

# INVESTMENTS & WEALTH MONITOR

*A reprinted article from July/August 2022*

## Cryptocurrencies and Digital Assets: Valuation Models and Due Diligence

*By Keith Black, PhD, CFA®, CAIA®, FDP*



INVESTMENTS & WEALTH INSTITUTE®

# Cryptocurrencies and Digital Assets

## VALUATION MODELS AND DUE DILIGENCE

By Keith Black, PhD, CFA®, CAIA®, FDP

**B**lockchains and distributed ledgers are revolutionary technologies that allow data and assets to be stored, secured, and sent in a global and trustless manner. The goal of distributed ledgers is to disrupt the centralized financial system, seeking to build a decentralized world that gives power to consumers and breaks the power of national regulators and financial institutions. Some investors believe that selected blockchain protocols may soon put banks and securities exchanges out of business.

### CRYPTOCURRENCIES CAN BE LIKENED TO PUBLIC EQUITY OR VENTURE CAPITAL INVESTMENTS

More than 20 years ago, another revolutionary technology captured the imagination of investors worldwide. At the time, we called it the internet, and it was populated by dot-com stocks. Today, we call it Web 2.0. From 1995 to 1999, there was massive speculation in internet stocks; the simple mention of a company building a website would cause its stock to rocket higher. Some investors believed that the internet would soon put brick-and-mortar retailers out of business. Outside of some notable exceptions such as books, music, and travel, dot-coms 25 years later account for just 15 percent of retail sales, and brick-and-mortar stores continue to do business.

More than 2,000 private companies issued initial public offerings (IPOs) during the five years from 1995 to 1999. These IPOs had prices that were as lofty as the expectations, at more than

40 times trailing revenues, with operating losses and cash burn rates that needed to be contained.<sup>1</sup> The speculation was that these internet stocks would soon take over the real world of retail. The problem was that many of these companies didn't have enough cash to last until the end of the year.

During that time, the Nasdaq Composite Index rose by more than 570 percent to its March 10, 2000, peak. The euphoria surrounding tech stocks drove the Nasdaq to trade above 90 times earnings, because the growth expectations were as spectacular as the stock prices. As we all know now, the Nasdaq fell by more than 75 percent between March 2000 and October 2002. More than \$1.7 trillion of the value of tech stocks was lost between March and November 2000. The Nasdaq wouldn't reach its high of March 2000 again until April 2015.

Is it different this time? Although history might not repeat, it often rhymes. Are cryptocurrencies and digital assets a repeat of the dot-com speculations of the late 1990s? Are we simply betting on a new technology to revolutionize an old industry? Rather than being captivated by the technology, what if we simply think of cryptocurrencies and digital assets as publicly traded venture capital or even a new stock market?

How did the venture capital market play out in the dot-com era? Although venture capital investors posted record profits, they did so by selling their companies into public markets, where broadly distributed investors suffered massive

losses. In 2000, investors lost more than \$1.7 trillion as most of the nascent internet stocks succumbed to their negative cash flows and high burn rates.

Venture capital is an exciting business, but we must realize that many venture capital investments lose most or all of their value, because it takes time and money to prove that some business models work and others don't. Venture capital works as a business model even if most of the portfolio company investments are losers. If 80 percent of our companies lose half of their value and 20 percent of our companies earn returns of 1,000 percent, investors have a total return of 140 percent before fees on the entire portfolio of companies. The goal of venture capital investing is to find those big winners, the \$1-billion unicorns or even the \$10-billion decacorns.

### OLIGOPOLIES AND THE WINNER-TAKE-ALL ECONOMY

The reason some companies are winners and the majority are losers is that many industries end up as oligopolies, where a small number of firms control the majority of the revenues and profits. Looking at the dot-com stocks more than 20 years later, we see some enormous winners, many of which are household names (see table 1). Amazon, Priceline, eBay, and Broadcom all went public between 1997 and 1999. The combined market cap of these four firms today is larger than the entire \$1.7-trillion draw-down that occurred as the Nasdaq market crashed in 2000. That is, just these four companies together ended up being worth more than all the losses

from a notorious era of speculation, volatility, and technological innovation.

