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An Overview of Cryptocurrency PMAR 2022

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What Is Cryptocurrency?

- **Cryptocurrency** is a digital currency in which transactions are verified and records maintained by a **decentralized system** using **cryptography**, rather than by a central banking authority. Source: Oxford Languages



What Is Bitcoin?

- **Bitcoin** was the first cryptocurrency, created in 2009 by Santoshio Nakimoto, the anonymous person(s), whose identity has not been revealed. The value or market capitalization of Bitcoin was recently \$750 billion, making it the largest cryptocurrency by far.

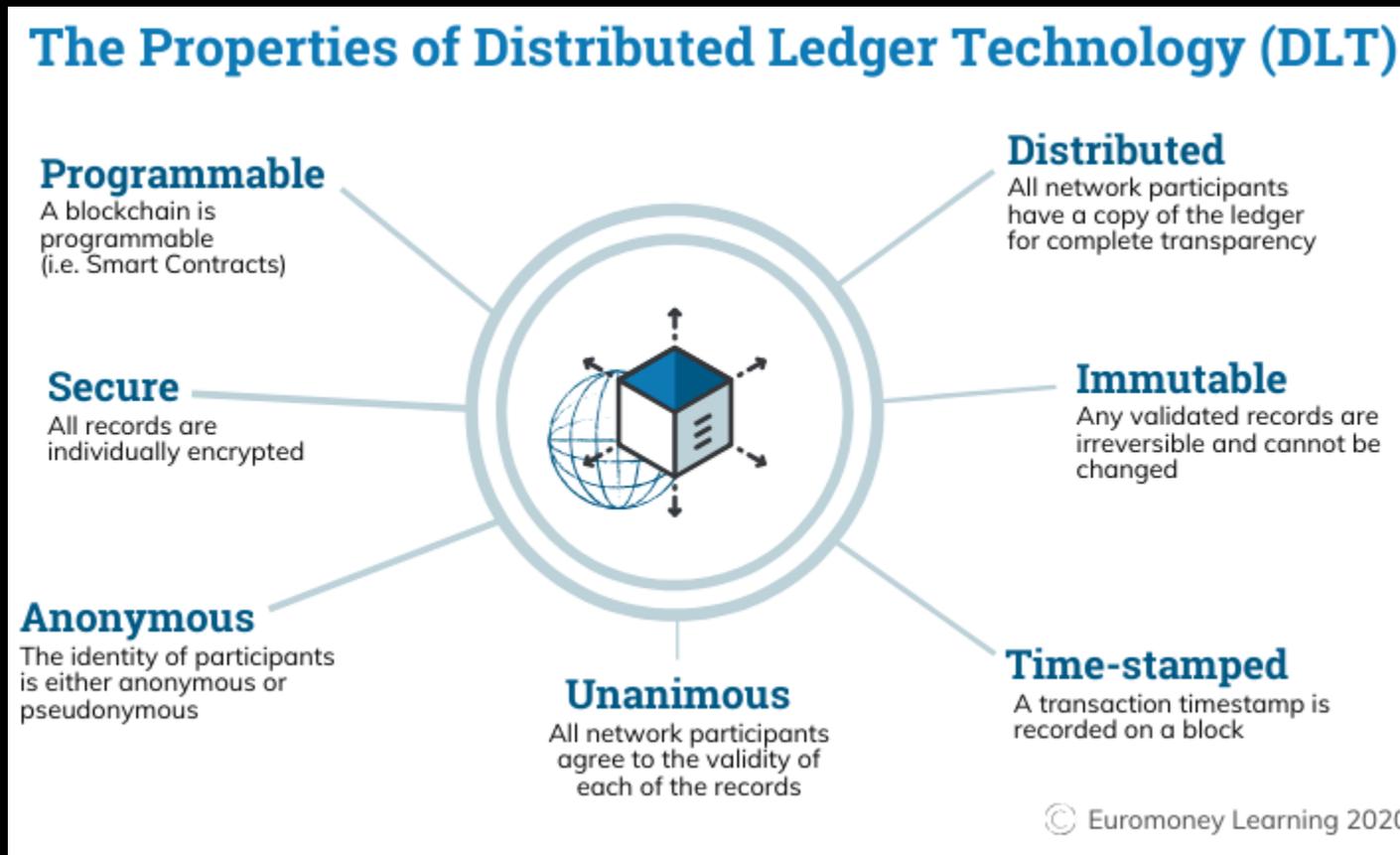
Source: Oxford Languages



Source: The Independent

What Is Blockchain?

- **Blockchain** is a system in which a record of transactions made in bitcoin or another cryptocurrency are maintained across several computers that are linked in a peer-to-peer network (i.e., a real-time distributed public ledger). Source: Investopedia



What Is Bitcoin (or Crypto) Mining?

