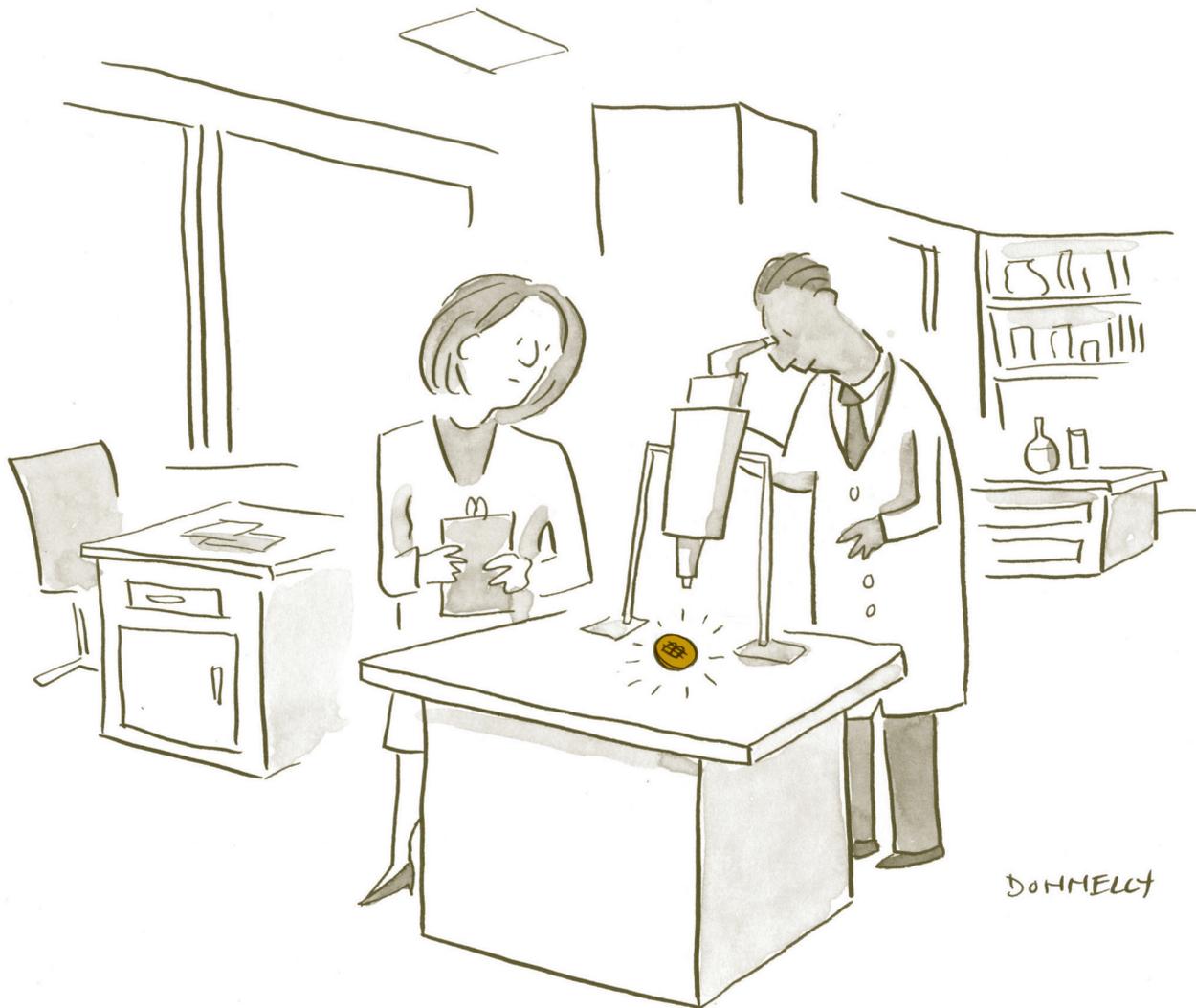


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— *A Closer Look At* —

CRYPTOCURRENCIES



As cryptocurrencies like Bitcoin have seen their valuations surge and plunge, it seems as if people are either making or losing fortunes on a daily basis. Many would-be investors have been left scratching their heads. What makes one cryptocurrency different from another? What is the blockchain and why does it matter? Are cryptocurrencies a revolutionary asset class or a comical bubble in the making?

