) from the original on 18 January 2024. Retrieved 19 January 2024.
38. French, Sally (9 February 2017). "Here's proof that this bitcoin crash is far from the worst the cryptocurrency has seen" (<https://www.marketwatch.com/story/heres-proof-that-this-bitcoin-crash-is-far-from-the-worst-the-cryptocurrency-has-seen-2018-02-09>). Market Watch. Archived (<https://web.archive.org/web/20180703220246/https://www.marketwatch.com/story/heres-proof-that-this-bitcoin-crash-is-far-from-the-worst-the-cryptocurrency-has-seen-2018-02-09>) from the original on 3 July 2018. Retrieved 3 July 2018.
39. "RMB Bitcoin trading falls below 1 pct of world total" (http://www.xinhuanet.com/english/2018-07/07/c_137308879.htm). Xinhuanet. Xinhua. 7 July 2018. Archived (https://web.archive.org/web/20180710225218/http://www.xinhuanet.com/english/2018-07/07/c_137308879.htm) from the original on 10 July 2018. Retrieved 10 July 2018.

40. Chavez-Dreyfuss, Gertrude (3 July 2018). "Cryptocurrency exchange theft surges in first half of 2018: report" (<https://www.reuters.com/article/us-crypto-currencies-ciphertrace/cryptocurrency-exchange-theft-surges-in-first-half-of-2018-report-idUSKBN1JT1Q5>). *Reuters*. Archived (<https://web.archive.org/web/20180704120854/https://www.reuters.com/article/us-crypto-currencies-ciphertrace/cryptocurrency-exchange-theft-surges-in-first-half-of-2018-report-idUSKBN1JT1Q5>) from the original on 4 July 2018. Retrieved 10 July 2018.
41. "Coinbase Bitcoin" (<https://fred.stlouisfed.org/graph/?g=1BVJt>). *Coinbase*. Federal Reserve Economic Data. 4 December 2024. Retrieved 4 December 2024.
42. Cuthbertson, Anthony (13 September 2021). "MicroStrategy buys another \$250m worth of bitcoin in hope of 100X price growth" (<https://www.independent.co.uk/tech/microstrategy-bitcoin-crypto-price-prediction-b1919178.html>). *The Independent*. Archived (<https://web.archive.org/web/20231122163924/https://www.independent.co.uk/tech/microstrategy-bitcoin-crypto-price-prediction-b1919178.html>) from the original on 22 November 2023. Retrieved 22 November 2023.
43. Oliver Effron. "Square just bought \$50 million in bitcoin" (<https://www.cnn.com/2020/10/08/business/square-bitcoin-crypto-investment/index.html>). *CNN*. Archived (<https://web.archive.org/web/20201024101610/https://www.cnn.com/2020/10/08/business/square-bitcoin-crypto-investment/index.html>) from the original on 24 October 2020. Retrieved 22 October 2020.
44. Olga Kharif (11 December 2020). "169-Year-Old MassMutual Invests \$100 Million in Bitcoin" (<https://www.bloomberg.com/news/articles/2020-12-10/169-year-old-insurer-massmutual-invests-100-million-in-bitcoin>). *Bloomberg*. Archived (<https://web.archive.org/web/20201219220543/https://www.bloomberg.com/news/articles/2020-12-10/169-year-old-insurer-massmutual-invests-100-million-in-bitcoin>) from the original on 19 December 2020. Retrieved 26 December 2020.
45. "PayPal says all users in US can now buy, hold and sell cryptocurrencies" (<https://techcrunch.com/2020/11/12/paypal-says-all-users-in-u-s-can-now-buy-hold-and-sell-cryptocurrencies/>). *Techcrunch*. 13 November 2020. Archived (<https://web.archive.org/web/20201124050031/https://techcrunch.com/2020/11/12/paypal-says-all-users-in-u-s-can-now-buy-hold-and-sell-cryptocurrencies/>) from the original on 24 November 2020. Retrieved 26 November 2020.
46. Chavez-Dreyfuss, Gertrude; Wilson, Tom (19 February 2021). "Bitcoin hits \$1 trillion market cap, surges to fresh all-time peak" (<https://www.reuters.com/article/idUSKBN2AJ0GC/>). *Reuters*. Retrieved 24 November 2023.
47. Sigalos, MacKenzie (14 November 2021). "Bitcoin's biggest upgrade in four years just happened – here's what changes" (<https://www.cnbc.com/2021/11/14/bitcoin-taproot-upgrade-what-it-means-for-investors.html>). *CNBC*. Archived (<https://web.archive.org/web/20211114215032/https://www.cnbc.com/2021/11/14/bitcoin-taproot-upgrade-what-it-means-for-investors.html>) from the original on 14 November 2021. Retrieved 15 November 2021.
48. Van Hijfte, Stijn (2020). *Blockchain Platforms: A Look at the Underbelly of Distributed Platforms*. Morgan & Claypool Publishers. ISBN 978-1681738925.
49. Wursthorn, Michael (19 October 2021). "A Bitcoin ETF Is Here. What Does That Mean for Investors?" (<https://www.wsj.com/articles/a-bitcoin-etf-is-almost-here-what-does-that-mean-for-investors-11634376601>). *The Wall Street Journal*. Archived (<https://web.archive.org/web/20240110200308/https://www.wsj.com/articles/a-bitcoin-etf-is-almost-here-what-does-that-mean-for-investors-11634376601>) from the original on 10 January 2024. Retrieved 11 January 2024.
50. Browne, Ryan (10 May 2022). "Bitcoin investors are panicking as a controversial crypto experiment unravels" (<https://www.cnbc.com/2022/05/10/bitcoin-btc-investors-panic-as-terra-usd-ust-sinks-below-1-peg.html>). *CNBC*. Archived (<https://web.archive.org/web/20220511021259/https://www.cnbc.com/2022/05/10/bitcoin-btc-investors-panic-as-terra-usd-ust-sinks-below-1-peg.html>) from the original on 11 May 2022. Retrieved 11 May 2022.