- Bitcoin **mining** is the process by which **new bitcoins are entered into circulation**, but it is also a critical component of the maintenance and development of the blockchain ledger. It is performed using very sophisticated computers that solve extremely complex computational math problems. Source: Investopedia

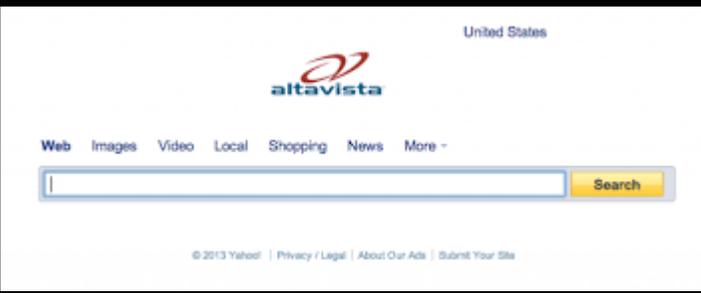
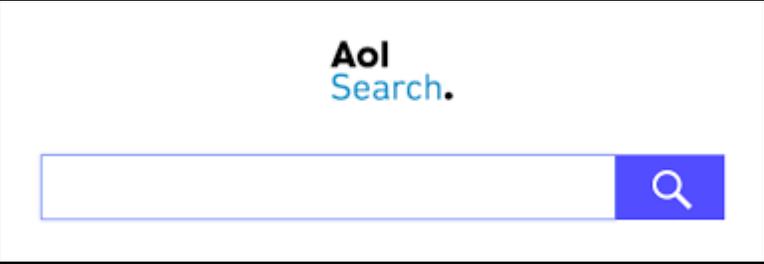


Source: CNBC

Top 10 Crypto Market Capitalizations (4/28/22)

<input type="checkbox"/> Symbol	Name	Price (Intraday)	Change	% Change	Market Cap <small>▼</small>	Volume in Currency (Since 0:00 UTC)	Volume in Currency (24Hr)	Total Volume All Currencies (24Hr)	Circulating Supply
<input type="checkbox"/>  BTC-USD	Bitcoin USD	45,830.31	+2,068.61	+4.727%	860.752B	37.387B	37.387B	37.387B	18.781M
<input type="checkbox"/>  ETH-USD	Ethereum USD	3,109.64	+126.99	+4.2576%	365.192B	30.6B	30.6B	30.6B	117.039M
<input type="checkbox"/>  USDT-USD	Tether USD	1.0002	-0.0001	-0.009%	62.479B	74.843B	74.843B	74.843B	62.469B
<input type="checkbox"/>  BNB-USD	BinanceCoin USD	352.65	+13.30	+3.9192%	59.293B	1.602B	1.602B	1.602B	168.137M
<input type="checkbox"/>  ADA-USD	Cardano USD	1.4774	+0.0601	+4.2398%	47.419B	1.868B	1.868B	1.868B	32.097B
<input type="checkbox"/>  XRP-USD	XRP USD	0.810094	+0.028006	+3.5809%	37.672B	3.692B	3.692B	3.692B	46.418B
<input type="checkbox"/>  DOGE-USD	Dogecoin USD	0.254251	+0.013770	+5.7262%	33.408B	4.542B	4.542B	4.542B	130.786B
<input type="checkbox"/>  USDC-USD	USDCoin USD	0.999619	-0.000177	-0.0177%	27.754B	3.537B	3.537B	3.537B	27.766B
<input type="checkbox"/>  HEX-USD	HEX USD	0.127722	-0.001927	-1.4863%	22.1B	21.851M	21.851M	21.851M	173.411B
<input type="checkbox"/>  DOT1-USD	Polkadot USD	20.52	+0.94	+4.8141%	20.206B	1.343B	1.343B	1.343B	982.553M

A Warning on Risk of Obsolescence



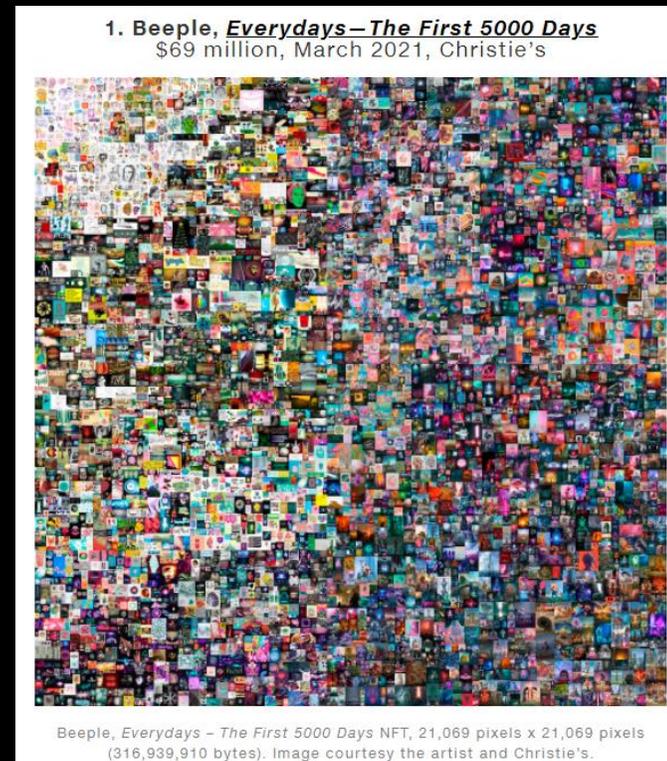
What Is A Smart Contract?

