



# Decrypting Crypto

---

## Survey of Crypto Currencies and Blockchain Equities

Venue:

Osher Lifelong Learning Institute  
U of M St. Paul Campus, Magrath Library

February 1, 2024

Instructor:

Bradley Horn  
Registered Investment Advisor  
Saffron Capital LLC  
Minneapolis, MN  
612-227-2485

# Introduction

## Purpose

Course discussion material is intended for general financial education only. Class discussion will focus on cryptocurrencies to confirm and challenge your understanding of how financial markets work. A balanced, interactive exchange is the goal combined with a data-driven perspective.

## Important Notice

Slides have been prepared by Saffron Capital LLC, a registered investment advisor regulated by the MN Department of Commerce. Course material has not been prepared as investment, tax, or legal advice, nor is not intended as a solicitation to buy or sell any securities, blockchain coins, or tokens.

Course attendees are reminded that:

- **Cryptocurrencies are for investors with high risk tolerance.**
- **The buying and selling of cryptocurrencies, as well as blockchain-related stocks, involves significant market price exposure and potential regulatory change risk. Past returns are no guarantee of future investment success.**
- **Decentralized finance (DeFi) and the wider cryptocurrency ecosystem are new market frontiers that offer many opportunities. DeFi is also associated with high fees, widespread scams, and theft of assets.**
- **Regulatory oversight of cryptocurrencies is immature. Investor protections are inadequate and FASB accounting standards are unfavorable for companies that own cryptocurrencies.**
- **Crypto is a cash driven market. The use of IRA assets is not the norm. IRA custodians may restrict a client's ability to own cryptocurrencies. Beware of any IRA custodian that seeks control of your private keys.**

## Use Limitations

The data, opinions, and market research provided in these slides are privileged. All rights are reserved. Unauthorized copying or distribution are prohibited if not approved in advance. By using the course slides, you agree to hold Saffron Capital, UofM, their employees, and any third-party data providers harmless from all claims, errors, omissions, or losses that might arise from using the slides.



# Course Outline

## Crypto Currencies and Blockchain Equities

1. Capital Market Exercise
2. Cryptocurrency Transactions
3. Market Context
4. The Crypto Currency Ecosystem
5. Blockchain Equities
6. Bitcoin Market Prices and Returns
7. Portfolio Considerations

Part 1

# Capital Market Exercises



# Liquidity Test: Fiat Currency

## Qatari Riyals (QR)



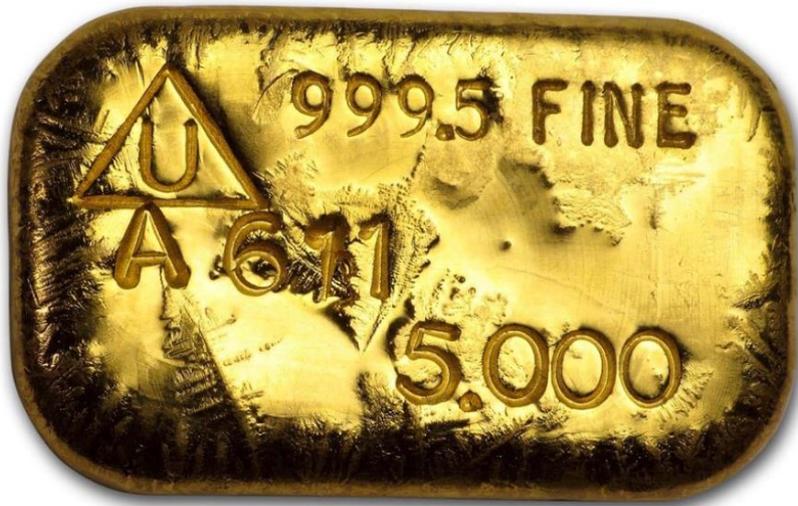
I own 300 of these bills for a total of QR 150,000.

Fair value: USD\$ 41,200. My goal is to sell these notes in exchange for US Dollars to the highest bidder in the class.

**How many US Dollars will you pay for these riyals?**

# Liquidity Test: Gold

## 20 ounces of Gold



I own 4 small bars of gold weighing 20 ounces total.

Fair Value: USD\$ 41,380. My goal is to sell the gold bars in exchange for US Dollars to the highest bidder in the class.

**How many US Dollars will you pay for the gold bars?**

# Liquidity Test: Digital Currency

## Bitcoin (BTC)



I own 1 Bitcoin.

Fair Value: \$USD 43,738. My goal is to sell this coin in exchange for US Dollars using a private blockchain transaction to the highest bidder in the class.

**How many US Dollars will you pay for 1 Bitcoin?**

# Capital Markets in Transition?



The United States is:

- 4% of world population
- 25% of world GDP
- 40% of global capital markets.

We have the deepest, most liquid, most trusted capital markets in the world.

Do we really need digital currencies? An alternative reserve currency? A new digital market ecosystem?

If so, why?

What if you live in a developing country that restricts currency trade?

# Comparison: Fiat Currency vs Gold vs Bitcoin

Attributes				Notes
 Medium of Exchange	+	+	+	All enable trade and commerce. Fiat scale and efficiency is best.
 Store of Value	+	+	+	All three are stores of value in the short- or mid-term.
 Convertible	+	+	+	Convertability is only impacted by local rules or capabilities.
 Confidential	+	+	+	Confidential transactions are common to all.
 Unregistered Trade	+	+	0	Fiat and gold can do unregistered trade with no transparency. Bitcoin trade is registered and visible on the blockchain.
 Crime	+	+	+	Bitcoin is often singled out, but is not unique.

The “+” rating indicates a positive attribute. The “0” rating indicates a neutral or negative rating.  
Copyright Saffron Capital. All rights reserved.

# Comparison: Fiat Currency vs Gold vs Bitcoin

Attributes				Notes
 Durability	0	+	+	Fiat is not a long-term store of value or purchasing power.
 Decentralized	0	0	+	Bitcoin replaces bank custodians with decentralized self-custody.
 Divisibility	+	0	+	Physical gold is easily divided. Fiat is divisible to 2 decimals and BTC to 8 decimals.
 Scarcity	0	0	+	Only bitcoin is finite in resource and divisibility
 Programmable	0	0	+	Programmable money can reduce manual admin work and expand currency attributes
 Portability	+	0	+	Gold has high value-to-weight, but is heavy and cumbersome.

The "+" rating indicates a positive attribute. The "0" rating indicates a neutral or negative rating.  
Copyright Saffron Capital. All rights reserved.