51. Milmo, Dan (18 June 2022). "Bitcoin value slumps below \$20,000 in cryptocurrencies turmoil" (<https://www.theguardian.com/technology/2022/jun/18/bitcoin-value-falls-cryptocurrency-markets-turmoil>). *The Guardian*. Archived (<https://web.archive.org/web/20220618231120/https://www.theguardian.com/technology/2022/jun/18/bitcoin-value-falls-cryptocurrency-markets-turmoil>) from the original on 18 June 2022. Retrieved 19 June 2022.
52. Yaffe-Bellany, David (13 June 2022). "Celsius Network Leads Crypto Markets Into Another Free Fall" (<https://www.nytimes.com/2022/06/13/technology/bitcoin-ether-price.html>). *The New York Times*. Archived (<https://web.archive.org/web/20220614030021/https://www.nytimes.com/2022/06/13/technology/bitcoin-ether-price.html>) from the original on 14 June 2022. Retrieved 14 June 2022.
53. Behrendt, Philipp (2023). "Taxation of the New Age: New Guidance for the World of Digital Assets" (<https://heinonline.org/HOL/Page?handle=hein.journals/jtaxpp25&id=105&div=&collection=>). *Journal of Tax Practice & Procedure*. **25**: 47. Archived (<https://web.archive.org/web/20231121164911/https://heinonline.org/HOL/Page?handle=hein.journals/jtaxpp25&id=105&div=&collection=>) from the original on 21 November 2023. Retrieved 21 November 2023.
54. "As banks buy up bitcoins, who else are the 'Bitcoin whales'?" (<https://www.bbc.com/news/technology-68434579>). *BBC Home*. 1 March 2024. Retrieved 14 March 2024.
55. Schmitt, Will (12 January 2024). "Bitcoin trading volumes surge after debut of long-awaited US ETFs" (<https://www.ft.com/content/f30ece62-0f1c-492a-8ccd-63ec9730573c>). *Financial Times*. Archived (<https://web.archive.org/web/20240112025105/https://www.ft.com/content/f30ece62-0f1c-492a-8ccd-63ec9730573c>) from the original on 12 January 2024. Retrieved 12 January 2024.
56. Lang, Hannah (11 January 2024). "US bitcoin ETFs see \$4.6B in volume in first day of trading" (<https://www.reuters.com/technology/spot-bitcoin-etfs-start-trading-big-boost-crypto-industry-2024-01-11/>). *Reuters*. Retrieved 12 January 2024.
57. "Bitcoin storms above \$100,000 as Trump 2.0 fuels crypto euphoria" (<https://www.reuters.com/technology/bitcoin-tops-100000-optimism-over-trump-crypto-plans-2024-12-05/>). *Reuters*. 5 December 2024.
58. McGee, Suzanne (12 December 2024). "BlackRock recommends bitcoin portfolio weighting of up to 2% for interested investors" (<https://www.reuters.com/markets/us/blackrock-recommends-bitcoin-portfolio-weighting-up-2-interested-investors-2024-12-12/>). *Reuters*.
59. Alexander, Carol; Imeraj, Arben (2019). "Introducing the BITIX: The Bitcoin Fear Gauge" (<https://www.ssrn.com/abstract=3383734>). *SSRN Electronic Journal*. doi:10.2139/ssrn.3383734 (<https://doi.org/10.2139%2Fssrn.3383734>). ISSN 1556-5068 (<https://search.worldcat.org/issn/1556-5068>). "XBT satisfies the norm 'ISO 4217' by the International Organisation for Standardisation (ISO) as BTC goes against the name of Bhutan's currency. In general, transaction instruments that are not national currencies, like gold or silver, begin with an X. However, the symbol XBT is not officially recognised by ISO."
60. Romain Dillet (9 August 2013). "Bitcoin Ticker Available On Bloomberg Terminal For Employees" (<https://techcrunch.com/2013/08/09/bitcoin-ticker-available-on-bloomberg-terminal/>). *TechCrunch*. Archived (<https://web.archive.org/web/20141101232825/http://techcrunch.com/2013/08/09/bitcoin-ticker-available-on-bloomberg-terminal/>) from the original on 1 November 2014. Retrieved 2 November 2014.
61. Bustillos, Maria (2 April 2013). "The Bitcoin Boom" (<https://www.newyorker.com/tech/elements/the-bitcoin-boom>). *The New Yorker*. Archived (<https://web.archive.org/web/20140727185121/http://www.newyorker.com/tech/elements/the-bitcoin-boom>) from the original on 27 July 2014. Retrieved 22 December 2013.
62. Bitcoin (<https://www.oxfordlearnersdictionaries.com/definition/english/bitcointm?q=bitcoin>), *Oxford Advanced Learner's Dictionary*
63. bitcoin (<https://dictionary.cambridge.org/dictionary/english/bitcoin>) Archived (<https://web.archive.org/web/20220503092252/http://dictionary.cambridge.org/dictionary/english/bitcoin>) 3 May 2022 at the *Wayback Machine*, *Cambridge Advanced Learner's Dictionary*

64. Katie Pisa; Natasha Maguder (9 July 2014). "Bitcoin your way to a double espresso" (<http://edition.cnn.com/2014/06/18/business/bitcoin-your-way-to-a-double-espresso/>). *CNN*. Archived (<https://web.archive.org/web/20150618072429/http://edition.cnn.com/2014/06/18/business/bitcoin-your-way-to-a-double-espresso/>) from the original on 18 June 2015. Retrieved 23 April 2015.
65. Gervais, Arthur; Karame, Ghassan O.; Capkun, Vedran; Capkun, Srdjan (May 2014). "Is Bitcoin a Decentralized Currency?" (<https://ieeexplore.ieee.org/document/6824541>). *IEEE Security & Privacy*. **12** (3): 54–60. doi:10.1109/MSP.2014.49 (<https://doi.org/10.1109%2FMSPP.2014.49>). ISSN 1540-7993 (<https://search.worldcat.org/issn/1540-7993>). S2CID 13948781 (<https://api.semanticscholar.org/CorpusID:13948781>). Archived (<https://web.archive.org/web/20231119101600/https://ieeexplore.ieee.org/document/6824541/>) from the original on 19 November 2023. Retrieved 22 November 2023.
66. "The great chain of being sure about things" (<https://www.economist.com/briefing/2015/10/31/the-great-chain-of-being-sure-about-things>). *The Economist*. 31 October 2015. Archived (<https://web.archive.org/web/20231204154941/https://www.economist.com/briefing/2015/10/31/the-great-chain-of-being-sure-about-things>) from the original on 4 December 2023. Retrieved 22 November 2023.
67. "Blockchain Networks: Token Design and Management Overview" (<https://nvlpubs.nist.gov/nistpubs/ir/2021/NIST.IR.8301.pdf>) (PDF). National Institute of Standards Technology (NIST). p. 32. Archived (<https://web.archive.org/web/20221224003108/https://nvlpubs.nist.gov/nistpubs/ir/2021/NIST.IR.8301.pdf>) (PDF) from the original on 24 December 2022. Retrieved 29 December 2022.
68. Sparkes, Matthew (9 June 2014). "The coming digital anarchy" (<https://www.telegraph.co.uk/technology/news/10881213/The-coming-digital-anarchy.html>). *The Daily Telegraph*. Archived (<https://web.archive.org/web/20150123190900/http://www.telegraph.co.uk/technology/news/10881213/The-coming-digital-anarchy.html>) from the original on 23 January 2015. Retrieved 7 January 2015.
69. Kroll, Joshua A.; Davey, Ian C.; Felten, E. (11–12 June 2013). *The Economics of Bitcoin Mining, or Bitcoin in the Presence of Adversaries*. The Twelfth Workshop on the Economics of Information Security (WEIS 2013). Washington, DC. S2CID 2794725 (<https://api.semanticscholar.org/CorpusID:2794725>).
70. "Man Throws Away 7,500 Bitcoins, Now Worth \$7.5 Million" (<http://washington.cbslocal.com/2013/11/29/man-throws-away-7500-bitcoins-now-worth-7-5-million/>). *CBS DC*. 29 November 2013. Archived (<https://web.archive.org/web/20140115062630/http://washington.cbslocal.com/2013/11/29/man-throws-away-7500-bitcoins-now-worth-7-5-million/>) from the original on 15 January 2014. Retrieved 23 January 2014.
71. Krause, Elliott (5 July 2018). "A Fifth of All Bitcoin Is Missing. These Crypto Hunters Can Help" (<https://www.wsj.com/articles/a-fifth-of-all-bitcoin-is-missing-these-crypto-hunters-can-help-1530798731>). *The Wall Street Journal*. Archived (<https://web.archive.org/web/2018070910939/https://www.wsj.com/articles/a-fifth-of-all-bitcoin-is-missing-these-crypto-hunters-can-help-1530798731>) from the original on 9 July 2018. Retrieved 8 July 2018.
72. Jeffries, Adrienne (19 December 2013). "How to steal Bitcoin in three easy steps" (<https://www.theverge.com/2013/12/19/5183356/how-to-steal-bitcoin-in-three-easy-steps>). *The Verge*. Archived (<https://web.archive.org/web/20190727141228/https://www.theverge.com/2013/12/19/5183356/how-to-steal-bitcoin-in-three-easy-steps>) from the original on 27 July 2019. Retrieved 17 January 2014.
73. Harney, Alexandra; Stecklow, Steve (16 November 2017). "Twice burned – How Mt. Gox's bitcoin customers could lose again" (<https://www.reuters.com/investigates/special-report/bitcoin-gox/>). *Reuters*. Archived (<https://web.archive.org/web/20190829052101/https://www.reuters.com/investigates/special-report/bitcoin-gox/>) from the original on 29 August 2019. Retrieved 6 September 2018.