Notice that each of these companies is very different. Each picked a business model and disrupted traditional industries, such as buying retail goods, booking travel, or selling collectibles and used goods. Each of these companies dominates an industry with relatively few competitors. Many tried to compete with them, but most failed. That is, winner takes all. Massive industries are dominated by just one to five companies. Oligopolies reign.

Although there are more than 18,000 cryptocurrencies today, the venture capital and oligopoly models tell us that fewer than 1,000 of these will have any value in the long run. The actual number might be fewer than 100. That is, more than 95 percent of the cryptocurrencies trading today likely have no long-run value. Today's cryptocurrency market already has a cap-weighted structure similar to stock market indexes (see table 2). Bitcoin accounts for 43 percent of the \$915-billion cryptocurrency market, ether makes up 15.2 percent, and the next 48 coins add another 36.4 percent of market capitalization. The top 50 coins, currencies, and tokens account for almost 95 percent of the market capitalization of the entire cryptocurrency space.

In the long run, the value of the digital assets market may be far beyond the \$915-billion market capitalization experienced in July 2022. In the short run, thousands of digital assets will trade at prices far below today's levels. How can investors today analyze the cryptocurrency market? Focus on the oligopolies and the sectors in traditional industries most likely to experience substantial disruption from the burgeoning digital asset community. Although thousands of coins and tokens will be worth far less in the future than they are today, some of the biggest companies in the world 20 years from now already may have been started in the crypto sector.

Table 1

**DOT-COM WINNERS**

Company	IPO Date	2021 Market Capitalization
Amazon.com	May 1997	\$1.7 trillion
Priceline.com	March 1999	\$100 billion
Ebay.com	September 1998	\$45 billion
Broadcom	April 1998	\$225 billion

Source: Yahoo Finance

Table 2

**MARKET CAPITALIZATION CONCENTRATION BY NUMBER OF COINS**

Total Cap: \$915 Billion; Number of coins: 20,179

Coin	Cap (\$Billion)	Cum Weight
BTC	393.0	43.0%
ETH	139.7	58.2%
USDT (Stablecoin)	65.9	65.4%
USDC (Stablecoin)	55.5	71.5%
BNB	37.9	75.6%
BUSD (Stablecoin)	17.6	77.6%
XRP	15.7	79.3%
ADA	15.1	80.9%
SOL	12.2	82.3%
DOGE	8.5	83.2%
Number of Coins	% of Cap	
Top 2	58.2%	
Top 10	83.2%	
Top 20	89.0%	
Top 50	94.6%	
Coins over \$50 billion	4	
Coins over \$25 billion	5	
Coins over \$10 billion	9	
Coins over \$5 billion	17	
Coins over \$1 billion	46	

Source: Coinmarketcap.com, as of July 11, 2022

**DUE DILIGENCE MODELS FOR CRYPTOCURRENCIES AND DIGITAL ASSETS**

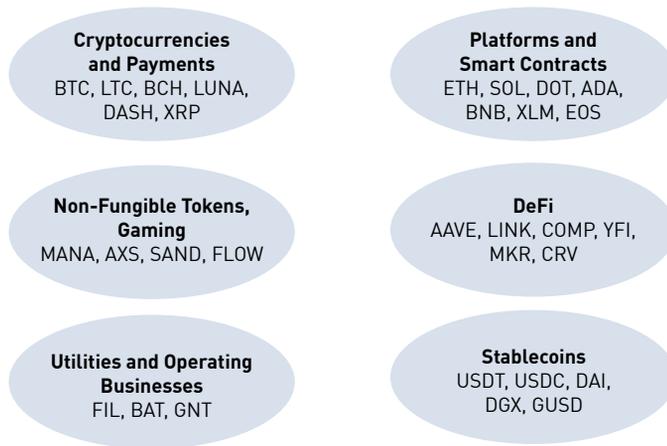
How can we build a framework for evaluating the value and potential of each specific cryptoasset? Let's proceed with a due diligence model or ask, "What would a venture capitalist do?" Ideally, investors would only buy assets that they understand and focus on those that have a chance to prosper in the long run. Let's first investigate the probability of long-run survival and then proceed to consider valuation models. Of course, there is little interest for a long-term investor to spend the time to value a crypto project that is not expected to succeed in the long run.