# Comparison: Fiat Currency vs Gold vs Bitcoin

Attributes				Notes
 Verifiable	0	0	+	Fiat and gold are subject to counterfeiting. Bitcoin verification is immediate.
 Government Guarantee	+	0	0	Provides stability and Trust Defines legal tender
 GAAP	+	+	0	Fiat and gold: treated as cash and financial assets Crypto currencies: treated as intangible assets
 Economy	+	0	0	Only fiat is used to manage economic conditions.
 Reserve	+	0	0	The USD serves as a reserve currency.
 Policing	+	0	0	Only fiat is used to police and reduce financial crime.

The "+" rating indicates a positive attribute. The "0" rating indicates a neutral or negative rating.  
Copyright Saffron Capital. All rights reserved.

# Bitcoin 'Monetary Policy' and Scarcity

Block Height	Halving	Block Subsidy			Date
		Binary (sats)	Decimal (sats)	Decimal (BTC)	
0	0	10010101000000101111100100000000	5,000,000,000	50.00000000	Jan 3, 2009
210,000	1	10010101000000101111100100000000	2,500,000,000	25.00000000	Nov 28, 2012
420,000	2	10010101000000101111100100000000	1,250,000,000	12.50000000	Jul 9, 2016
630,000	3	10010101000000101111100100000000	625,000,000	6.25000000	May 11, 2020
840,000	4	10010101000000101111100100000000	312,500,000	3.12500000	2024
1,050,000	5	10010101000000101111100100000000	156,250,000	1.56250000	2028
1,260,000	6	10010101000000101111100100000000	78,125,000	0.78125000	2032
1,470,000	7	10010101000000101111100100000000	39,062,500	0.39062500	2036
1,680,000	8	10010101000000101111100100000000	19,531,250	0.19531250	2040
1,890,000	9	10010101000000101111100100000000	9,765,625	0.09765625	2044
2,100,000	10	10010101000000101111100100000000	4,882,812	0.04882812	2048
2,310,000	11	10010101000000101111100100000000	2,441,406	0.02441406	2052
2,520,000	12	10010101000000101111100100000000	1,220,703	0.01220703	2056
2,730,000	13	10010101000000101111100100000000	610,351	0.00610351	2060
2,940,000	14	10010101000000101111100100000000	305,175	0.00305175	2064
3,150,000	15	10010101000000101111100100000000	152,587	0.00152587	2068
3,360,000	16	10010101000000101111100100000000	76,293	0.00076293	2072
3,570,000	17	10010101000000101111100100000000	38,146	0.00038146	2076
3,780,000	18	10010101000000101111100100000000	19,073	0.00019073	2080
3,990,000	19	10010101000000101111100100000000	9,536	0.00009536	2084
4,200,000	20	10010101000000101111100100000000	4,768	0.00004768	2088
4,410,000	21	10010101000000101111100100000000	2,384	0.00002384	2092
4,620,000	22	10010101000000101111100100000000	1,192	0.00001192	2096
4,830,000	23	10010101000000101111100100000000	596	0.00000596	2100
5,040,000	24	10010101000000101111100100000000	298	0.00000298	2104
5,250,000	25	10010101000000101111100100000000	149	0.00000149	2108
5,460,000	26	10010101000000101111100100000000	74	0.00000074	2112
5,670,000	27	10010101000000101111100100000000	37	0.00000037	2116
5,880,000	28	10010101000000101111100100000000	18	0.00000018	2120
6,090,000	29	10010101000000101111100100000000	9	0.00000009	2124
6,300,000	30	10010101000000101111100100000000	4	0.00000004	2128
6,510,000	31	10010101000000101111100100000000	2	0.00000002	2132
6,720,000	32	10010101000000101111100100000000	1	0.00000001	2136
6,930,000	33	10010101000000101111100100000000	0	0.00000000	2140

The blockchain was coded with a fixed number of bitcoins as a mining subsidy. 'Bitcoin halvings' cut the miner's reward 50% after 210,000 blocks are created.

**Block Height or Mining Rate:**

6 blocks/hr \* 24 hrs/day \* 365 days \* 3.9954 years = 210,00 blocks

**Satoshis (sats) per Bitcoin:**

100,000,000

**Block subsidy (Decimal BTC):**

50+25+12.5+6.25+ ... = 100 coins/block  
100 coins / block / 33 halvings = 3.030303 coins/block/halving

**Total Bitcoins Available:**

210,000 blocks \* 33 halvings \* 3.030303 coins/block/halving = 21,000,000 coins

**Estimated Bitcoins Already Mined:**

(50 + 25 + 12.5 + 6.25) \* 210,000 = 19,687,500 or 93.75% of total

**Estimated number of lost Bitcoins:**

4,035,938 or 20.5% due to human error

**First and Last Bitcoin Mined:**

Jan 3, 2009 / October 13, 2140 (est.)

Scarcity implies Bitcoin could be unattainable in our lifetime

**Important Note** – The case for rising Bitcoin prices as a function of scarcity assumes that Bitcoin is legal tender and enjoys regulatory acceptance. Changes in regulations could ban or restrict cryptocurrencies, undermining market demand and supply scarcity. Data: Bitcoin White Paper, RapidTables (binary to decimal to binary converters). Copyright Saffron Capital. All rights reserved.

Part 2

# Cryptocurrency Transactions

**How to Buy Bitcoin  
+  
How to Do a Bitcoin Transaction**

# How to Buy Cryptocurrencies

## General Steps

1. Choose a wallet
2. Select an Exchange or Broker
3. Create an account
4. Fund the account
5. Buy Bitcoin
6. Transfer to your wallet