74. Mingxiao, Du; Xiaofeng, Ma; Zhe, Zhang; Xiangwei, Wang; Qijun, Chen (5–8 October 2017). *A review on consensus algorithm of blockchain* (<https://ieeexplore.ieee.org/document/8123011>). 2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC). Banff, AB, Canada: IEEE. pp. 2567–2572. doi:10.1109/SMC.2017.8123011 (<https://doi.org/10.1109/9%2FSMC.2017.8123011>). ISBN 978-1-5386-1645-1. Archived (<https://web.archive.org/web/20231124215821/http://ieeexplore.ieee.org/document/8123011>) from the original on 24 November 2023. Retrieved 29 November 2023.
75. "Bitcoin boom benefiting TSMC: report" (<http://www.taipeitimes.com/News/biz/archives/2014/01/04/2003580449>). *Taipei Times*. 4 January 2014. Archived (<https://web.archive.org/web/20230129102127/https://www.taipeitimes.com/News/biz/archives/2014/01/04/2003580449>) from the original on 29 January 2023. Retrieved 22 October 2021.
76. Ashlee, Vance (14 November 2013). "2014 Outlook: Bitcoin Mining Chips, a High-Tech Arms Race" (<https://web.archive.org/web/20131121225123/http://www.businessweek.com/articles/2013-11-14/2014-outlook-bitcoin-mining-chips-a-high-tech-arms-race>). *BusinessWeek*. Archived from the original (<http://www.businessweek.com/articles/2013-11-14/2014-outlook-bitcoin-mining-chips-a-high-tech-arms-race>) on 21 November 2013. Retrieved 24 November 2013.
77. King, Ritchie S.; Williams, Sam; Yanofsky, David (17 December 2013). "By reading this article, you're mining bitcoins" (<http://qz.com/154877/by-reading-this-page-you-are-mining-bitcoins/>). *Quartz*. Archived (<https://web.archive.org/web/20131217221429/http://qz.com/154877/by-reading-this-page-you-are-mining-bitcoins/>) from the original on 17 December 2013. Retrieved 17 December 2013.
78. Hampton, Nikolai (5 September 2016). "Understanding the blockchain hype: Why much of it is nothing more than snake oil and spin" (<http://www.computerworld.com.au/article/606253/understanding-blockchain-hype-why-much-it-nothing-more-than-snake-oil-spin/>). *Computerworld*. Archived (<https://web.archive.org/web/20160906171838/http://www.computerworld.com.au/article/606253/understanding-blockchain-hype-why-much-it-nothing-more-than-snake-oil-spin/>) from the original on 6 September 2016. Retrieved 5 September 2016.
79. Stoll, Christian; Klaaßen, Lena; Gellersdörfer, Ulrich; Neumüller, Alexander (June 2023). Climate Impacts of Bitcoin Mining in the U.S. (<https://www.jstor.org/stable/resrep51839>) (Report). Working Paper Series. MIT Center for Energy and Environmental Policy Research. Archived (<https://web.archive.org/web/20231118132421/https://www.jstor.org/stable/resrep51839>) from the original on 18 November 2023. Retrieved 24 November 2023.
80. Messina, Irene (31 August 2023). "Bitcoin electricity consumption: an improved assessment" (<https://www.jbs.cam.ac.uk/2023/bitcoin-electricity-consumption>). *Cambridge Judge Business School*. Archived (<https://web.archive.org/web/20230907181818/https://www.jbs.cam.ac.uk/2023/bitcoin-electricity-consumption/>) from the original on 7 September 2023. Retrieved 7 September 2023.
81. de Vries, Alex; Gellersdörfer, Ulrich; Klaaßen, Lena; Stoll, Christian (16 March 2022). "Revisiting Bitcoin's carbon footprint" (<https://doi.org/10.1016%2Fj.joule.2022.02.005>). *Joule*. **6** (3): 499. Bibcode:2022Joule...6..498D (<https://ui.adsabs.harvard.edu/abs/2022Joule...6..498D>). doi:10.1016/j.joule.2022.02.005 (<https://doi.org/10.1016%2Fj.joule.2022.02.005>). ISSN 2542-4351 (<https://search.worldcat.org/issn/2542-4351>). S2CID 247143939 (<https://api.semanticscholar.org/CorpusID:247143939>).
82. Huang, Jon; O'Neill, Claire; Tabuchi, Hiroko (3 September 2021). "Bitcoin Uses More Electricity Than Many Countries. How Is That Possible?" (<https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html>). *The New York Times*. ISSN 0362-4331 (<https://search.worldcat.org/issn/0362-4331>). Archived (<https://web.archive.org/web/20230217105559/https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html>) from the original on 17 February 2023. Retrieved 16 January 2022.