- A **smart contract** is a self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralized blockchain network. **Smart contracts render transactions traceable, transparent, and irreversible.**
 - Analogy: DocuSign on the Blockchain. Source: Investopedia
 - Example: Title insurance often costs thousands of dollars when purchasing or refinancing properties.
 - A **blockchain of real estate transactions** would largely eliminate this costly charge.



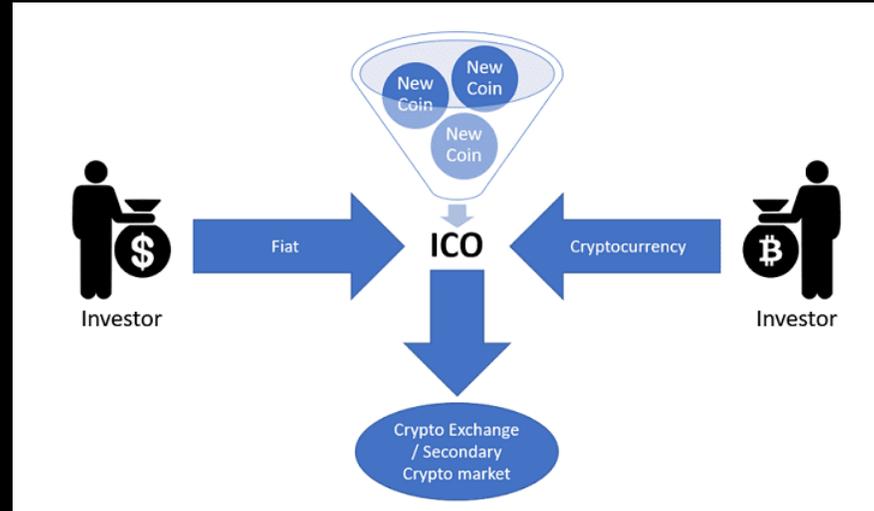
What Are Non-Fungible Tokens (NFTs)?

- NFTs are units of data stored on a blockchain digital ledger. Each non-fungible token acts as a **kind of certificate of authenticity**, showing that a digital asset is unique and not interchangeable. An NFT can never be changed, never be adjusted, and never be stolen, thanks to the principles of cryptography that make the blockchain unique.
- Examples
 - GIFs
 - Videos and sports highlights
 - Collectibles
 - Virtual avatars and video game skins
 - Music



What Are Initial Coin Offerings (ICOs)?

- **Initial Coin Offerings** are like an IPO for cryptocurrency.
- In the past it was possible to raise money simply by writing a **white paper** or proposing a concept / product.
- Today, in most cases you need a product, asset, or service (i.e., **tokenized**).
- In most cases, the new cryptocurrency is **linked** to Bitcoin or Ethereum.
- ICOs are coming under scrutiny from the SEC if the ICO operator aims to raise capital from U.S. investors.
- 99.9+% of companies are private so, in theory, many more assets can be sold (in part or full) and put on the blockchain.



How Can I Buy Or Sell Cryptocurrency or NFTs?

- Firms like [Coinbase](#) have emerged to trade cryptocurrencies. Brokerage firms like [Robinhood](#) also enable crypto trading and more mainstream firms are adding trading capability. However, there have been many instances of cryptocurrencies [being stolen](#). For this and other reasons, cryptocurrencies [have not been approved by the SEC](#) to trade in ETF or Index Fund formats.
 - There are securities like [Grayscale Bitcoin Trust](#) that aim to track Bitcoin, Ethereum and trade on exchanges.
 - There are also [futures contracts](#) on Bitcoin.