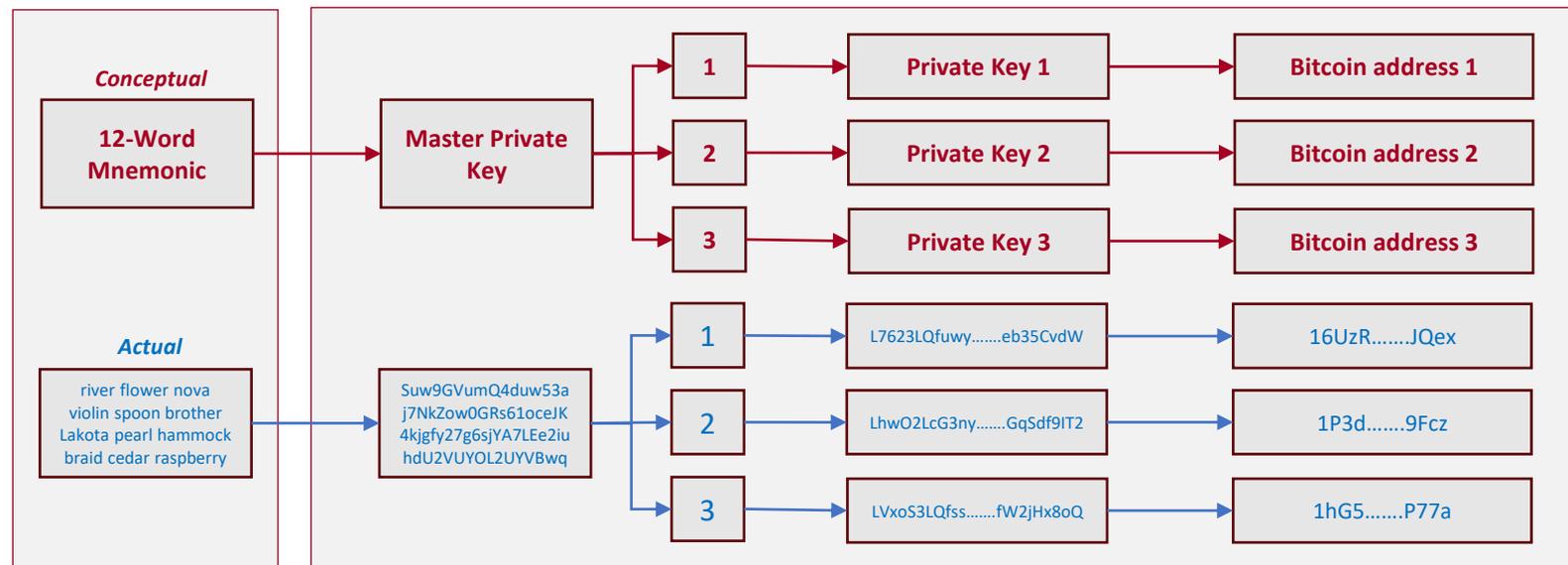
# How to Buy Cryptocurrencies

## Step 1 – Choose a Bitcoin Wallet

### Selection Criteria:

#### 1. HD Wallet with the ability to create blockchain private keys and addresses

- Supports self-custody of coins and tokens (a ‘non-custodial wallet’ )
- A seed key is used to create a ‘hierarchical deterministic’ tree of private keys by address.
- The seed key is also used to restore your wallet in case your device is lost or stolen



#### Seed Key

Requires one-time back-up to recover wallet

#### HD Tree

Permissions and actions activated by the seed key or 12-word mnemonic

# How to Buy Cryptocurrencies

## Step 1 – Choose a Bitcoin Wallet (cont.)

### Selection Criteria:

2. **Back-up and security features**
  - Essential to back-up seed key and pin codes for wallet recovery
3. **Developer community**
  - Better to have an active community for maintenance/upgrades
4. **Confirm preference for ‘Hot’ vs ‘Cold’ wallet type**
  - Hot = Online wallets (no direct control; potential hacking risk)
  - Cold = Provide an airgap between the wallet and the internet
5. **Ease of use**
  - Seek an elegant UI for fast and easy use
6. **Accept or reject ‘Know Your Customer’ requirements**
  - Wallet provider may require ID and disclosure of non-public info
7. **Seek multi-blockchain support**
  - Preferred if you want to store multiple blockchain assets
8. **Access to decentralized exchanges and Apps**
  - For advanced users



# How to Buy Cryptocurrencies

## Step 1 – Choose a Bitcoin Wallet (cont.)

Examples:

Name	Type/	Platforms	Estimated Cost	Key Feature
Ledger Nano X	Hardware/Cold	Windows, OSX Linux	\$65	HD Wallet
Trezor	Hardware/Cold	Windows, OSX Linux	\$99	HD Wallet
KeepKey	Hardware/Cold	Windows, OSX Linux	\$99	HD Wallet
Mycelium	Mobile/Hot	Android	Free	HD Wallet
Electrum	Desktop/Hot	Windows, OSX Linux	Free	HD Wallet
Atomic Wallet	Mobile/Hot	Windows, OSX Linux, Debian	Free	HD Wallet
CoinBase	Web/Hot	Windows, OSX Linux, Debian	Free	HD Wallet

Wallet list is not exhaustive, nor is it a ranking. Investors must do their own due diligence to establish the infrastructure for their DeFi activities. Pricing subject to change. Copyright Saffron Capital. All rights reserved.

# How to Buy Cryptocurrencies

## Step 2 –Select an Exchange or Broker

Choose a reputable cryptocurrency exchange or broker where you can buy Bitcoin with fiat currency. Examples are listed below:

- Exchanges: Kraken, Gemini, Crypto.com, KuCoin, Coinbase, etc.
- Brokers: Interactive Brokers, eToro, TastyTrade, Alpaca Trading, Fidelity, etc.

**Due diligence is required as vendors will differ regarding:**

- Balance sheet strength
- Custody arrangements
- The range and level of fees
- Yields on unutilized cash
- Margin costs
- Minimum investment requirements
- Funding options (wire transfer, ACH transfer, debit card, credit card, PayPal, etc.)
- Availability of BTC credit cards, debit cards, and ATMs
- Number of crypto tickers traded (for coins, tokens, ETFs, derivatives)
- Ease of use: supported wallets, GUI, technical support
- Education and documentation support
- *Regulatory compliance strategy, status under US law, and history.*

# How to Buy Cryptocurrencies

## Step 3 – Create an account

Sign up for an account on the exchange or with a broker where you can buy cryptocurrencies with fiat.

## Step 4 – Fund the account

Deposit funds into your exchange or broker account. Most exchanges and brokers accept bank transfers and other payment methods.

## Step 5 – Buy Bitcoin, another cryptocurrency or token

Once the account is funded, navigate to the trading section of the account and place an order to buy by specifying the ticker and the amount you want to purchase.

## Step 6 – Transfer to your wallet

After buying a crypto currency, consider transferring it to your personal wallet for increased security and self-custody storage. This step is optional and is recommended for long-term storage. The process may differ depending on the exchange or broker.