To help cut through the noise, we would like to share a brief primer on cryptocurrencies, an exploration of blockchain technology, and our recommendation for potential investors. We should state up front that this is a nascent technology with few real experts, despite the reams of material written about it. While we hope to summarize many complex topics, curious readers can refer to our sources and citations for additional resources.

To begin, let's define some key terms:

Cryptocurrencies are digital assets that use cryptography¹ to secure transactions. They can be used to move or store value via the internet, to buy goods and services, or to trade as an investment.² Today there are approximately 1,600 cryptocurrencies with a market cap of nearly \$400 billion.³ Examples include Bitcoin, Litecoin, and Zcash. Although a handful of merchants⁴ are testing cryptocurrencies as a means of exchange, their extreme price volatility has been a major hurdle for widespread adoption. For context, Bitcoin averages around 300,000 transactions per day while Visa's payment system processes an average of 7.2 million transactions *per hour*.⁵

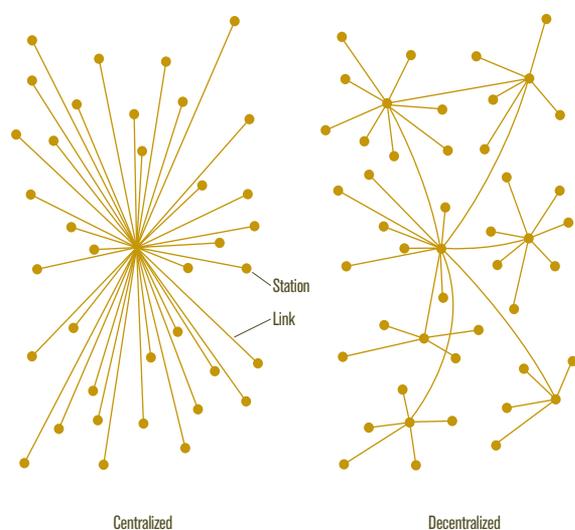
Additionally, some cryptocurrencies are issued to facilitate transactions within a specific platform, somewhat like arcade tokens. For example, a group called Protocol Labs is developing FileCoin, a cryptocurrency-powered storage network, to compete against services like Dropbox and iCloud. Users earn FileCoin by listing their open hard drive space or spend FileCoin to purchase space on its decentralized platform. The unique cryptocurrency only has value within its ecosystem, just as an arcade token can buy you a game of Skee-Ball but is useless at a grocery store.

Bitcoin is the largest and most well-known cryptocurrency. Its roots trace back to a white paper written in 2008 by a computer programmer using the pseudonym Satoshi Nakamoto. He or she proposed that "a purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution."⁶ Whereas traditional systems rely on centralized governments to print money, Bitcoin is "mined" by anyone who completes the computational task of verifying a transaction and recording it on the blockchain (more on this below). »

Doing so unlocks new Bitcoin as a reward for that individual's effort.⁷ Individuals all over the world compete to be each transaction's validator and play a part in the decentralized network.⁸

Blockchain is the technology that underlies Bitcoin and other cryptocurrencies. It is a database (or ledger) where every transaction is recorded and cryptographically protected. As opposed to a private ledger—one controlled by a bank, for example—blockchain is a public, *decentralized* ledger (Exhibit 1); it is not controlled by any government, corporation, or individual. It is often considered a superior database because it removes the need for a central authority to reconcile each transaction. By spreading the database across a large number of computers, blockchain also has a lower risk of being hacked or manipulated. This means people can complete transactions—transferring money, for example—on a faster and more secure basis.

EXHIBIT 1 CENTRALIZED VS. DECENTRALIZED



Source: Vitalik Buterin, "The Meaning of Decentralization," Medium, February 6, 2017.

Initial Coin Offerings ("ICOs") are a means of raising capital in exchange for cryptocurrencies. For example, FileCoin raised over \$250 million via an ICO,⁹ and ICOs overall raised over \$4 billion in 2017.¹⁰ The first quarter of 2018 has already surpassed that amount, with over \$6 billion raised.¹¹ For issuers of ICOs, the funds represent non-dilutive, interest-free capital with

no repayment obligation. This has garnered increased regulatory scrutiny and, earlier this year, the Securities and Exchange Commission announced numerous investigations. Issuers may also be seeking to capitalize on the flood of interest in cryptocurrencies by raising funds for projects with questionable investment merit. For example, we are skeptical of the hip-hop group Wu-Tang Clan's recent offering, as well as those by PonziCoin and FOMO Coin.