First, we must understand the various use cases for cryptocurrencies and digital assets (see figure 1). In terms of a stock market or venture capital model, in which industry does the cryptoasset operate? Some cryptoassets are seeking to disrupt a traditional business such as bank deposits and loans, securities trading, global money transfers, or web browsers. Others are creating completely new business models, such as smart contracts, non-fungible tokens, and the metaverse.

If we think about cryptocurrencies and digital assets as publicly traded venture capital investments, we can build a model for valuation. Of course, we

Figure 1

## CRYPTOCURRENCY AND DIGITAL ASSET USE CASES



Source: Author

## CHECKLIST FOR DETERMINING THE POTENTIAL SURVIVAL OF A CRYPTOCURRENCY OR DIGITAL ASSET

1. What industry is the protocol seeking to create or disrupt? What is the size of that addressable market? Does the market have need for the utility that the cryptoasset provides?
2. Has the project published a well-drafted business plan or white paper? Is the project currently being built or is it already functioning?
3. What are the skills, experience, and success of the programming team as well as the management team? Is this the right team to lead this project?
4. What is the popularity of the project? This can be measured by the number of users or wallets, the number of software developers contributing to the GitHub, or the number of followers on Twitter, Discord, Telegram, or Reddit.
5. Does the project exhibit well-designed technology? Is the code efficient and error-free or can it be exploited? Has the project passed an audit from a consulting firm familiar with blockchain design and smart contract code? Is the custody and security design of the project sufficient to protect investor assets?
6. Is the project well-designed from a financial point of view? Are there scenarios in which the coin can be attacked financially, such as a stablecoin being backed by another cryptoasset that it launched? Are the tokenomics appropriately shared between investors and owners of the project, leaving income and assets to pay the software development team for building, upgrading, and managing the project?
7. Does the market have a real need for this project? Does it run on a standardized blockchain, such as by offering an ERC-20 token that can use the Ethereum blockchain, or is it trying to create a new blockchain? With more than 10 layer-one protocols already functioning, new projects would be well advised to use an existing protocol unless a new blockchain is required to implement their use case.

Source: "Why Do ICOs Fail? Are They Still Worth Investing in 2019-2020?" (July 16, 2020), <https://appinventiv.com/blog/why-icos-fail-and-their-worth-in-2019/>.

only proceed to valuation once we are convinced that the cryptoasset represents a project with true potential value. There is no point in going through the valuation process for any asset that is deemed to be a scam, a fraud, or a joke.

## SEVEN METHODS FOR VALUING CRYPTOCURRENCY AND DIGITAL ASSET PROJECTS

A variety of models can be used for valuing cryptoassets. Hougan and Lawant (2021) discuss the total addressable market, valuing cryptoassets as a network, and the cost-of-production valuation. Burniske and Tatar (2018) discuss the equation of exchange, and Plan B (2019a,b) details the stock-to-flow model. This article adds the ideas of using price-to-sales multiples and discounted cash-flow models based on the yield paid as rewards for mining, staking, and providing liquidity.

Some of the models come from traditional valuation methods for public equity and private equity, such as discounted cash flow on staking yields; price/revenue and revenue growth based on income to miners, stakers, and liquidity providers; and the value of existing businesses in the total addressable market. From commodities markets, we can investigate the stock-to-flow model and the cost-of-production model. From macroeconomics and monetary theory, we can consider the equation of exchange. Finally, we consider Metcalfe's law regarding the value of the network.

