

# Cryptocurrencies

The latest fad or the next frontier?

## Key Takeaways

- ▶ Cryptocurrencies are risky, volatile and largely unregulated.
- ▶ At this time, they are purely speculative but may become more desirable in the future as a means of portfolio diversification.
- ▶ Blockchain—the technology engine that drives cryptocurrencies—has other potential applications and could be an attractive long-term investment on its own.
- ▶ The universe of cryptocurrency investment vehicles is small but could expand as consumers and Wall Street firms build momentum toward mainstream acceptance.
- ▶ Investors should work with their financial advisors to determine whether cryptocurrencies make sense as a portfolio holding.

Cryptocurrencies have generated a tsunami of public excitement—and minted a new group of multimillionaires—seemingly overnight. They collectively returned 707% in 2017<sup>1</sup>, dwarfing the performance of traditional assets like stocks, bonds and real estate (see chart to the right). The most popular, Bitcoin, returned an astounding 1,278%.

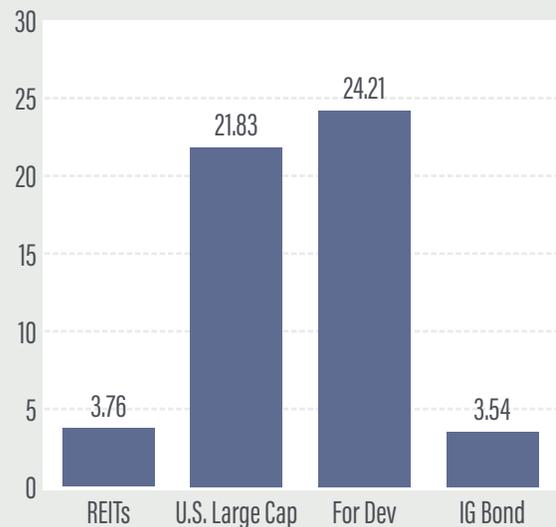
On the other hand, they are extremely risky and thus far have been the province of speculators rather than disciplined long-term investors. Critics have likened them to Ponzi schemes, multi-level marketing pyramids and history's most notorious economic bubbles.

In terms of cryptocurrencies, generally, I can say almost with certainty that they will come to a bad ending.

— Warren Buffet, Remarks on CNBC's Squawk Box, January 10, 2018.

### Cryptocurrencies outperformed traditional assets by 3,000%+ in 2017:

#### 2017 returns



Source: *State of Blockchain 2018*, CoinDesk.

Source: Barclays, Bloomberg, Dow Jones, FactSet, MSCI Russell, Standard & Poor's. See disclosures for representative indices. The indices are unmanaged, are not available for investment and do not incur expenses.

Ultimately, of course, the choice of whether to invest in cryptocurrencies is up to you. Before deciding, you will need to understand what they are and how they work.

## Cryptocurrency Basics

Cryptocurrencies are digital currencies available online or through a smartphone app. The "crypto" part of their name comes from the fact that cryptography—the use of secret coding to make messages secure from tampering—is a vital element of their design.

The first cryptocurrency, Bitcoin, was invented in 2009 by an individual or group known by the pseudonym Satoshi Nakamoto. Nakamoto also invented the technology underlying Bitcoin, a potentially revolutionary system called blockchain.

Several aspects of cryptocurrencies differentiate them from traditional currencies such as the dollar:

- ▶ Cryptocurrencies are not regulated by governments or central authorities like the Federal Reserve.
- ▶ They do not exist in tangible form like paper or coins.
- ▶ Their exchange is strictly peer-to-peer—directly between parties—and does not require the involvement of intermediaries such as banks.
- ▶ Their supply typically is limited to a predetermined maximum.
- ▶ Buyers and sellers use pseudonyms and usually cannot be identified.
- ▶ Not all cryptocurrencies are intended for use as money. Some give their owners the right to use a product or service or to obtain certain assets in the future.

<sup>1</sup> Source: *State of Blockchain 2018*, CoinDesk. Past performance is no guarantee of future results.

## How Are Cryptocurrencies Produced?

Unlike government currencies, whose issuance is open-ended and can be increased or reduced at will, most cryptocurrencies are issued in finite amounts. Bitcoin, for instance, is capped at a total of 21 million coins. This intentional scarcity may help feed market urgency.