83. de Vries, Alex; Stoll, Christian (December 2021). "Bitcoin's growing e-waste problem" (<https://www.sciencedirect.com/science/article/pii/S0921344921005103>). *Resources, Conservation and Recycling*. **175**: 105901. Bibcode:2021RCR...17505901D (<https://ui.adsabs.harvard.edu/abs/2021RCR...17505901D>). doi:10.1016/j.resconrec.2021.105901 (<https://doi.org/10.1016%2Fj.resconrec.2021.105901>). ISSN 0921-3449 (<https://search.worldcat.org/isbn/0921-3449>). S2CID 240585651 (<https://api.semanticscholar.org/CorpusID:240585651>). Archived (<https://web.archive.org/web/20211123145025/https://www.sciencedirect.com/science/article/abs/pii/S0921344921005103>) from the original on 23 November 2021. Retrieved 24 November 2023.
84. Simonite, Tom (5 September 2013). "Mapping the Bitcoin Economy Could Reveal Users' Identities" (<https://www.technologyreview.com/2013/09/05/176558/mapping-the-bitcoin-economy-could-reveal-users-identities/>). *MIT Technology Review*. Archived (<https://web.archive.org/web/20200927062235/https://www.technologyreview.com/2013/09/05/176558/mapping-the-bitcoin-economy-could-reveal-users-identities/>) from the original on 27 September 2020. Retrieved 2 April 2014.
85. Lee, Timothy (21 August 2013). "Five surprising facts about Bitcoin" (<https://www.washingtonpost.com/news/the-switch/wp/2013/08/21/five-surprising-facts-about-bitcoin-2/>). *The Washington Post*. Archived (<https://web.archive.org/web/20220709135222/https://www.washingtonpost.com/news/the-switch/wp/2013/08/21/five-surprising-facts-about-bitcoin-2/>) from the original on 9 July 2022. Retrieved 21 November 2023.
86. McMillan, Robert (6 June 2013). "How Bitcoin lets you spy on careless companies" (<https://www.wired.com/2013/06/bitcoin-retail/>). *Wired UK*. Archived (<https://web.archive.org/web/20140209202222/http://www.wired.co.uk/news/archive/2013-06/06/bitcoin-retail>) from the original on 9 February 2014. Retrieved 3 April 2020.
87. Anderson, Ross; Shumailov, Ilia; Ahmed, Mansoor (24 November 2018). "Making Bitcoin Legal" (<https://www.research.ed.ac.uk/en/publications/making-bitcoin-legal>). In Matyáš, Vashek; Švenda, Petr; Stajano, Frank; Christianson, Bruce (eds.). *Security Protocols XXVI*. Lecture Notes in Computer Science. Vol. 11286. Springer. pp. 243–253. doi:10.1007/978-3-030-03251-7_29 (https://doi.org/10.1007%2F978-3-030-03251-7_29). ISBN 978-3-030-03250-0. Archived (<https://web.archive.org/web/20231124165246/https://www.research.ed.ac.uk/en/publications/making-bitcoin-legal>) from the original on 24 November 2023. Retrieved 24 November 2023.
88. Möser, Malte; Böhme, Rainer; Breuker, Dominic (2013). *An Inquiry into Money Laundering Tools in the Bitcoin Ecosystem* (<https://maltemoeser.de/paper/money-laundering.pdf>) (PDF). 2013 APWG eCrime Researchers Summit. IEEE. ISBN 978-1-4799-1158-5. Archived (<https://web.archive.org/web/20180626110754/https://maltemoeser.de/paper/money-laundering.pdf>) (PDF) from the original on 26 June 2018. Retrieved 19 June 2019.
89. Serwer, Adam; Liebelson, Dana (10 April 2013). "Bitcoin, Explained" (<https://www.motherjones.com/politics/2013/04/what-is-bitcoin-explained/>). *Mother Jones*. Archived (<https://web.archive.org/web/20140427022315/https://www.motherjones.com/politics/2013/04/what-is-bitcoin-explained/>) from the original on 27 April 2014. Retrieved 26 April 2014.
90. Vigna, Paul (17 January 2016). "Is Bitcoin Breaking Up?" (<https://www.wsj.com/articles/is-bitcoin-breaking-up-1453044493>). *The Wall Street Journal*. Archived (<https://web.archive.org/web/20160820144312/http://www.wsj.com/articles/is-bitcoin-breaking-up-1453044493>) from the original on 20 August 2016. Retrieved 8 November 2016.
91. Gervais, Arthur; Capkun, Srdjan; Karame, Ghassan O.; Gruber, Damian (8 December 2014). "On the privacy provisions of Bloom filters in lightweight bitcoin clients" (<https://doi.org/10.1145/2664243.2664267>). *Proceedings of the 30th Annual Computer Security Applications Conference*. ACSAC '14. New York, NY, USA: Association for Computing Machinery. pp. 326–335. doi:10.1145/2664243.2664267 (<https://doi.org/10.1145%2F2664243.2664267>). ISBN 978-1-4503-3005-3. S2CID 9161497 (<https://api.semanticscholar.org/CorpusID:9161497>). Archived (<https://web.archive.org/web/20240421113526/https://consent.cookiebot.com/uc.js>) from the original on 21 April 2024. Retrieved 22 November 2023.

92. Barhydt, Bill (4 June 2014). "3 reasons Wall Street can't stay away from bitcoin" (<https://www.cnbc.com/2014/06/04/3-reasons-wall-street-cant-stay-away-from-bitcoin.html>). CNBC. Archived (<https://web.archive.org/web/20231204140256/https://www.cnbc.com/2014/06/04/3-reasons-wall-street-cant-stay-away-from-bitcoin.html>) from the original on 4 December 2023. Retrieved 22 November 2023.
93. Roberts, Daniel (15 December 2017). "How to send bitcoin to a hardware wallet" (<https://finance.yahoo.com/news/send-bitcoin-hardware-wallet-140141385.html>). *Yahoo Finance*. Archived (<https://web.archive.org/web/20180217142235/https://finance.yahoo.com/news/send-bitcoin-hardware-wallet-140141385.html>) from the original on 17 February 2018. Retrieved 17 February 2018.
94. Mike Orcutt (19 May 2015). "Leaderless Bitcoin Struggles to Make Its Most Crucial Decision" (<https://www.technologyreview.com/s/537486/leaderless-bitcoin-struggles-to-make-its-most-crucial-decision/>). *MIT Technology Review*. Archived (<https://wayback.archive-it.org/all/20171018075515/https://www.technologyreview.com/s/537486/leaderless-bitcoin-struggles-to-make-its-most-crucial-decision/>) from the original on 18 October 2017. Retrieved 15 November 2016.
95. Orcutt, Mike (19 May 2015). "Leaderless Bitcoin Struggles to Make Its Most Crucial Decision" (<https://www.technologyreview.com/s/537486/leaderless-bitcoin-struggles-to-make-its-most-crucial-decision/>). *MIT Technology Review*. Archived (<https://wayback.archive-it.org/all/20171018075515/https://www.technologyreview.com/s/537486/leaderless-bitcoin-struggles-to-make-its-most-crucial-decision/>) from the original on 18 October 2017. Retrieved 22 June 2017.
96. Tschorsch, Florian; Scheuermann, Björn (2016). "Bitcoin and Beyond: A Technical Survey on Decentralized Digital Currencies". *IEEE Communications Surveys and Tutorials*. **18** (3): 2084–2123. doi:10.1109/comst.2016.2535718 (<https://doi.org/10.1109/comst.2016.2535718>). S2CID 5115101 (<https://api.semanticscholar.org/CorpusID:5115101>).
97. Wilhelm, Alex. "Popular Bitcoin Mining Pool Promises To Restrict Its Compute Power To Prevent Feared '51%' Fiasco" (<https://techcrunch.com/2014/07/16/popular-bitcoin-mining-pool-promises-to-restrict-its-compute-power-to-prevent-feared-51-fiasco/>). *TechCrunch*. Archived (<https://web.archive.org/web/20171205042008/https://techcrunch.com/2014/07/16/popular-bitcoin-mining-pool-promises-to-restrict-its-compute-power-to-prevent-feared-51-fiasco/>) from the original on 5 December 2017. Retrieved 25 January 2018.
98. European Central Bank (2012). *Virtual Currency Schemes* (<http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>) (PDF). European Central Bank. doi:10.2866/47380 (<https://doi.org/10.2866/47380>). ISBN 978-92-899-0862-7. OCLC 1044382974 (<https://search.worldcat.org/oclc/1044382974>). Archived (<https://web.archive.org/web/20121106053452/http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>) (PDF) from the original on 6 November 2012.
99. Dodd, Nigel (May 2018). "The Social Life of Bitcoin" (https://eprints.lse.ac.uk/69229/1/Dodd_The%20social%20life%20of%20Bitcoin_author_2017%20LSERO.pdf) (PDF). *Theory, Culture & Society*. **35** (3): 35–56. doi:10.1177/0263276417746464 (<https://doi.org/10.1177/0263276417746464>). ISSN 0263-2764 (<https://search.worldcat.org/issn/0263-2764>). S2CID 51914607 (<https://api.semanticscholar.org/CorpusID:51914607>). Archived (https://web.archive.org/web/20231122163925/https://eprints.lse.ac.uk/69229/1/Dodd_The%20social%20life%20of%20Bitcoin_author_2017%20LSERO.pdf) (PDF) from the original on 22 November 2023. Retrieved 22 November 2023.
100. "Bitcoin and other cryptocurrencies are useless" (<https://www.economist.com/leaders/2018/08/30/bitcoin-and-other-cryptocurrencies-are-useless>). *The Economist*. 30 August 2018. Archived (<https://web.archive.org/web/20180904040905/https://www.economist.com/leaders/2018/08/30/bitcoin-and-other-cryptocurrencies-are-useless>) from the original on 4 September 2018. Retrieved 4 September 2018.