## DISCOUNTED CASH FLOW ON STAKING YIELDS

Traditional fixed income securities can be valued using the discounted cash flow of the interest payments and stocks can be valued using a dividend-discount model. We estimate the size, timing, and duration of future cash flows and calculate the discounted present value of those future cash flows. Recently, the centralized crypto exchange Gemini offered yields on nearly 40 coins, some of which are noted in table 3. Owners of cryptocurrencies

can earn yield by staking or lending their assets to other market participants, with many centralized exchanges offering token lending programs. Yields are stated on an annual basis and typically are paid in the coin being lent or staked. For example, if the yield on Curve (CRV) is 8 percent per year, depositing 100 CRV tokens will yield 108 CRV tokens after one year, but the dollar yield is unclear because many of the underlying crypto-assets have substantial volatility and the price of the token may increase or decrease substantially during the course of the year.

Table 3

**YIELDS ON GEMINI EARN**

Yield	Crypto Asset
> 6%	Gemini Dollar, Axie Infinity, Curve, FileCoin, 1Inch
3-6%	Polygon, Bitcoin Cash, Storj
2-3%	Litecoin, Synthetix, Compound, Maker, SushiSwap
1-2%	Bitcoin, Ether, Fantom, Balance, Aave, Basic Attention Token, Uniswap
0-1%	Chainlink, Decentraland, ZCash, Amp

Source: Gemini.com

Table 4

**PRICE/SALES MULTIPLES—CRYPTOASSETS**

Project	12-Month Revenue	Price/Sales Multiple
Ethereum (ETH)	\$10 billion	21.6
Uniswap (UNI)	\$1.4 billion	4.5
Pancake Swap (CAKE)	\$720 million	1.5
Looks Rare (RARE)	\$570 million	0.9
Sushiswap (SUSHI)	\$360 million	2.1

Source: TokenTerminal.com

**PRICE/REVENUE AND REVENUE GROWTH BASED ON INCOME TO MINERS, STAKERS, AND LIQUIDITY PROVIDERS**

Internet stocks created new and ill-fated valuation methods to justify price levels of companies with zero to minimal revenues; however, many of today's crypto protocols earn substantial revenues. A key difference between internet stocks and cryptoassets is noted in the fat protocol thesis.<sup>2</sup> The creators of the internet did not successfully monetize the plumbing of the internet; they didn't, for example, charge a small fee for each email sent or each webpage viewed. This thin protocol value allowed for the fat application layer, where the value of the internet was earned largely by applications such as Amazon, Priceline, and Google. In the blockchain world, there are fat protocols and thin applications. Today's cryptoasset market capitalization is dominated by layer-one protocols, with Bitcoin, Ethereum, Solana, and Cardano accounting for nearly two-thirds of the total market value of all cryptoassets. Because the market currently charges fees for each transaction, much of today's crypto market value has been concentrated in the companies building the base-layer plumbing that facilitates the blockchain revolution.

Those substantial revenues earned by blockchain protocols and applications

Table 5

**PRICE/SALES MULTIPLES—TOP TECH STOCKS**

Stock	Price/Sales Multiple
Apple (AAPL)	5.9
Meta Platforms (META)	4.5
Amazon.com (AMZN)	2.3
Alphabet (GOOG)	5.5
Netflix (NFLX)	2.8

may be paid to stakers or to miners and liquidity providers. For example, bitcoin is mined using a proof-of-work process, in which substantial computing power is applied to solve an encryption problem while publishing the next block of transactions. By minting 6.25 new bitcoins every 10 minutes, bitcoin miners earned more than \$600 million in revenues during the past year. Those processing transactions on the Ethereum blockchain earned more than \$10 billion for publishing transaction blocks and processing smart contracts. Fees earned by liquidity providers who deposit tokens that can be traded on Uniswap or Sushiswap exceeded \$1.7 billion combined during 2021. Many cryptoassets trade at price/sales multiples similar to those of top tech stocks, despite the cryptoassets having higher revenue growth than the leading tech stocks (see tables 4 and 5).