**Stay informed about security measures, market trends, and regulations**

# Details of a Bitcoin Transaction

## 1. Wallets and Addresses

**Jack and Jill** have Bitcoin wallets on their computers  
 Wallets manage blockchain keys and addresses  
  
 An address is a string of letters and numbers  
 Each address has a balance of Bitcoins

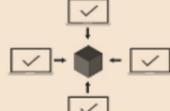
## 2. Creating a New Address

**Jack** creates a new address for Alice to send a Bitcoin payment  
  
 A cryptographic key pair is generated with a *public* and *private* key in Bob's wallet

## 3. Submitting a Payment Request

  
**Jill's** public key verifies the transaction request is from a legit account owner  
  
**Jill's** wallet has the private key for the address she's paying Bitcoins from  
  
**Jill** tells her Bitcoin client that she'd like to transfer the payment amount to **Jack's** address  
  
 The *public* key allows anyone to verify that a message signed with the *private* key is valid

## 4. Verifying the Transaction

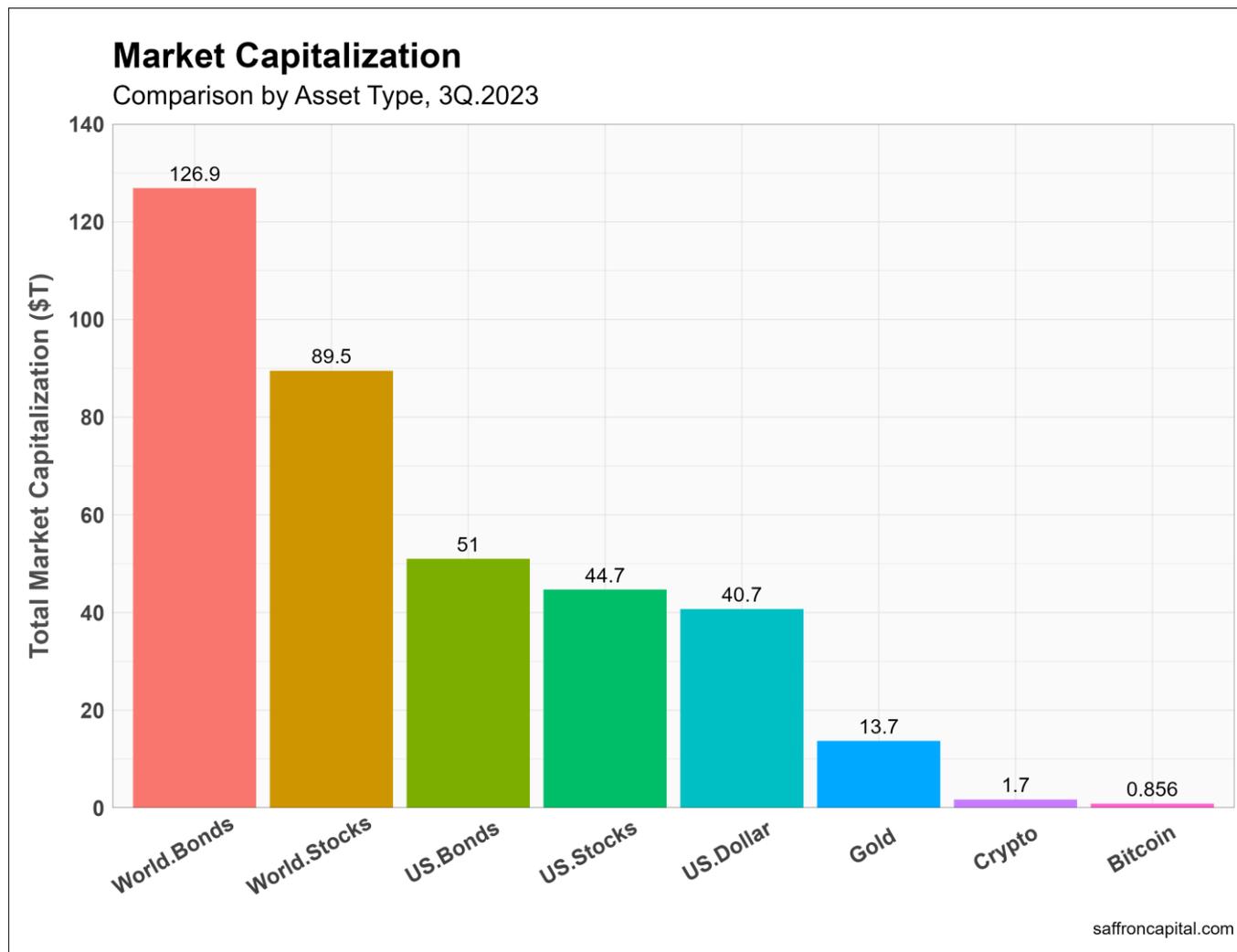
The transaction is included in a new blockchain block, along with all other transactions, in the 10-minute interval.  
  