101. Feuer, Alan (14 December 2013). "The Bitcoin Ideology" (<https://www.nytimes.com/2013/12/15/sunday-review/the-bitcoin-ideology.html>). *The New York Times*. Archived (<https://web.archive.org/web/20180701222302/https://www.nytimes.com/2013/12/15/sunday-review/the-bitcoin-ideology.html>) from the original on 1 July 2018. Retrieved 1 July 2018.
102. Mohamed, Theron (30 May 2023). "Nobel economist Paul Krugman slams crypto as mostly useless, after saying it's hugely overpriced and helps criminals" (<https://markets.businessinsider.com/news/currencies/paul-krugman-crypto-bitcoin-price-bubble-crime-cbdc-desantis-banks-2023-5>). *Business Insider*. Archived (<https://web.archive.org/web/20231123131322/http://markets.businessinsider.com/news/currencies/paul-krugman-crypto-bitcoin-price-bubble-crime-cbdc-desantis-banks-2023-5>) from the original on 23 November 2023. Retrieved 23 November 2023.
103. "Free Exchange. Money from nothing. Chronic deflation may keep Bitcoin from displacing its rivals" (<https://www.economist.com/news/finance-and-economics/21599053-chronic-deflation-may-keep-bitcoin-displacing-its-fiat-rivals-money>). *The Economist*. 15 March 2014. Archived (<https://web.archive.org/web/20140325085119/http://www.economist.com/news/finance-and-economics/21599053-chronic-deflation-may-keep-bitcoin-displacing-its-fiat-rivals-money>) from the original on 25 March 2014. Retrieved 25 March 2014.
104. "The magic of mining" (<https://www.economist.com/news/business/21638124-minting-digital-currency-has-become-big-ruthlessly-competitive-business-magic>). *The Economist*. 13 January 2015. Archived (<https://web.archive.org/web/20150112165531/http://www.economist.com/news/business/21638124-minting-digital-currency-has-become-big-ruthlessly-competitive-business-magic>) from the original on 12 January 2015. Retrieved 13 January 2015.
105. Shiller, Robert (1 March 2014). "In Search of a Stable Electronic Currency" (<https://www.nytimes.com/2014/03/02/business/in-search-of-a-stable-electronic-currency.html>). *The New York Times*. Archived (<https://web.archive.org/web/20141024120222/http://www.nytimes.com/2014/03/02/business/in-search-of-a-stable-electronic-currency.html>) from the original on 24 October 2014.
106. Velde, François (December 2013). "Bitcoin: A primer" (https://www.chicagofed.org/digital_assets/publications/chicago_fed_letter/2013/cfldecember2013_317.pdf) (PDF). *Chicago Fed letter*. Federal Reserve Bank of Chicago. p. 4. Archived (https://web.archive.org/web/20141026065254/http://www.chicagofed.org/digital_assets/publications/chicago_fed_letter/2013/cfldecember2013_317.pdf) (PDF) from the original on 26 October 2014. Retrieved 3 September 2016.
107. Wile, Rob (6 April 2014). "St. Louis Fed Economist: Bitcoin Could Be A Good Threat To Central Banks" (<http://www.businessinsider.com/interview-with-david-andolfatto-2014-4>). *Business Insider*. Archived (<https://web.archive.org/web/20150924095030/http://www.businessinsider.com/interview-with-david-andolfatto-2014-4>) from the original on 24 September 2015. Retrieved 16 April 2014.
108. Weindling, Jacob (18 September 2017). "China May Be Gearing Up to Ban Bitcoin" (<https://www.pastemagazine.com/politics/bitcoin/china-may-be-gearing-up-to-ban-bitcoin>). *Paste*. Archived (<https://web.archive.org/web/20231122163924/https://www.pastemagazine.com/politics/bitcoin/china-may-be-gearing-up-to-ban-bitcoin>) from the original on 22 November 2023. Retrieved 22 November 2023.
109. Lavin, Tim (8 August 2013). "The SEC Shows Why Bitcoin Is Doomed" (<http://www.bloombergview.com/articles/2013-08-08/did-the-sec-just-validate-bitcoin-no->). *Bloomberg News*. Archived (<https://web.archive.org/web/20140325214514/http://www.bloombergview.com/articles/2013-08-08/did-the-sec-just-validate-bitcoin-no->) from the original on 25 March 2014. Retrieved 20 October 2013.
110. Montag, Ali (9 July 2018). "Nobel-winning economist: Authorities will bring down 'hammer' on bitcoin" (<https://www.cnn.com/2018/07/09/nobel-prize-winning-economist-joseph-stiglitz-criticizes-bitcoin.html>). *CNN*. Archived (<https://web.archive.org/web/20180711200915/http://www.cnn.com/2018/07/09/nobel-prize-winning-economist-joseph-stiglitz-criticizes-bitcoin.html>) from the original on 11 July 2018. Retrieved 11 July 2018.