coinbase

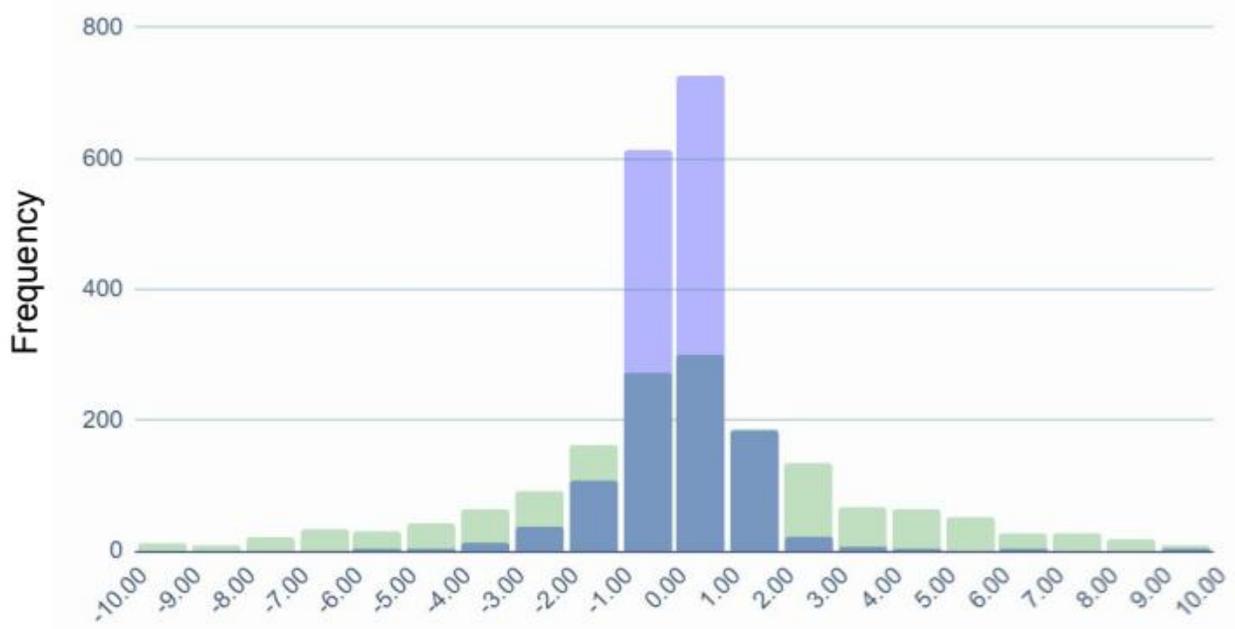


Robinhood 
Company



 GRAYSCALE[®]
Grayscale[®] Bitcoin Trust

How Volatile Is Bitcoin Vs. The S&P 500?



Distribution of Daily Returns (Purple = S&P 500, Green= Bitcoin)

Asset	Annual StdDev	StdDev vs. Bitcoin
Gold	14.23%	19.28%
S&P 500	18.09%	24.52%
Bitcoin	73.78%	100.00%
US Dollar	6.94%	9.41%

Is Bitcoin a Good Diversifier? (Not when you need it most)

Bitcoin's Correlations With Daily Changes

S&P 500	0.139
GLD	0.072
US Dollar Index	-0.025
S&P 500 (when down)	0.16
S&P 500 (when down >2%)	0.46

What Does Warren Buffett Think Of Bitcoin?

Buffett: Bitcoin is a **mirage**. It may be a better way of transmitting money, but it is not money.

Why doesn't Buffett like Bitcoin?

- It has **no intrinsic value**. In contrast...
 - **Stock**: Ownership in a business and its cash flows
 - **Bond**: Interest and repayment of principal
 - **Real Estate**: Shelter and/or rent
 - **Land**: Grows crops, may have natural resources

Is Buffett wrong on Bitcoin having **no value**?

Does Ethereum Provide Cashflow and Therefore, Have Intrinsic Value?