**THE VALUE OF EXISTING BUSINESSES IN THE TOTAL ADDRESSABLE MARKET**

Venture capitalists are fond of understanding a product's total addressable market, seeking to estimate the revenue potential of a product or service by estimating the market share a new product can achieve and multiplying that market share by the annual revenue of that product's entire industry. That is, the potential value of a protocol offering a new product or service can be estimated by comparing the project to the current market capitalization of existing companies in the same business.

To apply this to cryptocurrencies, we need to find comparable real-world companies with which the new crypto protocols seek to compete. With its total token supply limited to 21 million, some investors believe that bitcoin will serve

as a long-term store of value, similar to the role played by gold today. If bitcoin is believed to compete with gold as a store of value, the \$393-billion valuation of bitcoin can increase by more than 25 times to match the current \$10-trillion market value of gold.

Cryptos with business models in the decentralized finance (defi) areas of decentralized exchanges and borrowing and lending are seeking to disintermediate banks such as JP Morgan (\$420 billion) and exchanges such as CME Group (\$72 billion). With a combined market capitalization of less than \$20 billion, defi tokens such as Aave, Compound, Uniswap, Sushiswap, Chainlink, and Synthetix may have substantial upside if they succeed in taking market share from the titans of the centralized finance world.

---

*This ratio points out the scarcity of a commodity and has been used to explain the role of gold as a store of value.*

---

### THE STOCK-TO-FLOW MODEL

In the commodities market, prices can be estimated using a stock-to-flow model. In this model, the level of current inventory, or stock, is divided by the current-year production, or flow. This ratio points out the scarcity of a commodity and has been used to explain the role of gold as a store of value. This scarcity can be noted by a nearly 100-year period in which the supply of gold increased by 1.52 percent per year and the U.S. monetary base increased by 7.17 percent per year during the same time period.<sup>3</sup> At the current rate of production, it would take almost 60 years to double the current stock of gold. The constrained supply may explain how gold was able to beat inflation by more than 3 percent per year during the past 30 years.

Plan B (2019a,b) states an expectation that the price of bitcoin will continue to rise as the growth of its supply continues to slow. With 19 million bitcoin outstanding today, the supply growth is strictly limited, with an explicit schedule to reach a maximum supply of 21 million bitcoin in the year 2140.

When Bitcoin started in 2009, 50 bitcoin were awarded each 10 minutes to the miners securing the network and posting all recorded transactions to the bitcoin blockchain. Every four years, the size of the block rewards is halved, falling to 25 in November 2012, 12.5 in July 2016, 6.25 in May 2020, and 3.125 in 2024, etc. These block rewards continue to be halved each four years until all 21 million bitcoin have been released by the year 2140. This halving schedule and known monetary policy is a key element to the value proposition of bitcoin, especially in a world where central banks have been printing fiat currency for many years without regard for the inflation rate that degrades the value of the currency. Plan B (2019a,b) expects bitcoin to reach a valuation of \$100,000 by the date of the next halving in 2024.

### THE COST-OF-PRODUCTION MODEL

Closely related to this halving schedule is the cost-of-production model. In a proof-of-work mining process, producers of bitcoin compete to solve a cryptographic puzzle. The first to solve this puzzle in each 10-minute period is allowed to publish the next block of transactions and earn the block reward, currently valued at 6.25 bitcoin, or approximately \$125,000 when bitcoin is trading at \$20,000. The difficulty of bitcoin mining adjusts automatically given the amount of computing, or hashing, power currently deployed on the network. As more miners come online, the difficulty of mining increases to make sure that the block time on the bitcoin blockchain averages 10 minutes. After each halving occurs, it is assumed that the variable cost of production

would double, because the same amount of electricity is expended to earn block rewards that have been reduced by half.