111. "Regulation of Cryptocurrency Around the World: November 2021 Update" (<https://tile.loc.gov/storage-services/service/ll/llglrd/2021687419/2021687419.pdf>) (PDF). United States Library of Congress. Archived (<https://web.archive.org/web/20211224043203/https://tile.loc.gov/storage-services/service/ll/llglrd/2021687419/2021687419.pdf>) (PDF) from the original on 24 December 2021. Retrieved 28 December 2022.
112. Murphy, Hannah (8 June 2018). "Who really owns bitcoin now?" (<https://www.ft.com/content/29259448-69b3-11e8-b6eb-4acfcfb08c11>). *Financial Times*. Archived (<https://web.archive.org/web/20180610051316/https://www.ft.com/content/29259448-69b3-11e8-b6eb-4acfcfb08c11>) from the original on 10 June 2018. Retrieved 10 June 2018.
113. "Monetarists Anonymous" (<https://www.economist.com/finance-and-economics/2012/09/29/monetarists-anonymous>). *The Economist*. 29 September 2012. ISSN 0013-0613 (<https://search.worldcat.org/issn/0013-0613>). Archived (<https://web.archive.org/web/20220901043303/https://www.economist.com/finance-and-economics/2012/09/29/monetarists-anonymous>) from the original on 1 September 2022. Retrieved 22 November 2023.
114. Ball, James (22 March 2013). "Silk Road: the online drug marketplace that officials seem powerless to stop" (<https://www.theguardian.com/world/2013/mar/22/silk-road-online-drug-marketplace>). *The Guardian*. ISSN 0261-3077 (<https://search.worldcat.org/issn/0261-3077>). Archived (<https://web.archive.org/web/20131012012106/http://www.theguardian.com/world/2013/mar/22/silk-road-online-drug-marketplace>) from the original on 12 October 2013. Retrieved 22 November 2023.
115. Katz, Lily (12 July 2017). "Bitcoin Acceptance Among Retailers Is Low and Getting Lower" (<https://www.bloomberg.com/news/articles/2017-07-12/bitcoin-acceptance-among-retailers-is-low-and-getting-lower>). *Bloomberg News*. Archived (<https://web.archive.org/web/20180125204553/https://www.bloomberg.com/news/articles/2017-07-12/bitcoin-acceptance-among-retailers-is-low-and-getting-lower>) from the original on 25 January 2018. Retrieved 25 January 2018.
116. Kharif, Olga (1 August 2018). "Bitcoin's Use in Commerce Keeps Falling Even as Volatility Eases" (<https://www.bloomberg.com/news/articles/2018-08-01/bitcoin-s-use-in-commerce-keeps-falling-even-as-volatility-eases>). *Bloomberg News*. Archived (<https://web.archive.org/web/20180802073219/https://www.bloomberg.com/news/articles/2018-08-01/bitcoin-s-use-in-commerce-keeps-falling-even-as-volatility-eases>) from the original on 2 August 2018. Retrieved 2 August 2018.
117. Chan, Bernice (16 January 2015). "Bitcoin transactions cut the cost of international money transfers" (<https://www.scmp.com/lifestyle/technology/article/1679904/bitcoin-transactions-cut-cost-international-money-transfers>). *South China Morning Post*. Archived (<https://web.archive.org/web/20190531060301/https://www.scmp.com/lifestyle/technology/article/1679904/bitcoin-transactions-cut-cost-international-money-transfers>) from the original on 31 May 2019. Retrieved 31 May 2019.
118. Sheidlower, Noah (11 April 2022). "Bitcoin by bitcoin, restaurants start to accept cryptocurrencies" (<https://www.nbcnews.com/business/bitcoin-bitcoin-restaurants-start-accept-cryptocurrencies-rcna21211>). *NBC News*. Retrieved 7 October 2024.
119. "Majority of Salvadorans do not want bitcoin, poll shows" (<https://www.reuters.com/technology/majority-salvadorans-do-not-want-bitcoin-poll-shows-2021-09-02/>). *Reuters*. 2 September 2021. Archived (<https://web.archive.org/web/20211130154620/https://www.reuters.com/technology/majority-salvadorans-do-not-want-bitcoin-poll-shows-2021-09-02/>) from the original on 30 November 2021. Retrieved 30 November 2021.
120. "IMF urges El Salvador to remove Bitcoin as legal tender" (<https://www.bbc.co.uk/news/world-latin-america-60135552>). *BBC News*. 26 January 2022. Archived (<https://web.archive.org/web/20220126154241/https://www.bbc.co.uk/news/world-latin-america-60135552>) from the original on 26 January 2022. Retrieved 26 January 2022.
121. Alvarez, Fernando; Argente, David; Van Patten, Diana (2022). *Are Cryptocurrencies Currencies? Bitcoin as Legal Tender in El Salvador* (Report). Cambridge, MA: National Bureau of Economic Research. doi:10.3386/w29968 (<https://doi.org/10.3386/w29968>).

122. "Bitcoin Declared Legal Currency in Central African Republic" (<https://www.bloomberg.com/news/articles/2022-04-28/bitcoin-is-declared-a-legal-currency-in-central-african-republic-l2isppnb>). *Bloomberg*. 28 April 2022. Archived (<https://web.archive.org/web/20220428141222/https://www.bloomberg.com/news/articles/2022-04-28/bitcoin-is-declared-a-legal-currency-in-central-african-republic-l2isppnb>) from the original on 28 April 2022. Retrieved 28 April 2022.
123. "Frequently Asked Questions on Central African Republic" (<https://www.imf.org/en/Countries/CAF/central-african-republic-qandas>). *International Monetary Fund*. Archived (<https://web.archive.org/web/20230811002905/https://www.imf.org/en/Countries/CAF/central-african-republic-qandas>) from the original on 11 August 2023. Retrieved 11 August 2023.
124. Rasool, Mohammed (3 November 2020). "Iran Is Pivoting to Bitcoin" (<https://www.vice.com/en/article/qjppx3/iran-bitcoin-us-sanctions>). *Vice*. Archived (<https://web.archive.org/web/20201103235640/https://www.vice.com/en/article/qjppx3/iran-bitcoin-us-sanctions>) from the original on 3 November 2020. Retrieved 10 November 2020.
125. "Iran: New Crypto Law Requires Selling Bitcoin Directly to Central Bank to Fund Imports" (<https://english.aawsat.com/home/article/2596686/iran-new-crypto-law-requires-selling-bitcoin-directly-central-bank-fund-imports>). *Asharq Al-Awsat*. 31 October 2020. Archived (<https://web.archive.org/web/20201031235032/https://english.aawsat.com/home/article/2596686/iran-new-crypto-law-requires-selling-bitcoin-directly-central-bank-fund-imports>) from the original on 31 October 2020. Retrieved 31 October 2020.
126. Kohler, Judith (21 September 2022). "Colorado accepts cryptocurrency to pay taxes, moving the state 'tech forward'" (<https://www.denverpost.com/2022/09/21/colorado-accepts-cryptocurrency-taxes/>). *The Denver Post*. Archived (<https://web.archive.org/web/20221229090417/https://www.denverpost.com/2022/09/21/colorado-accepts-cryptocurrency-taxes/>) from the original on 29 December 2022. Retrieved 29 December 2022.
127. "'Crypto Valley' canton to accept Bitcoin for tax payments" (<https://www.swissinfo.ch/eng/business/-crypto-valley--canton-to-accept-bitcoin-for-tax-payments/46010364>). *SWI swissinfo*. 3 September 2020. Archived (<https://web.archive.org/web/20231122163924/https://www.swissinfo.ch/eng/business/-crypto-valley--canton-to-accept-bitcoin-for-tax-payments/46010364>) from the original on 22 November 2023. Retrieved 22 November 2023.
128. Huang, Vicky Ge (15 October 2023). "Why the U.S. Government Has \$5 Billion in Bitcoin" (<https://www.wsj.com/finance/currencies/federal-government-bitcoin-5-billion-78ce0938>). *The Wall Street Journal*. Archived (<https://web.archive.org/web/20240220023509/https://www.wsj.com/finance/currencies/federal-government-bitcoin-5-billion-78ce0938>) from the original on 20 February 2024. Retrieved 20 February 2024.
129. Castillo, Michael del (16 June 2023). "U.S. Government Owns Way More Bitcoin Than Any Other Country—So Why Aren't They Selling It?" (<https://www.forbes.com/sites/michaeldelcastillo/2023/06/16/us-government-owns-way-more-bitcoin-than-any-other-countryso-why-arent-they-selling-it>). *Forbes*. Archived (<https://web.archive.org/web/20240221155659/https://www.forbes.com/sites/michaeldelcastillo/2023/06/16/us-government-owns-way-more-bitcoin-than-any-other-countryso-why-arent-they-selling-it>) from the original on 21 February 2024. Retrieved 21 February 2024.
130. "Jersey approve Bitcoin fund launch on island" (<https://www.bbc.com/news/world-europe-jersey-28247796>). *BBC News*. 10 July 2014. Archived (<https://web.archive.org/web/20140710211917/http://www.bbc.com/news/world-europe-jersey-28247796>) from the original on 10 July 2014. Retrieved 10 July 2014.
131. "Chicago Mercantile Exchange jumps into bitcoin futures" (<https://www.cbsnews.com/news/chicago-mercantile-exchange-jumps-into-bitcoin-futures/>). *CBS News*. 18 December 2017. Archived (<https://web.archive.org/web/20190531054602/https://www.cbsnews.com/news/chicago-mercantile-exchange-jumps-into-bitcoin-futures/>) from the original on 31 May 2019. Retrieved 31 May 2019.
132. "Gold or Bitcoin? Store-of-value debate rages as Bitcoin grows" (<https://www.bloomberg.com/professional/insights/trading/gold-or-bitcoin-store-of-value-debate-rages-as-bitcoin-grows/>). *Bloomberg Professional Services*. 25 October 2021. Retrieved 2 October 2024.