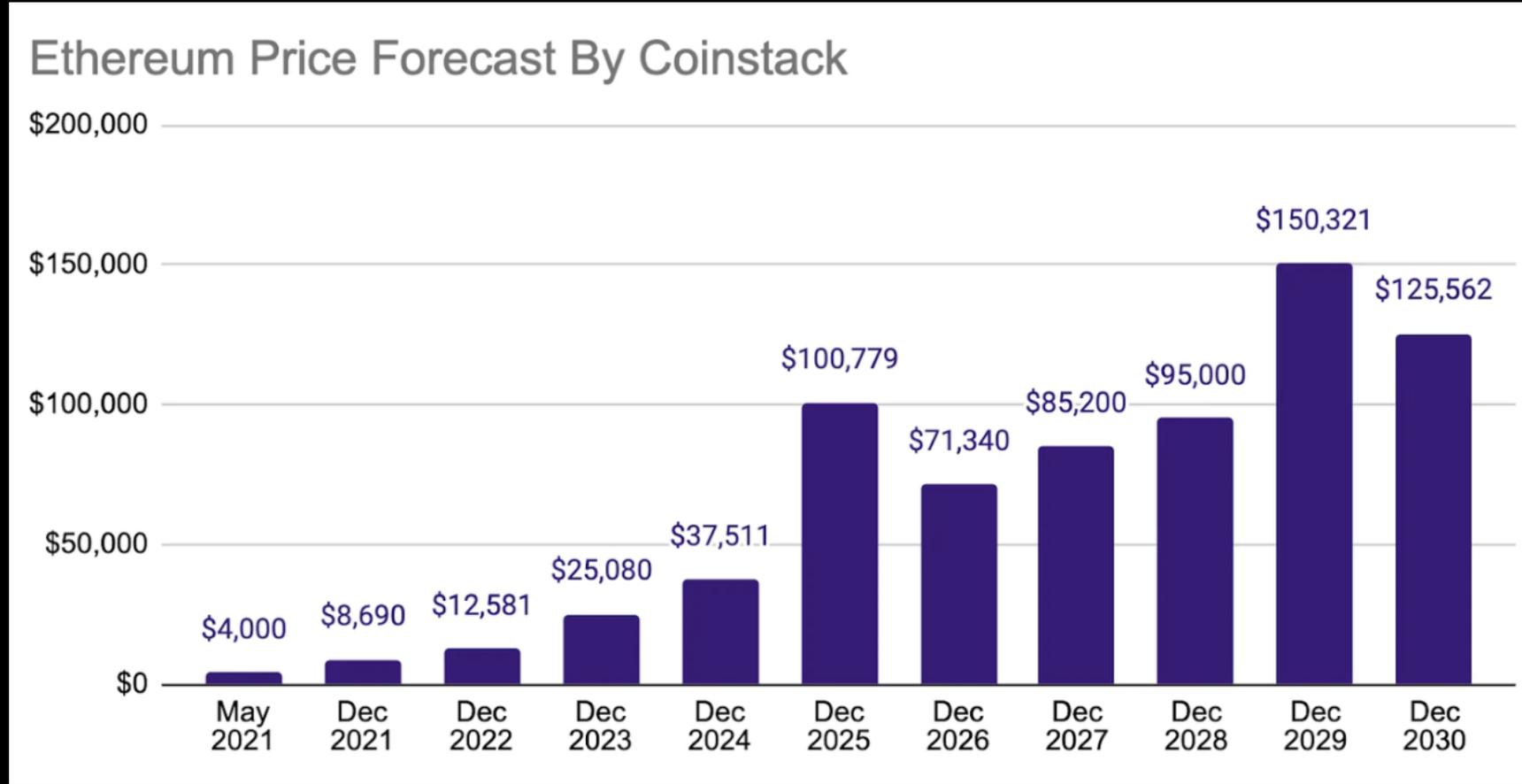
- Analogy: Vanguard has a mutual ownership structure. Profits from their funds are rolled back into the company, reducing investor fees.
- Similarly, it appears at least some fees paid from using Ethereum's network are rolled back into the currency, therefore providing some intrinsic value.
 - Note: Bitcoin fees go to the miners.

ETH's Intrinsic Value Comes from Cash Flows

Ethereum's DCF Gives Intrinsic Value of \$13k to \$25k, Coinstack Alpha Fund Reopened, Portfolio up 697% YTD 🐼, Get an NFT Ticket to our Weekly Crypto Advice Call