Bitcoin miners need to make substantial investments in computer hardware, focusing on custom designed bitcoin mining rigs built using application-specific integrated circuits. Each rig may cost \$5,000 to \$10,000 and successful miners deploy thousands of mining rigs. These rigs also are substantial users of electricity; they are said to consume as much as 0.5 percent of the world's electricity. Given that electricity costs are a key driver of miner profitability, miners seek to locate in areas of low electricity costs, especially those that are driven by natural sources such as steam-driven turbines from volcanoes or hydroelectric dams. In early 2022, the cost of production of one bitcoin averaged \$34,000, including both the fixed cost of mining rigs and data centers and the variable cost of electricity.<sup>4</sup> Miners with the lowest average production costs are likely to be the longest lasting and most profitable, and those with the highest production costs are likely to stop mining when the price of bitcoin falls below the variable cost of the electricity used to generate the new supply of bitcoin. As the highest-cost miners shut off their rigs during times of low crypto prices, this acts as a support on the price of bitcoin and serves to increase the profitability of the remaining miners who have a higher probability of publishing the next block given the smaller number of miners remaining.

Proof-of-stake networks are more difficult to value using the cost-of-production method because the minting of the next block is awarded based on the size of each miner's stake in the network. That is, a miner who owns or controls 1 percent of the staked tokens on the network has a 1-percent probability of publishing the next block of transactions. Proof-of-stake mining uses 99 percent less electricity than proof-of-work mining because proof-of-stake mining requires only the

selected miner to perform the complicated cryptography required to secure the network rather than the redundant efforts of thousands of mining rigs in the proof-of-work system. Given the lower variable costs of proof-of-stake mining, miners will be less likely to reduce supply during times of low token prices.

### THE EQUATION OF EXCHANGE

Burniske and Tatar (2018) adapt Fisher's (1911) equation of exchange to value bitcoin. The famous equation,  $MV=PQ$ , notes that money supply times velocity equals the price of goods and services times the quantity of goods and services. Today's high level of Consumer Price Index inflation can be explained using this equation, because the quantity of goods and services has been constrained by COVID-19 and supply-chain related shortages and money supply has increased through both monetary and fiscal policy stimulus. The velocity of the U.S. dollar, or the speed of spending money, has ranged from 0.9 to 3.5 during the past 30 years. Bitcoin may have a higher velocity than U.S. dollars, with the average bitcoin holding period of just more than two months, resulting in a velocity of about 5.

With an estimated \$10-trillion annual trading volume and a velocity of 5, the value of bitcoin is estimated at \$2 trillion. When fully diluted by the eventual bitcoin supply of 21 million, this implies a long-run value of \$95,238 per bitcoin.

### METCALFE'S LAW REGARDING THE VALUE OF THE NETWORK

The last method of valuing cryptoassets comes from network theory. Metcalfe's law states that the value of a network is proportional to the square of the number of participants. This model is easily applied to cryptoassets, given the transparency of blockchains that report the number of total wallets on each blockchain and the frequency of their use. This model has been used successfully for relative valuations of social networking companies whose values have increased with the size of their user

bases. It appears that cryptoassets also tend to be following Metcalfe's law, because the protocols with the largest number of users have been earning higher levels of valuation (Alabi 2017).

### CONCLUSION

The valuation of the entire cryptocurrency sector in July 2022 is \$915 billion, less than the market capitalization of single tech companies such as Amazon.com (\$1.1 trillion), Google (\$1.5 trillion), or Apple (\$2.4 trillion). The crypto space also is smaller than the \$4-trillion global hedge fund industry and the \$8-trillion private equity and private credit arena.

Although nearly 20,000 cryptocurrencies exist today, fewer than 100 of today's cryptocurrencies likely will have substantial value in 10 years. Today's market capitalization already is highly concentrated with nearly 85 percent of value in the top 10 cryptoassets and 95 percent of value in the top 50. However, those cryptoassets that survive and thrive and succeed at disintermediating substantial current businesses or those that create brand new industries may individually have valuations on the order of those enjoyed today by Amazon.com, Google, or Apple.