133. "Goldman Sachs says bitcoin will compete with gold as "store of value" " (<https://www.reuters.com/business/finance/goldman-sachs-says-bitcoin-will-compete-with-gold-store-value-2022-01-05/>). *Reuters*. 5 January 2022.
134. Lee, Timothy B. "The \$11 million in bitcoins the Winklevoss brothers bought is now worth \$32 million" (<https://www.washingtonpost.com/news/the-switch/wp/2013/11/09/the-11-million-in-bitcoins-the-winklevoss-brothers-bought-is-now-worth-32-million/>). *The Washington Post*. Archived (<https://web.archive.org/web/20170706111658/https://www.washingtonpost.com/news/the-switch/wp/2013/11/09/the-11-million-in-bitcoins-the-winklevoss-brothers-bought-is-now-worth-32-million/>) from the original on 6 July 2017. Retrieved 11 August 2017.
135. Maidenberg, Micah; Driebusch, Corrie; Jin, Berber (17 August 2023). "A Rare Look Into the Finances of Elon Musk's Secretive SpaceX" (<https://www.wsj.com/tech/behind-the-curtain-of-elon-musks-secretive-spacex-revenue-growth-and-rising-costs-2c828e2b>). *The Wall Street Journal*. Archived (<https://archive.today/20230817224420/https://www.wsj.com/tech/behind-the-curtain-of-elon-musks-secretive-spacex-revenue-growth-and-rising-costs-2c828e2b>) from the original on 17 August 2023. Retrieved 19 November 2023.
136. Ostroff, Caitlin; Elliott, Rebecca (8 February 2021). "Tesla Buys \$1.5 Billion in Bitcoin" (<https://www.wsj.com/articles/tesla-buys-1-5-billion-in-bitcoin-11612791688>). *The Wall Street Journal*. ISSN 0099-9660 (<https://search.worldcat.org/issn/0099-9660>). Archived (<https://web.archive.org/web/20240106160013/https://www.wsj.com/articles/tesla-buys-1-5-billion-in-bitcoin-11612791688>) from the original on 6 January 2024. Retrieved 22 November 2023.
137. Vigna, Paul (20 December 2021). "Bitcoin's 'One Percent' Controls Lion's Share of the Cryptocurrency's Wealth" (<https://www.wsj.com/articles/bitcoins-one-percent-controls-lions-share-of-the-cryptocurrencys-wealth-11639996204>). *Wall Street Journal*. ISSN 0099-9660 (<https://search.worldcat.org/issn/0099-9660>). Archived (<https://web.archive.org/web/20211222180909/https://www.wsj.com/articles/bitcoins-one-percent-controls-lions-share-of-the-cryptocurrencys-wealth-11639996204>) from the original on 22 December 2021. Retrieved 22 December 2021.
138. Cota, Isabella (2 September 2023). "Two years of bitcoin in Bukele's El Salvador: An opaque experiment with a little-used currency" (<https://english.elpais.com/international/2023-09-02/two-years-of-bitcoin-in-bukeles-el-salvador-an-opaque-experiment-with-a-little-used-currency.html>). *El País*. Archived (<https://web.archive.org/web/20231124082557/https://english.elpais.com/international/2023-09-02/two-years-of-bitcoin-in-bukeles-el-salvador-an-opaque-experiment-with-a-little-used-currency.html>) from the original on 24 November 2023. Retrieved 24 November 2023.
139. Gandal, Neil; Hamrick, J.T.; Moore, Tyler; Oberman, Tali (May 2018). "Price manipulation in the Bitcoin ecosystem" (<https://doi.org/10.1016%2Fj.jmoneco.2017.12.004>). *Journal of Monetary Economics*. **95**: 86–96. doi:10.1016/j.jmoneco.2017.12.004 (<https://doi.org/10.1016%2Fj.jmoneco.2017.12.004>). S2CID 26358036 (<https://api.semanticscholar.org/CorpusID:26358036>).
140. Griffin, John M.; Shams, Amin (August 2020). "Is Bitcoin Really Untethered?" (<https://doi.org/10.1111%2Fjofi.12903>). *The Journal of Finance*. **75** (4): 1913–1964. doi:10.1111/jofi.12903 (<https://doi.org/10.1111%2Fjofi.12903>). ISSN 0022-1082 (<https://search.worldcat.org/issn/0022-1082>). S2CID 229576274 (<https://api.semanticscholar.org/CorpusID:229576274>).
141. Popper, Nathaniel (13 June 2018). "Bitcoin's Price Was Artificially Inflated Last Year, Researchers Say" (<https://www.nytimes.com/2018/06/13/technology/bitcoin-price-manipulation.html>). *The New York Times*. Archived (<https://web.archive.org/web/20180613100732/https://www.nytimes.com/2018/06/13/technology/bitcoin-price-manipulation.html>) from the original on 13 June 2018. Retrieved 13 June 2018.