 The block is sent to every node in the blockchain network  
  
 Miners validate the new block and transaction  
  
 Nodes receive a reward for proof-of-work  
  
  
**Jack** sees in his wallet that he is paid when the blockchain ledger is updated. The transaction is confirmed as final  
  
 The blockchain update is distributed across the network  
  
 A new validated block is added to the blockchain

## 5. Transaction Completed

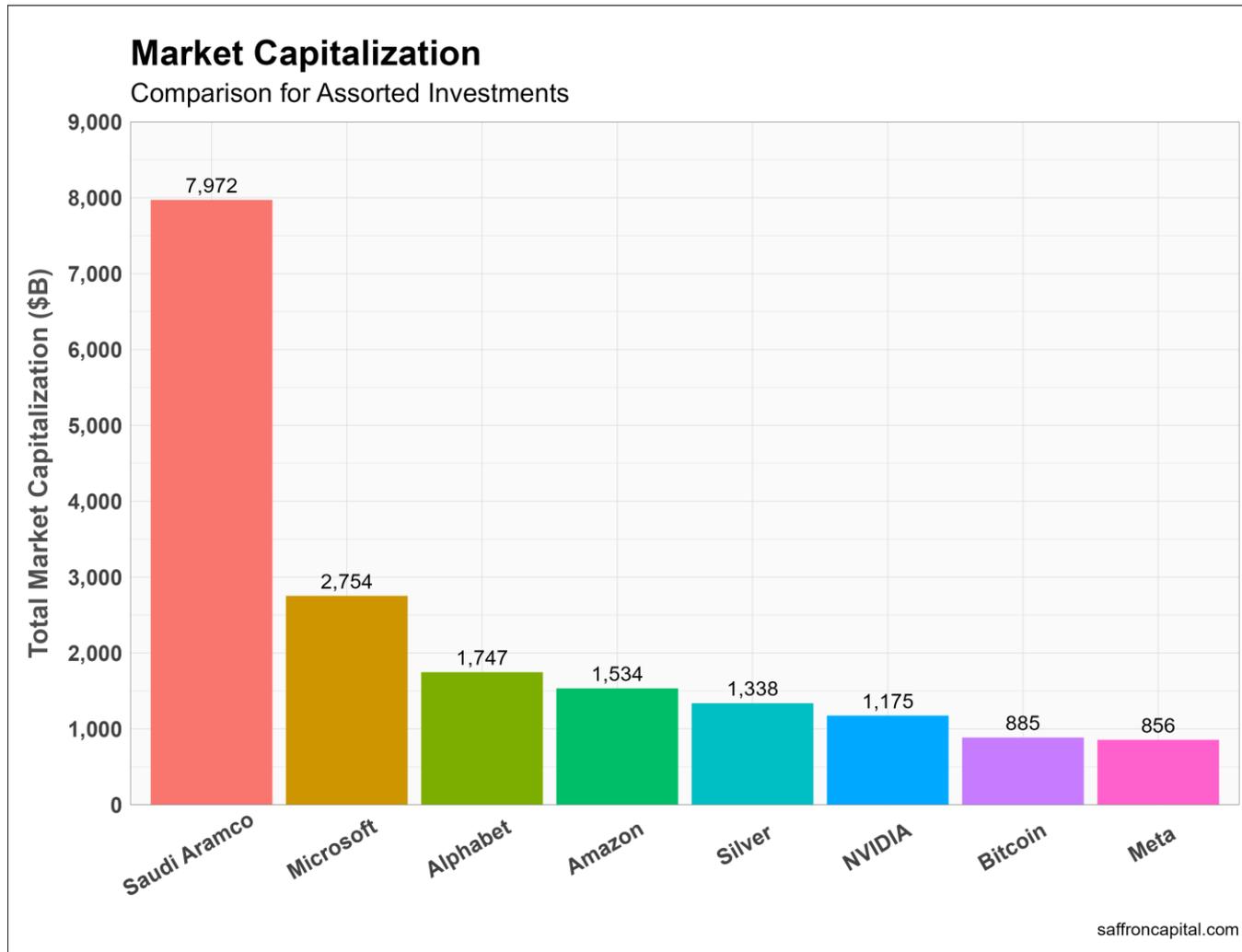
Part 3

# Market Context

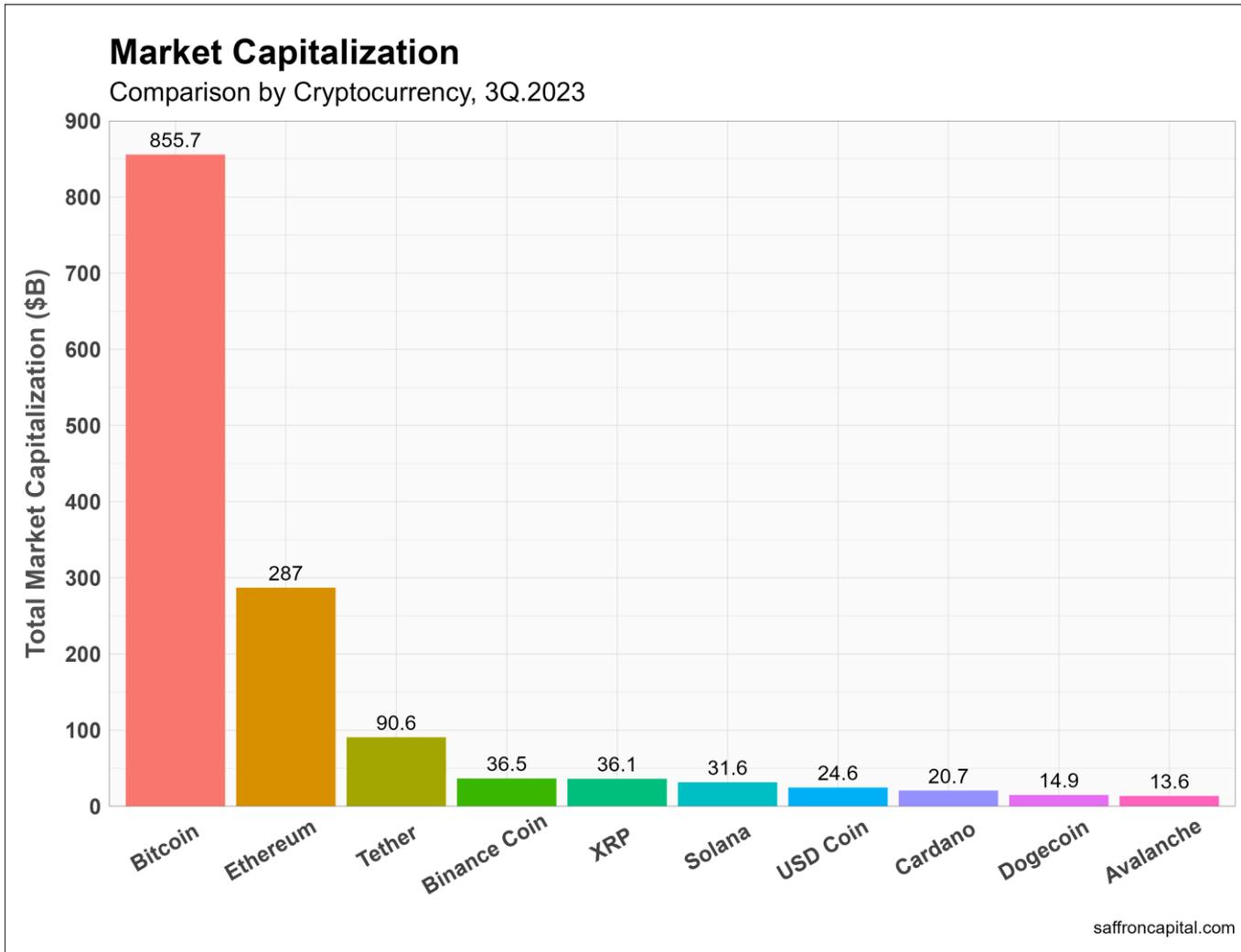