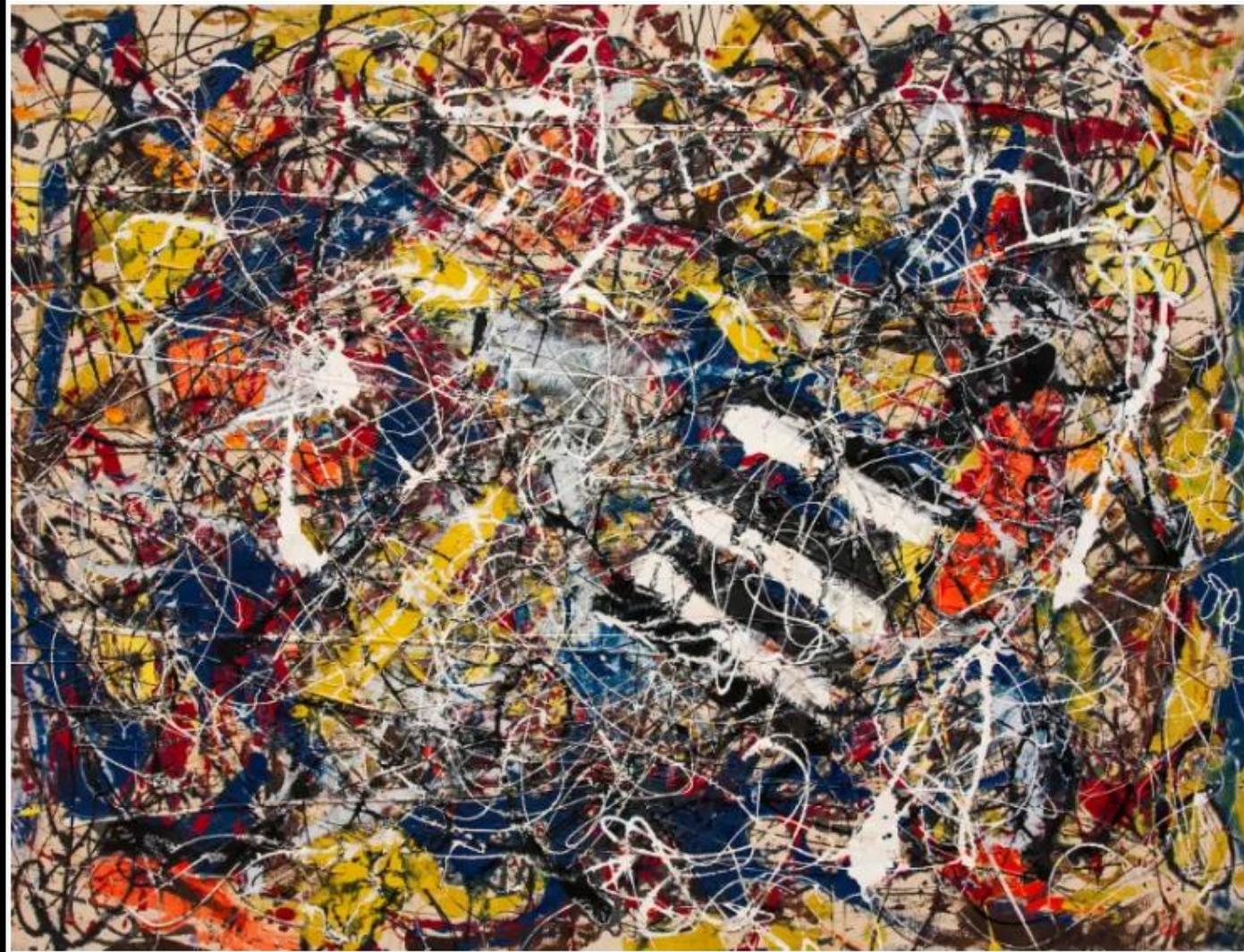
<https://coinstack.substack.com/p/intrinsic-value-comes-from-cash-flows?s=>

Does Ethereum Provide Cashflow and Therefore, Have Intrinsic Value?



<https://coystack.substack.com/p/intrinsic-value-comes-from-cash-flows?s=>

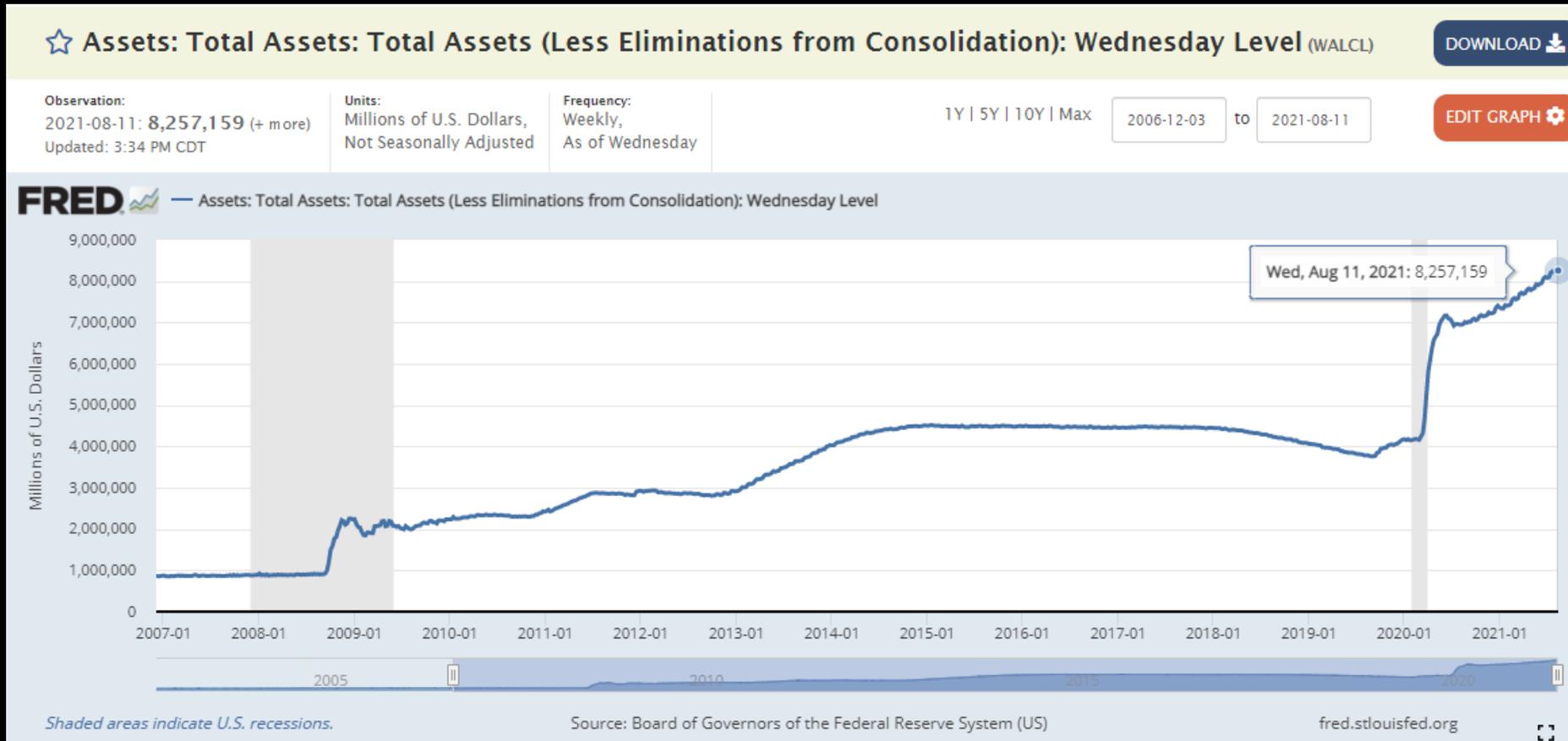
How Much Would You Pay For This Painting If You Were As Rich As Warren Buffett? (Poll)