There are a handful of ways to obtain cryptocurrencies. The most common are:

- ▶ Buying on an electronic exchange
- ▶ Mining
- ▶ Receiving as part of an initial coin offering

**Buying cryptocurrencies** is a straightforward process, much like having an online brokerage account. You can open an account with any crypto exchange and fund it with dollars or another hard currency. Note that regulation of exchanges is scant at best, so your investment is at risk not only from market fluctuation, but also from an absence of legal protections against shady business practices.

**Mining** is the process of creating blocks in a blockchain. Successful miners are issued cryptocurrencies as compensation for the considerable work involved in creating blocks. (See paragraph 4 on page 3 for more information.)

**Initial coin offerings (ICOs)** are a form of raising capital for new cryptocurrencies or other ventures. While ICOs resemble equity initial public offerings, they are closer to crowdsourcing in that investors provide funding for proposed projects rather than purchase ownership shares. Investors can receive cryptocurrencies in exchange for their funding and do not participate in any investment upside. Although ICOs have raised a lot of money—\$5.7 billion in 2017, nearly twice as much as crypto-related venture capital<sup>2</sup>—they are not legally sanctioned and have drawn unfavorable attention from state and federal authorities.

## Bitcoin Dominates the Market

As of late May 2018, there were nearly 1,560 cryptocurrencies whose aggregate market value was a robust \$388.8 billion<sup>3</sup>. The top 22 each had a market value of at least \$1 billion and collectively accounted for 87% of the total market

Towering above this crowd was Bitcoin, whose \$125.0 billion not only more than doubled the value of the number two player, Ethereum, but also represented approximately 38% of the market as a whole.

### Ancestral Origins

Cryptocurrencies have been around for only a few years, but they did not come out of the blue. They are actually the latest in a series of alternative currencies that businesses have used to reward customers stretching back to at least the eighteenth century.

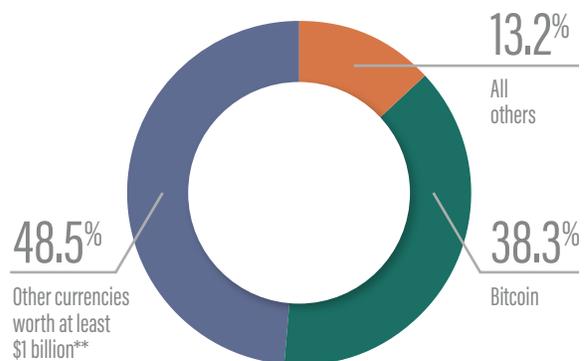
The first of these is believed to be the copper tokens that American retailers gave to customers with purchases in the late 1700s—the grandfather of what is now known as premium marketing. The tokens gave way to trading stamps in the 1890s, and coupons originated in the early 1900s and remain popular today.

Most recently, there are the ubiquitous loyalty or affinity programs. Think frequent-flyer miles, hotel points, credit card points and store cards that can be redeemed for value in the form of thousands of products and services.



### The cryptocurrency market is dominated by Bitcoin:

Total market value = \$388.8 billion\*



Source: CoinMarketCap.com

<sup>2</sup> Source: CoinDesk, *State of Blockchain 2018*.

<sup>3</sup> Data as of May 27, 2018. Source: CoinMarketCap.com.

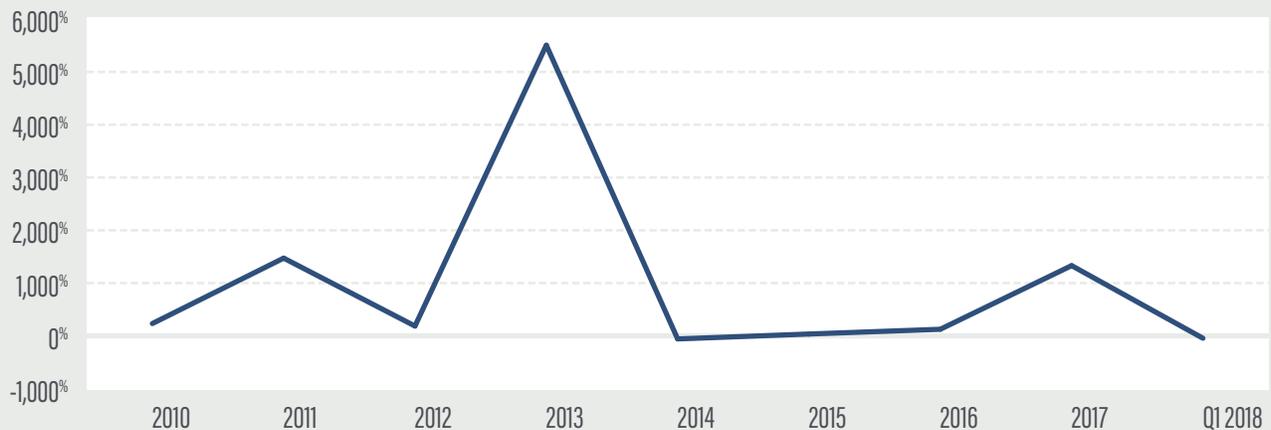
\* As of May 27, 2018.