At this point, you may be wondering why any of this matters. We suggest thinking about cryptocurrencies as an "internet of value" driven by decentralized applications. As the internet has evolved, so has the ability to transfer different types of media: FTP in 1980 made it possible to transfer files, SMTP in 1982 to transfer messages like email, and VOIP in 1995 to transfer voice communications. In 2008, Satoshi Nakamoto introduced a way to transmit value via the internet. Basically, cryptocurrencies are like email, except that they are used to send *value* rather than messages. Today, email is a global, digital network with nearly 100% adoption. But since its early days, many email startups have fallen by the wayside. Similarly, we believe the technology underlying cryptocurrencies is here to stay, but the winners may change as the sector evolves. The key question for us is whether Bitcoin *et al.* will become a dominant player like Gmail, or fade away like the many now-defunct email service providers.

We believe the internet of value and blockchain technology represent real and exciting steps forward. While that does not mean our current system of transferring value will be replaced, it is likely to change. The U.S. already has a stable banking system and centralized payment platforms like Visa, PayPal, and Venmo. However, the number of people globally who are unable to join the banking system is in the billions. Could cryptocurrencies be their leapfrog technology? It is possible they simply forgo traditional bank accounts in favor of the internet of value. To the extent technologies enabling this kind of application win adoption, cryptocurrencies will have some enduring value. But, as we have seen with ICOs, the market can »

be warped by speculators more interested in earning a quick buck—or a quick Bitcoin.

Direct investments in cryptocurrencies should be considered highly speculative, done through secure exchanges, and sized such that a total loss would not have a material effect on an investor's long-term goals. While we do not currently recommend a dedicated investment in cryptocurrencies, blockchain technology is becoming integrated across various facets of the economy. Some of the companies we invest in already benefit from these technologies. For example, companies involved in financial services and supply chain management stand to benefit from using blockchain technology to reduce costs and improve efficiency. Smart regulation could lead to broader adoption and better investor safety. In the meantime, we suggest that those interested in this area of the market ignore the hype of daily price volatility and continue asking hard questions before putting their capital at risk. ■

- 1 *Cryptography is the art of writing or solving codes. In the world of cryptocurrencies, this is done through an algorithm that converts input of any length into a unique, encrypted digital signature. To see the algorithm that powers Bitcoin, search for "SHA-256 Calculator."*
- 2 *Comparing cryptocurrencies like Bitcoin to traditional currencies like the dollar can be misleading, causing some industry participants to prefer the term "crypto asset."*
- 3 *"Cryptocurrency Market Capitalizations," Coin Market Cap, accessed May 15, 2018. <https://coinmarketcap.com>.*
- 4 *Including Microsoft, Overstock.com, Etsy, and others.*
- 5 *"Payments and Processing Update," Morgan Stanley Research, April 9, 2018.*
- 6 *Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," Bitcoin, October 31, 2008, <https://bitcoin.org/bitcoin.pdf>.*
- 7 *Noelle Acheson, "How Bitcoin Mining Works," CoinDesk, January 29, 2018, <https://www.coindesk.com/information/how-bitcoin-mining-works/>.*
- 8 *Bitcoin mining is big business. Two Chinese bitcoin mining equipment makers are planning to raise as much as \$1 billion each through initial public offerings later this year. "Chinese Bitcoin Mining Gear Makers Set Sights on World's Largest Bitcoin IPOs," Reuters, May 14, 2018.*
- 9 *Including investments from traditional venture capital investors such as Andreessen Horowitz, Union Square Ventures, and Winklevoss Capital. "Filecoin," Crunchbase, accessed May 15, 2018. <https://www.crunchbase.com/organization/filecoin>.*
- 10 *Steven Russolillo, "Initial Coin Offerings Surge Past \$4 Billion—and Regulators Are Worried," Wall Street Journal, December 14, 2017.*
- 11 *David Floyd, "\$6.3 Billion: 2018 ICO Funding Has Passed 2017's Total," Coindesk, April 19, 2018. <https://www.coindesk.com/6-3-billion-2018-ico-funding-already-outpaced-2017/>.*

Additional Sources:

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- *Monergo, Joel. "Fat Protocols," Union Square Ventures, August 8, 2016. <http://www.usv.com/blog/fat-protocols>.*

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