Source: Wikipedia

The Interaction Between Supply & Demand Determines Price

- The current supply of Bitcoin, 18.8 million coins, grows very slowly and is ultimately **fixed** at 22 million. (*Only 17% more Bitcoins can ever be mined.*)
- Contrast Bitcoin growth to the Fed's Balance Sheet (\$800b to \$9t in ~10 years)



The Interaction Between Supply & Demand Determines Price

- Demand for Bitcoin is **growing much faster than supply**, hence the increase in price
- Where is demand coming from?
 - U.S. Dollar Substitute
 - El Salvador made BTC legal tender
 - Gold substitute (“Gold for millennials”)
 - Black market (\$1.8 trillion*)
 - “Libertarians” like the fact that there is no central bank in charge



* Estimate of size of black market is from havoscope.com

Where Is Bitcoin Demand Coming From?

- Companies such as Tesla, MicroStrategy, Overstock (cash substitute)
- Financial firm's initiatives (PayPal, Mastercard, BlackRock, Bank of New York)
- NFL player, Russell Okung (50% of \$13 million salary paid in Bitcoins)
- Lionel Messi, perhaps the greatest soccer player ever, partially paid in crypto
- Bitcoin may solve some needs more quickly and efficiently
 - Example: Physical gold may result in storage fees, insurance cost, etc.; cash is at risk of getting stolen, damaged, and is difficult to transport in bulk, etc.
- Cryptocurrency may be used as **collateral** for “smart contracts”

Why Crypto Is Here To Stay

- You can't get rid of it even if you wanted to since it is outside of government control, despite additional taxation, oversight, etc.
- In some respects, it is like a new Swiss banking system with its anonymity and ability to trade large sums of money.
- The financial plumbing of the world is old, not transparent, and inefficient.
- Mainstream firms (e.g. JP Morgan, Goldman Sachs) are offering crypto products to their clients.
- Well known investors like Bill Miller and Cathie Wood are strong proponents of Bitcoin.
- Potential to reduce corruption if transactions are placed on the Blockchain for all to see.
- More firms are accepting Bitcoin or using it as a cash substitute.
- Transaction costs will go down over time.
 - The current average Bitcoin transaction fee is \$25, but is < \$10 if you can wait a bit.



Cryptocurrency : Considerations for Performance Analysts

John D. Simpson, CIPM

PMAR Conference May 2022

Cryptocurrencies: are they currencies or an asset class?

- Currency: circulation as a medium of exchange; something (such as coins, treasury notes, and banknotes) that is in circulation as a medium of exchange (Merriam Webster)
- Cryptocurrency: any form of currency that only exists digitally, that usually has no central issuing or regulating authority but instead uses a decentralized system to record transactions and manage the issuance of new units, and that relies on cryptography to prevent counterfeiting and fraudulent transactions (Merriam Webster)
- Asset Class: grouping of securities or other assets with similar characteristics and are subject to the same laws and regulations; e.g., cash equivalents, equities, bonds, real estate, private equity, real assets... [cryptocurrencies]

Cryptocurrencies: a cross-section of characteristics

- Can be used for payments/exchange like a currency, but are other assets really denominated in cryptocurrencies?
- Probably better viewed for performance as assets that are denominated in traditional currencies
- A bit of a mix between traditional asset classes and alternative asset classes
- A bit of a mix between real assets and financial assets