\*\* Includes (in descending order) Ethereum, Ripple, Bitcoin Cash, EOS, Litecoin, Stellar, Cardano, TRON, IOTA, NEO, Monero, Dash, Tether, NEM, VeChain, Ethereum Classic, Binance Coin, Qtum, Bytecoin, Omise GO and Zcash.

Bitcoin's remarkable rise, size and periodic demise make it synonymous with the cryptocurrency market among the general public. Valued at just a few pennies when it started trading in 2010, Bitcoin soared in 2017 alone from \$968<sup>4</sup> to an all-time high of \$19,343 on December 16<sup>5</sup>—and promptly sank 35% to close the year at \$12,629. As of late May 2018, it has lost another 43% and trades at about \$7,200. Bitcoin's annual returns paint a similarly up-and-down picture<sup>6</sup> (see chart below).

This speculation-driven volatility is a defining trait of Bitcoin and, by extension, cryptocurrencies generally. It can help produce big profits for informed traders with high risk tolerances (and strong stomachs), and big losses for less sophisticated investors who want to chase the potential returns that everyone is after.

### Bitcoin's annual returns are the picture of volatility:



Source: The Case for Crypto In An Institutional Portfolio, Bitwise Asset Management, May 2018.

## Blockchain Makes It All Possible

Blockchain is the technology engine that drives cryptocurrencies and their distinctive characteristics. Essentially, it is a decentralized database ledger that enables cryptocurrency buyers and sellers to interact directly, records all transactions and verifies their accuracy.

While the spirit of openness associated with blockchain and cryptocurrencies suggests a level playing field for participants, reality is quite different. Firsthand participation is limited to individuals and groups who can afford the high price of admission: the state-of-the-art computer hardware and processing power required for the intense number-crunching that makes the system function. It is estimated that the computing for Bitcoin alone uses enough electricity to power millions of households.

The blockchain process is complex and can be hard to understand. Here is a simplified explanation of the steps involved, as illustrated by blockchain's use in a Bitcoin transaction:

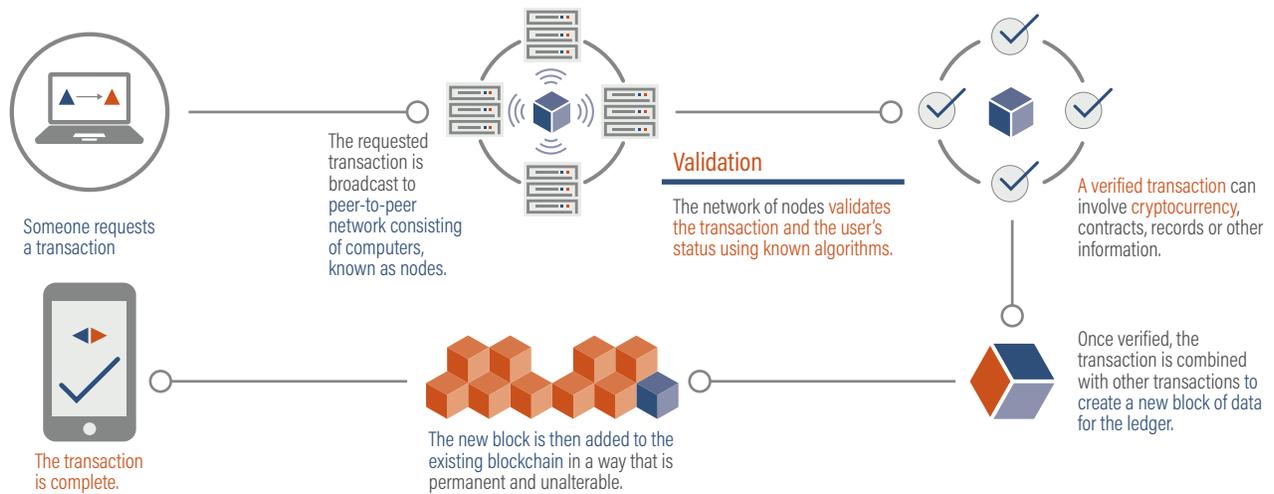
1. Buyers and sellers must have Bitcoin open-source software that enables them to communicate directly using their personal Bitcoin addresses. Each address is a cryptographic "public key" code of numbers and letters that can be unlocked with a "private key" code that is known only to the address holder and protected by a means of authentication such as a password.
2. The seller initiates a transaction by notifying the network of Bitcoin-enabled computers that a specific value of Bitcoin will be transferred from the seller's address to the buyer's address. The seller confirms the validity of the transaction by "signing" it with his private key.
3. A transaction message, which automatically goes to all computers on the Bitcoin network, notifies the network that the buyer—the owner of the receiving address, who signs for receipt with his private key—owns the Bitcoin transferred by the seller. The transaction is now irreversible, but still requires verification by the network.
4. This is where the "block" in blockchain is created. The network verifies a transaction by grouping it in a block of the latest transactions using a cryptographic process that confirms the block's validity, timestamps each transaction and links the block to the previous block in the blockchain. Network members known as "miners" compete to generate valid blocks. The block recognized soonest by the network permanently joins the blockchain and its miner is rewarded with newly issued Bitcoin.
5. The transaction is complete.