# Capital Market Benchmarking



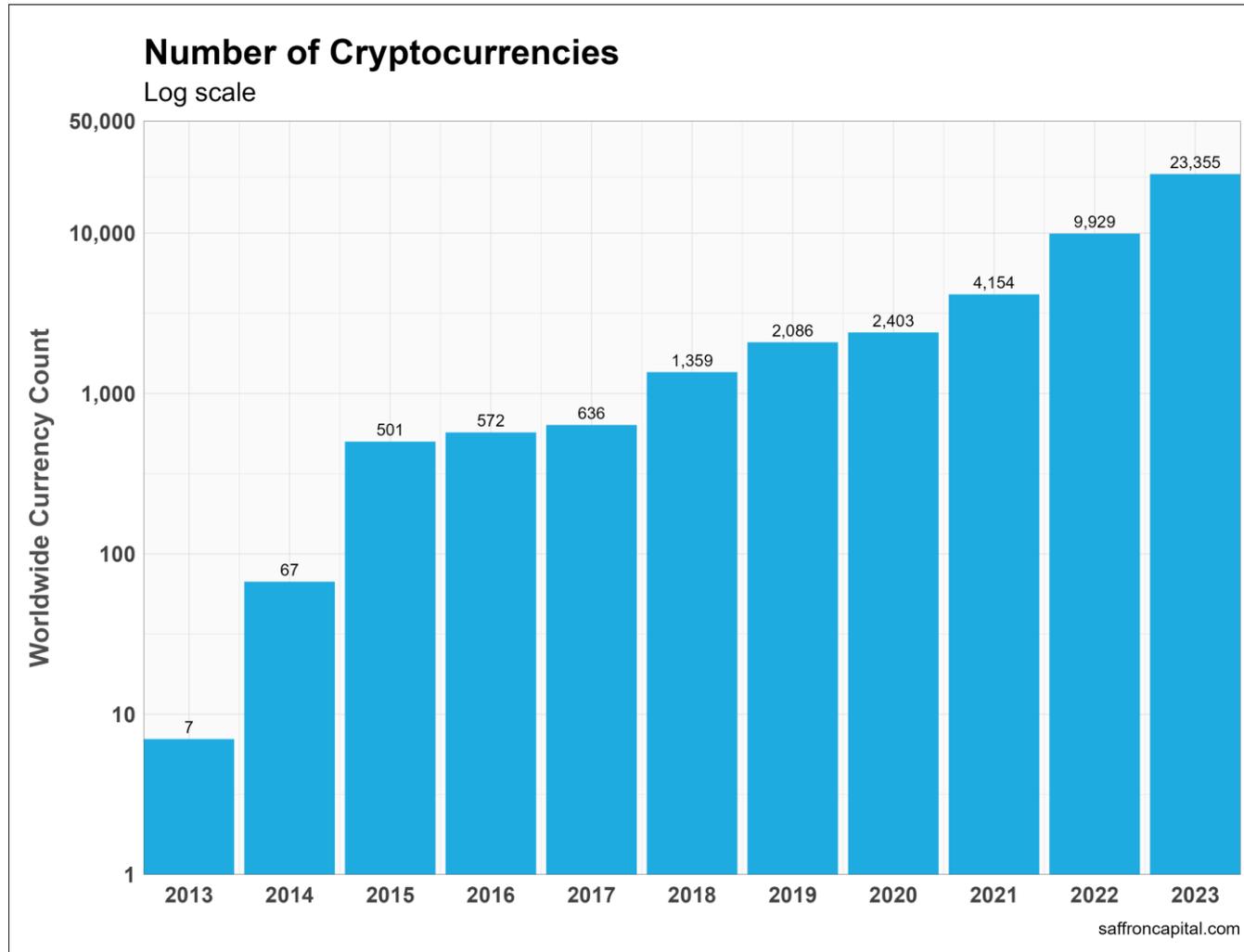
# Capital Investment Benchmarking



# Crypto Currency Benchmarking



# So Many Coins...



The total number of crypto currencies has grown to more than 23,000 coins and tokens. Examples:

Coins that are:

- Transfer units
- Specialized in nature
- Stable in value

Tokens that are:

- Value units or assets
- Infrastructure or app capabilities
- Claims to rights or services

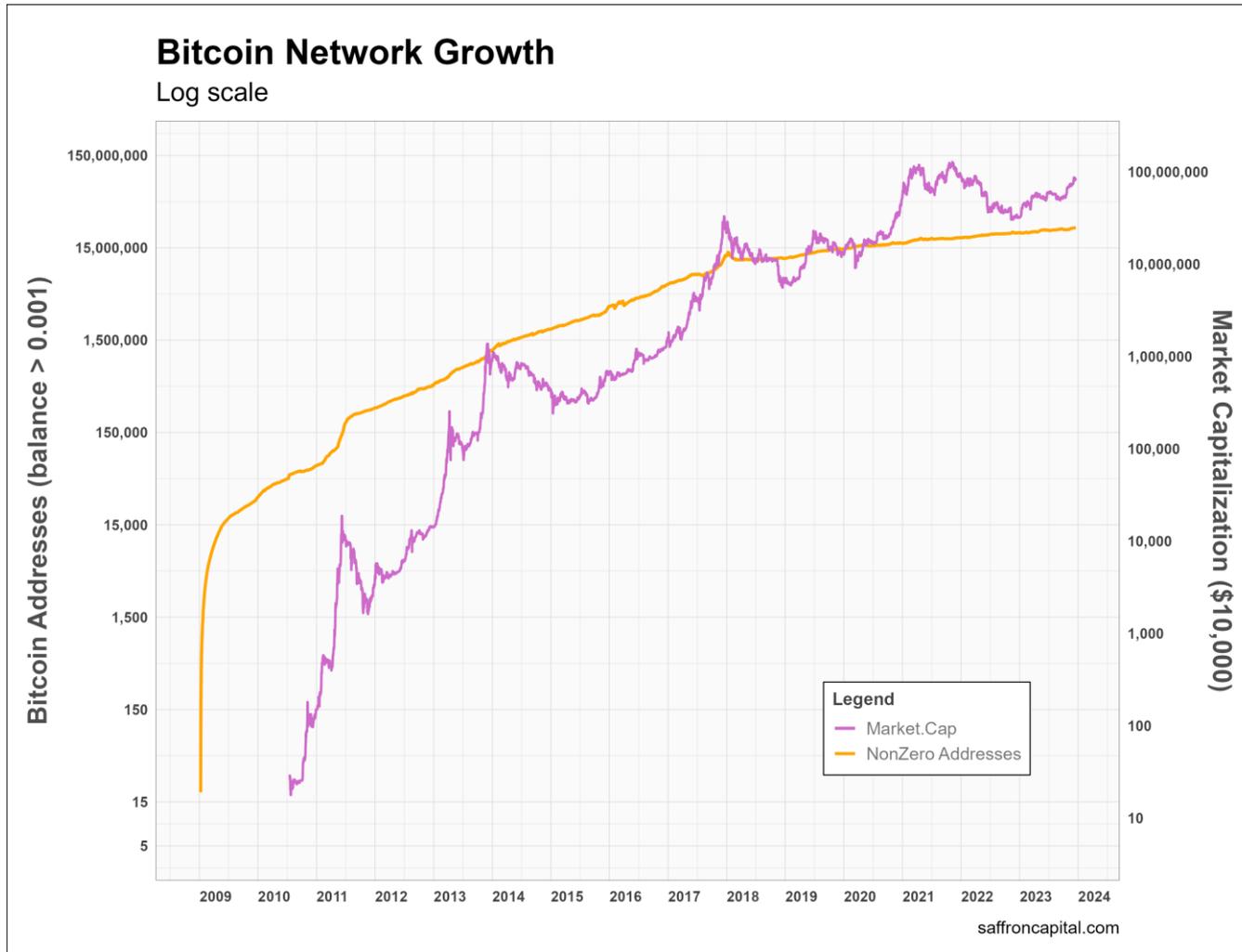
Why so many?