Accounting and valuation: foundation for returns

- Transaction processing:
 - Trades and transfers
 - Dividends
 - **Corporate actions** (hard fork, soft fork, air drop, token burns...)
- Valuations:
 - At least the major cryptocurrencies have easy to obtain prices
 - Need to document pricing sources, determination of fair value
- Custody:
 - Ownership of crypto assets is based on private keys usually held in cold/offline storage
 - Retail investors often use apps such as Coinbase, Kraken providing brokerage with online and/or offline storage
 - Professional investors may use regulated, insured enterprise-grade custodians

Approaches to investing in cryptoassets: Use of CME futures contracts, options on futures contracts

- Typically used by:
 - Hedge funds
 - Proprietary trading firms
- Accounting and performance considerations:
 - No additional complexity, assuming an ability to process futures contracts and options contracts
 - Taxation: taxed at 60% long / 40% short (different from direct investment in cryptoassets)
- Benefits: fully regulated market; familiar custody situation. Bitcoin futures have historically often traded at a premium to spot prices.
- Cons: investor needs to consider costs of rolling futures positions to maintain exposures

Approaches to investing in cryptoassets: direct relationship with crypto custodian

- Typically used by:
 - Large institutional investors
- Accounting and performance considerations:
 - Direct transaction processing and accounting, but likely can leverage expertise of the crypto custodian
- Benefits: low cost method to get exposure and avoid use of fund providers and their associated costs
- Cons: requires due diligence on custodian and also on underlying assets, plus opening and funding of accounts

Approaches to investing in cryptoassets: use of private placement funds

- Typically used by:
 - High-net-worth individuals, family offices, registered investment advisors, hedge funds
- Accounting and performance considerations:
 - Outsourcing accounting to fund provider (e.g., Pantera Bitcoin Fund)
- Benefits: variety of investment choices (e.g., active or passive funds, single- or multiple asset funds; different market caps)
- Cons: only available to accredited investors; logistical challenges of relying on reporting from multiple funds

Approaches to investing in cryptoassets: publicly traded seasoned shares of private placement funds

- Typically used by:
 - Retail investors, high-net-worth investors, registered investment advisors, funds
- Accounting and performance considerations:
 - Direct transaction processing and accounting; shares obtained through OTCQX or similar entity; trading done through traditional brokers or custodians
- Benefits: ease of trading – similar to stocks, ETFs
- Cons: seasoning (6+ months) before shares can be traded may mean shares trade at premium or discount to their true value

Approaches to investing in cryptoassets: use of venture capital funds

- Typically used by:
 - Asset owners (endowments, foundations, pensions, family offices)
- Accounting and performance considerations:
 - Outsourcing accounting to fund provider
- Benefits: outsource crypto experience to venture capital firm
- Cons: requires due diligence on the venture capital firm; potentially high fees

Approaches to investing in cryptoassets: use of crypto brokerage apps/windows

- Typically used by:
 - Individual investors
- Accounting and performance considerations:
 - Rely on brokerage app for accounting, but may need to integrate with broader reporting
- Benefits: access to cryptoassets in format similar to trading via brokerage; convenience
- Cons: requires due diligence provider; higher trading costs; personal security/custody risk

Taxation of cryptoassets

- Varying views on how cryptoassets should be taxed:
 - Like a currency? → ordinary income (holding period doesn't matter)
 - Like a commodity? → section 1256 contracts (60% long-term, 40% short-term)
 - Like property? → tax as long-term capital gain if held longer than one year, otherwise tax as short-term capital gain
 - Current IRS stance is to tax as property.

Benchmarks:

- Many choices exist, including:
 - Bitwise 10 Large Cap Crypto Index (BITW)
 - Bitwise 20 Mid Cap Crypto Index (BITW20)
 - Bitwise 70 Small Cap Crypto Index (BITW70)
- S&P Cryptocurrency Indices
- FTSE Digital Asset Series
- Peer Groups?

Other considerations:

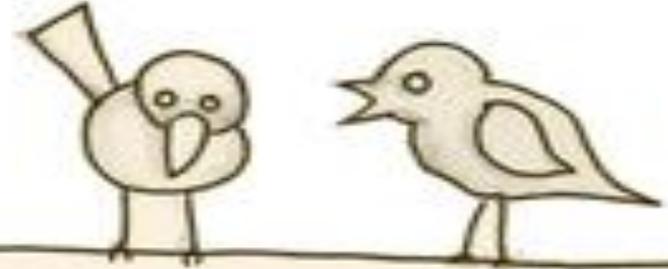
- Return attribution:
 - Does the benchmark include cryptoassets
 - How to handle off-benchmark decisions? Allocation bet?
- Risk measurement:
 - Supplement standard deviation-based measures with drawdown-based risk measures
 - Supplement Sharpe-based measures with drawdown-based appraisal measures (e.g., Sterling ratio, Calmar ratio)

Questions?



Sources/additional reading:

- Cryptoassets: Venture into the Unknown (Cambridge Associates)
- Cryptoassets: The Guide to Bitcoin, Blockchain and Cryptocurrency for Investment Professionals (CFA Institute)



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