<sup>4</sup> Closing Bitcoin price on 12/31/16.

<sup>5</sup> Source: CoinDesk.com. Past performance is no guarantee of future results.

<sup>6</sup> The Bitcoin return shown for 2017 modestly differs from the return cited on page 2 due to different sourcing and is intended as a representative illustration of Bitcoin's historical performance when combined with the returns shown for 2010–2016.

## How blockchain works :



Source: "Making sense of bitcoin, cryptocurrency and blockchain," PwC.

## Blockchain Could Have a Bright Future—Regardless of Cryptocurrencies

While Bitcoin cannot exist without blockchain, blockchain can easily exist without Bitcoin. For a growing number of investors, cryptocurrencies may end up being a relatively brief phenomenon, but blockchain's potential applications are vast and its future appears bright.

A couple of blockchain's biggest innovations are especially significant in this context. First, the technology eliminates the need for third-party intermediaries, which can greatly increase speed, boost accuracy and cut fees. Second, transaction parties are verified but not identified—a huge advantage at a time when data privacy is a mounting concern both for individuals and the organizations that collect their data.

A recent Deloitte survey of large companies worldwide<sup>7</sup> underscores businesses' awareness that blockchain is not simply here to stay, but also vital to their long-term success. Seventy-four percent of surveyed companies saw "a compelling business case" for blockchain, and 68% were afraid of losing competitive advantage if they did not adopt the technology.

The most natural applications of blockchain are in financial services, where it could be used to accelerate settlement of all kinds of transactions and verify ownership of stocks and other financial assets. Numerous financial companies are actively involved in major projects incorporating blockchain.

### Other potential blockchain applications could include:

**Education.** Educational institutions could store credentialing data needed for assessments, degrees and transcripts.

**Health care.** Patients' health information could be encrypted and shared among multiple providers.

**Government.** Blockchain's role as an encrypted database could make it a method of storing the vast quantities of information that governments collect and track.

**Legal.** Contract information such as parties, terms, transfers of ownership and delivery of goods or services could be stored and tracked.

**Retail.** Secure peer-to-peer marketplaces could be created to record and track transactions with all relevant information, including payment.

**Travel/Hospitality.** An authenticated "single travel ID" form could be stored and used in place of travel documents, ID cards, loyalty program information and payment data.

**Voting.** Votes could be cast electronically, counted and verified.

<sup>7</sup> Source: "Deloitte: 3 out of 4 Big Companies See 'Compelling' Case for Blockchain," CoinDesk.com, May 15, 2018.

**Blockchain has numerous potential applications:**

**Legal**



"Smart contracts" stored on the blockchain track contract parties, terms, transfer of ownership, and delivery of goods or services.

**Supply Chain**



By utilizing a distributed ledger, companies within a supply chain gain transparency into shipment tracking, deliveries and progress among other suppliers where no inherent trust exists.

**Government**



Blockchain offers promise as a technology to store personal identity information, criminal backgrounds, and "e-citizenship," authorized by biometrics.

**Energy**



Decentralized energy transfer and distribution are possible via micro-transactions of data sent to blockchain, validated and re-dispersed to the grid while securing payment to the submitter.

**Food**



Using blockchain to store food supply chain data offers enhanced traceability of product origin, batching, processing, expiration, storage temperatures and shipping.