- Multiple use cases
- Innovation and greed
- Imperfect competition
- Weak regulations

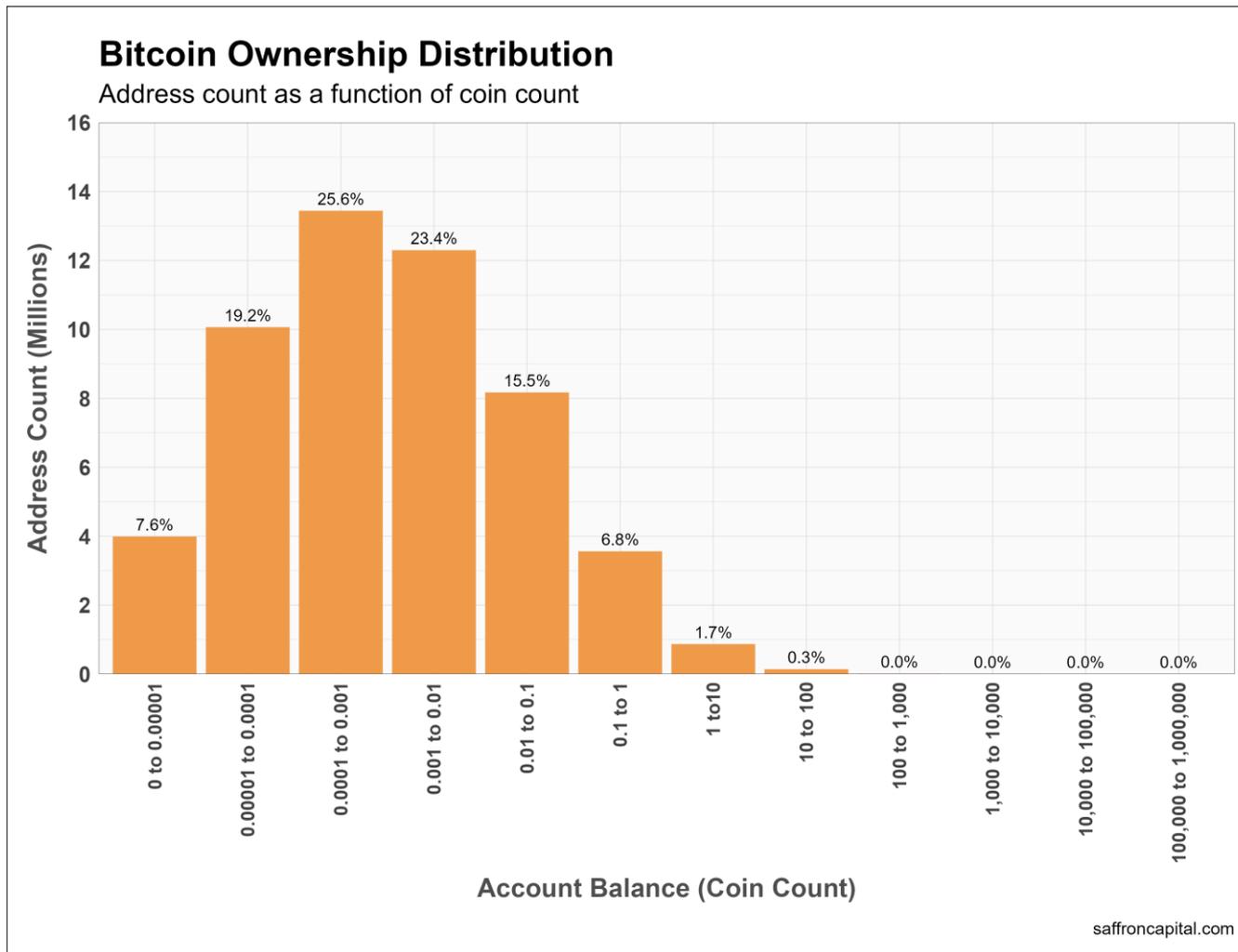
# Bitcoin Market Share