142. Costelloe, Kevin (29 November 2017). "Bitcoin 'Ought to Be Outlawed,' Nobel Prize Winner Stiglitz Says" (<https://www.bloomberg.com/news/articles/2017-11-29/bitcoin-ought-to-be-outlawed-nobel-prize-winner-stiglitz-says-jal10hxd>). *Bloomberg News*. Archived (<https://web.archive.org/web/20180612224313/https://www.bloomberg.com/news/articles/2017-11-29/bitcoin-ought-to-be-outlawed-nobel-prize-winner-stiglitz-says-jal10hxd>) from the original on 12 June 2018. Retrieved 5 June 2018. "It doesn't serve any socially useful function."
143. Authers, John (9 June 2021). "Don't Call Bitcoin a Bubble. It's an Epidemic" (<https://www.bloomberg.com/opinion/articles/2021-06-09/don-t-call-bitcoin-a-bubble-it-s-an-epidemic>). *Bloomberg.com*. Archived (<https://web.archive.org/web/20210610021335/https://www.bloomberg.com/opinion/articles/2021-06-09/don-t-call-bitcoin-a-bubble-it-s-an-epidemic>) from the original on 10 June 2021.
144. Tirole, Jean (1 February 2024). "Cryptocurrencies: an economist's view" (<https://www.tse-fr.eu/cryptocurrencies-economists-view>). *La Jaune et la Rouge*. Vol. February 2024, no. 792. Retrieved 15 November 2024.
145. "Bitcoin breaks \$100,000 barrier amid post-election cryptocurrency surge" (<https://www.washingtonpost.com/business/2024/12/04/bitcoin-price-100k-crypto-trump/>). *Washington Post*. Retrieved 5 December 2024. "People use bitcoin as a speculative asset. It's like gold, it's just like gold, only it's virtual, it's digital. People are not using it as a form of payment or a store of value," he said. "It's highly volatile. It's not a competitor for the dollar; it's really a competitor for gold." "
146. Klein, Tony; Pham Thu, Hien; Walther, Thomas (October 2018). "Bitcoin is not the New Gold – A comparison of volatility, correlation, and portfolio performance" (https://pureadmin.qub.ac.uk/ws/files/155247201/crypto_V2.pdf) (PDF). *International Review of Financial Analysis*. **59**: 105–116. doi:10.1016/j.irfa.2018.07.010 (<https://doi.org/10.1016%2Fj.irfa.2018.07.010>). S2CID 158400153 (<https://api.semanticscholar.org/CorpusID:158400153>). Archived (https://web.archive.org/web/20231125164037/https://pureadmin.qub.ac.uk/ws/files/155247201/crypto_V2.pdf) (PDF) from the original on 25 November 2023. Retrieved 24 November 2023.
147. Mazur, Mieszko (31 March 2022). "Misperceptions of Bitcoin Volatility". *The Journal of Alternative Investments*. **24** (4): 33–44. doi:10.3905/jai.2022.1.153 (<https://doi.org/10.3905%2Fjai.2022.1.153>). ISSN 1520-3255 (<https://search.worldcat.org/issn/1520-3255>). S2CID 247843794 (<https://api.semanticscholar.org/CorpusID:247843794>).
148. Montag, Ali (26 August 2018). "'HODL,' 'whale' and 5 other cryptocurrency slang terms explained" (<https://www.cnbc.com/2018/01/23/what-hodl-whale-and-other-cryptocurrency-slang-terms-mean.html>). *CNBC*. Archived (<https://web.archive.org/web/20220112091630/http://www.cnbc.com/2018/01/23/what-hodl-whale-and-other-cryptocurrency-slang-terms-mean.html>) from the original on 12 January 2022. Retrieved 16 March 2021.
149. Hajric, Vildana (19 November 2020). "All the Bitcoin Lingo You Need to Know as Crypto Heats Up" (<https://www.bloomberg.com/news/articles/2020-11-19/what-the-heck-is-hodl-bitcoin-lingo-for-crypto-noobs-quicktake>). *Bloomberg*. Archived (<https://web.archive.org/web/20201129234847/https://www.bloomberg.com/news/articles/2020-11-19/what-the-heck-is-hodl-bitcoin-lingo-for-crypto-noobs-quicktake>) from the original on 29 November 2020. Retrieved 1 December 2020.
150. Clinch, Matt (10 March 2014). "Roubini launches stinging attack on bitcoin" (<https://www.cnbc.com/2014/03/10/nches-stinging-attack-on-bitcoin.html>). *CNBC*. Archived (<https://web.archive.org/web/20220709232801/https://www.cnbc.com/2014/03/10/nches-stinging-attack-on-bitcoin.html>) from the original on 9 July 2022. Retrieved 22 November 2023.
151. "This Billionaire Just Called Bitcoin a 'Pyramid Scheme'" (<https://fortune.com/2017/07/27/howard-marks-bitcoin-pyramid-scheme>). *Fortune*. Archived (<https://web.archive.org/web/20170924045918/http://fortune.com/2017/07/27/howard-marks-bitcoin-pyramid-scheme/>) from the original on 24 September 2017. Retrieved 23 September 2017.

152. Ott Ummelas; Milda Seputyte (31 January 2014). "Bitcoin 'Ponzi' Concern Sparks Warning From Estonia Bank" (<https://www.bloomberg.com/news/2014-01-30/bitcoin-ponzi-scheme-worry-sparks-estonia-central-bank-caution.html>). *Bloomberg News*. Archived (<https://web.archive.org/web/20140329214501/http://www.bloomberg.com/news/2014-01-30/bitcoin-ponzi-scheme-worry-sparks-estonia-central-bank-caution.html>) from the original on 29 March 2014. Retrieved 1 April 2014.
153. Posner, Eric (11 April 2013). "Fool's Gold" (<https://slate.com/news-and-politics/2013/04/bitcoin-is-a-ponzi-scheme-the-internet-currency-will-collapse.html>). *Slate*. ISSN 1091-2339 (<http://search.worldcat.org/issn/1091-2339>). Archived (<https://web.archive.org/web/20220708202651/https://slate.com/news-and-politics/2013/04/bitcoin-is-a-ponzi-scheme-the-internet-currency-will-collapse.html>) from the original on 8 July 2022. Retrieved 22 November 2023.
154. Davradakis, Emmanouil; Santos, Ricardo (2019). *Blockchain, FinTechs and their relevance for international financial institutions* (<https://data.europa.eu/doi/10.2867/11329>). European Investment Bank. doi:10.2867/11329 (<https://doi.org/10.2867%2F11329>). ISBN 978-92-861-4184-3. Archived (<https://web.archive.org/web/20240421113801/https://op.europa.eu/en/publication-detail/-/publication/ae472145-237a-11e9-8d04-01aa75ed71a1/language-en>) from the original on 21 April 2024. Retrieved 24 November 2023.

Further reading

- Nakamoto, Satoshi (31 October 2008). "Bitcoin: A Peer-to-Peer Electronic Cash System" (<https://web.archive.org/web/20140320135003/https://bitcoin.org/bitcoin.pdf>) (PDF). bitcoin.org. Archived from the original (<https://bitcoin.org/bitcoin.pdf>) (PDF) on 20 March 2014. Retrieved 28 April 2014.

Retrieved from "<https://en.wikipedia.org/w/index.php?title=Bitcoin&oldid=1267557093>"