**Blockchain for every industry**

Exploring blockchain use cases beyond Bitcoin and financial services

Blockchain technology has the potential to upend the way every industry manages its information and data, not only financial services. This infographic details the opportunities in every vertical to effectively store transaction, customer, and supplier data in a immutable ledger online.

**Retail**



Secure P2P marketplaces can track P2P retail transactions, with product information, shipment, and bills of lading input on the blockchain, and payments made via Bitcoin.

**Healthcare**



Electronic medical records stored in blockchain, accessed and updated via biometrics, allow for the democratization of patient data and could alleviate the burden of transferring records among providers.

**Insurance**



When autonomous vehicles and other smart devices communicate status updates with insurance providers via the blockchain, premium costs could decrease as the need for auditing and authenticating data is reduced.

**Travel and Hospitality**



Passengers store their authenticated "single travel ID" on the blockchain for use in lieu of travel documents, identification cards, loyalty program IDs and payment data.

**Education**



Educational institutions could utilize the blockchain to store credentialing data around assessments, degrees, and transcripts, as well as verification of knowledge transfer between parties.

Source: "Infographic: Blockchain Opportunities for Every Industry," Catalyst Companies.

# The Investment Case for Cryptocurrencies

## A Speculative Play

It is hard to make a conventional case for investing in cryptocurrencies at present, mainly because they are a very new asset class that has mostly attracted speculators. Investment professionals rightly point out that cryptocurrencies lack the essential characteristics—earnings, dividends, revenues, cash flows, business and economic fundamentals—needed to determine a rational valuation.

Also worth noting, cryptocurrencies should not be seen as an opportunity to profit from the growth of blockchain technology. Though cryptocurrencies require blockchain to exist, their value is not tied to advancements in blockchain's usage or effectiveness.

There are some other examples of risk specific to cryptocurrencies that investors should be aware of:

- ▶ **Fraud and cybercrime.** These are not simply possibilities; they have already occurred on a large scale. The most famous example is Mt. Gox, which for several years was the largest Bitcoin exchange. A hacker struck Mt. Gox starting in 2011 and eventually stole Bitcoins worth approximately \$450 million. The exchange never recovered and went out of business in 2014.
- ▶ **ID theft or loss.** The ID and password needed to access exchanges can be forgotten, lost or stolen by hackers or phishers. Once access is denied, it cannot be restored, resulting in the loss of one's entire account.

- ▶ **Computer outage or cyberattack.** Exchanges have experienced outages due to excessive demand or other issues. Massive cyberattacks could limit access to exchanges because blockchain and digital storage exist on the Internet.
- ▶ **Little regulation.** U.S. regulation of cryptocurrencies is scant and unorganized. The Securities and Exchange Commission (SEC) does not regulate crypto exchanges, and has not yet approved any crypto mutual or exchange-traded funds. While this status quo may change, it is unlikely to happen soon.
- ▶ **Investigations.** Even in the absence of robust regulation, authorities are ratcheting up their investigation of alleged misconduct. The SEC has opened dozens of investigations into initial coin offerings, for instance, and the Justice Department has announced a joint effort with the Commodity Futures Trading Commission to probe whether traders are manipulating the price of Bitcoin and other cryptocurrencies.

## Conclusion

Consider investing in cryptocurrencies as a purely speculative play and be prepared to potentially lose much—if not all—of your investment. As always, talk to your financial advisor before making any moves.

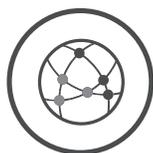
### A Note for Investors

Are cryptocurrencies the latest fad or the next frontier? Clearly, investors and financial advisors alike have much to think about.

We urge investors to proceed with caution. Educate yourself, know the considerable risks involved and work with your advisor to determine whether cryptocurrencies make sense for your portfolio. Depending on how comfortable you are with volatility, it may be wiser to stay on the sidelines than to be on the field.

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**The S&P 500 Index (representing U.S. Large Cap Equity)** is a capitalization-weighted index of 500 stocks. The S&P 500 Index is designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries.

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The foregoing discussion is general in nature, is intended for informational purposes only and is not intended to provide specific advice or recommendations for any individual or organization.

Cryptocurrency investments are purely speculative, subject to high return volatility and largely unregulated. Additionally, they are susceptible to risks such as fraud, cyberattacks, ID theft and price manipulation. Investing in cryptocurrencies involves an extreme amount of risk. There can be no assurance that these types of investments will achieve their objectives or avoid substantial losses.

Investors should consider their own personal financial situation, investment goals, risk tolerance, investment time horizon and tax situation before investing. Please consult a financial professional regarding your specific financial situation before investing.

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