The challenge for today's investors is to pick the relatively small number of today's cryptoassets that will be among the largest winners during the next decade. By following the due diligence and valuation processes of today's public equity and private equity investors, analysts may increase the odds of finding the large, long-run winners in the cryptoassets space. By having the discipline of following a time-tested process, investors will at least be able to avoid speculation by focusing on cryptoassets that have business plans, operating protocols, growing numbers of users, and the potential to create or disrupt a large industry. Buying cryptoassets without a business plan or white paper and a growing user base is more speculation than investing and is likely to be unsuccessful in the long

run. That is, Shiba Inu and Doge may be the equivalent of the dot-com era pets.com. ●

*Keith Black, PhD, CFA®, CAIA®, FDP, is an adjunct faculty member at the University of Massachusetts Amherst. He earned a BA from Whittier College, an MBA from Carnegie Mellon University, and a PhD from the Illinois Institute of Technology. Contact him at [kblack@umass.edu](mailto:kblack@umass.edu).*

### ENDNOTES

1. International Banker, "The Dotcom Bubble Burst (2000)" (September 29, 2021), <https://internationalbanker.com/history-of-financial-crises/the-dotcom-bubble-burst-2000/>.
2. Joel Monegro, "Fat Protocols," Union Square Ventures (August 8, 2016), <https://www.usv.com/writing/2016/08/fat-protocols/>.
3. "The Stock-to-flow Ratio As the Most Significant Reason for Gold's Monetary Importance." See *In Gold We Trust Report* (2012), <https://ingoldwetrust.report/the-stock-to-flow-ratio-as-the-most-significant-reason-for-golds-monetary-importance/?lang=en>.
4. William Suberg, "Bitcoin Miners Can Take Fresh 20% BTC Price Hit Before Capitulating, Data Shows." *CoinTelegraph* (January 15, 2022), <https://cointelegraph.com/news/bitcoin-miners-can-take-fresh-20-btc-price-hit-before-capitulating-data-shows>.

### REFERENCES

- Alabi, Ken. 2017. Digital Blockchain Networks Appear to be Following Metcalfe's Law. *Electronic Commerce Research and Applications* 24: 23-29.
- Burniske, C., and J. Tatar. 2018. *Cryptoassets: The Innovative Investor's Guide to Bitcoin and Beyond*. New York: McGraw Hill.
- Fisher, I. 1911. *The Purchasing Power of Money: Its Determination and Relation to Credit Interest and Crises*. New York: Macmillan.
- Hougan, M., and D. Lawant. 2021. *Cryptoassets: The Guide to Bitcoin, Blockchain, and Cryptocurrency for Investment Professionals*. Charlottesville, VA: CFA Institute Research Foundation. <https://www.cfainstitute.org/research/foundation/2021/cryptoassets>.
- Plan B: Modeling Bitcoin Value with Scarcity (2019a). <https://medium.com/@100trillionUSD/modeling-bitcoins-value-with-scarcity-91fa0fc03e25>.
- Plan B: Bitcoin Stock-to-Flow Cross Asset Model (2019b). <https://medium.com/@100trillionUSD/bitcoin-stock-to-flow-cross-asset-model-50d260feed12>.

### CONTINUING EDUCATION

To take the CE quiz online, go to [www.investmentsandwealth.org/IWMquiz](http://www.investmentsandwealth.org/IWMquiz)



# INVESTMENTS & WEALTH INSTITUTE®

5619 DTC Parkway, Suite 600  
Greenwood Village, CO 80111  
Phone: +1 303-770-3377  
Fax: +1 303-770-1812  
[www.investmentsandwealth.org](http://www.investmentsandwealth.org)

© 2022 Investments & Wealth Institute®. Reprinted with permission. All rights reserved.

INVESTMENTS & WEALTH INSTITUTE® is a registered mark of Investment Management Consultants Association Inc. doing business as Investments & Wealth Institute. CIMA®, CERTIFIED INVESTMENT MANAGEMENT ANALYST®, CIMC®, CPWA®, CERTIFIED PRIVATE WEALTH ADVISOR®, RMA®, and RETIREMENT MANAGEMENT ADVISOR® are registered certification marks of Investment Management Consultants Association Inc. doing business as Investments & Wealth Institute.