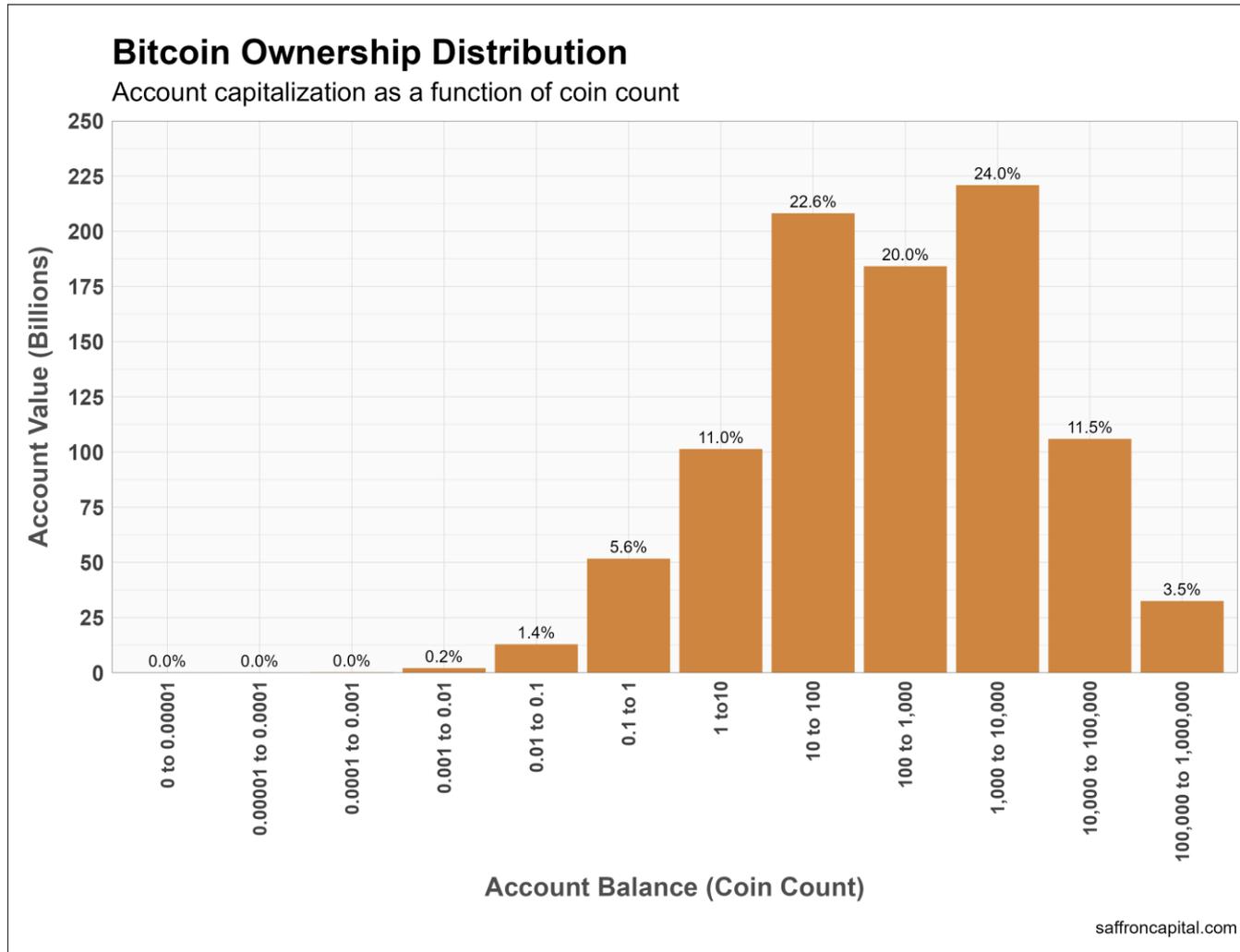
# Crypto Coin Network Growth



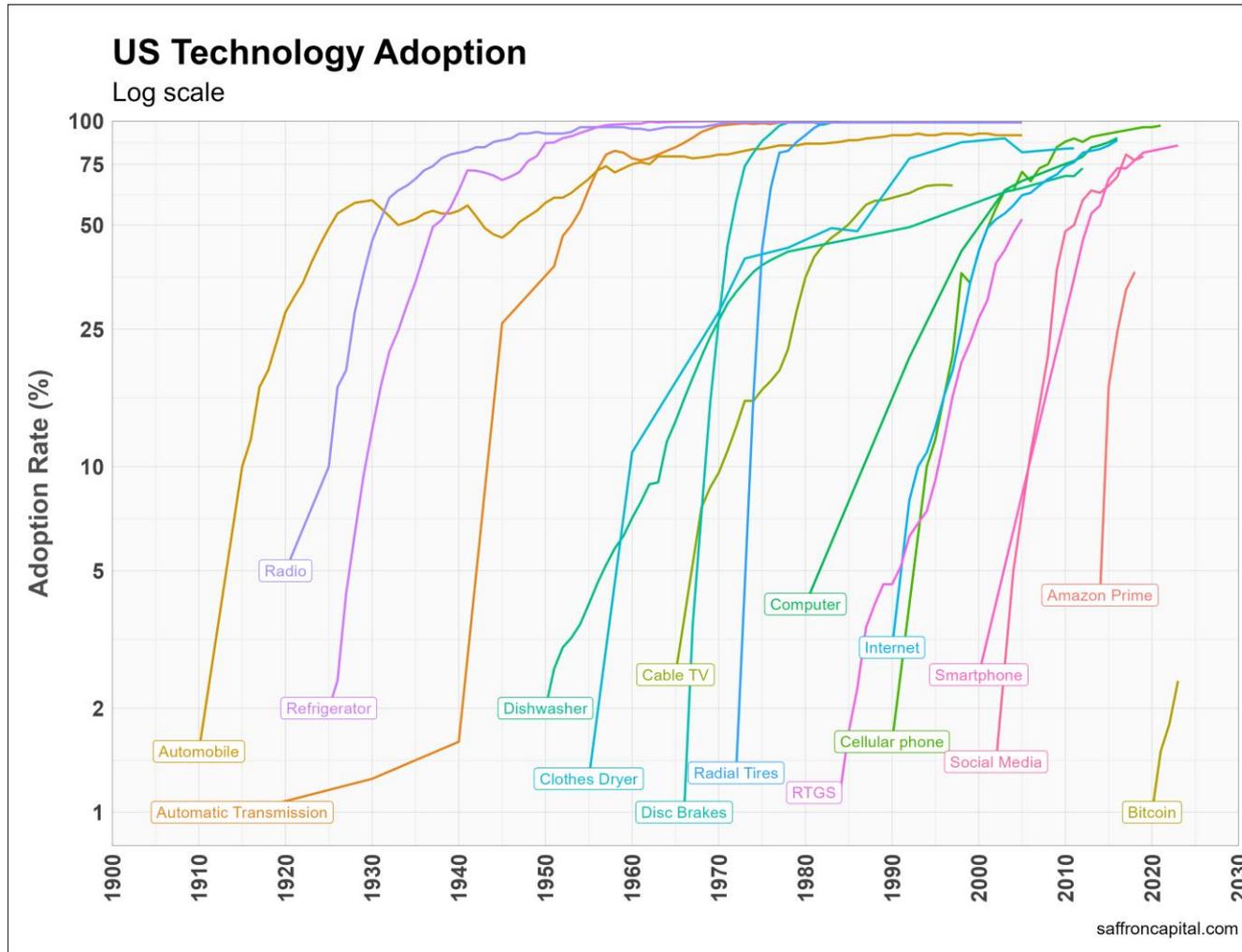
# Bitcoin Ownership Distribution



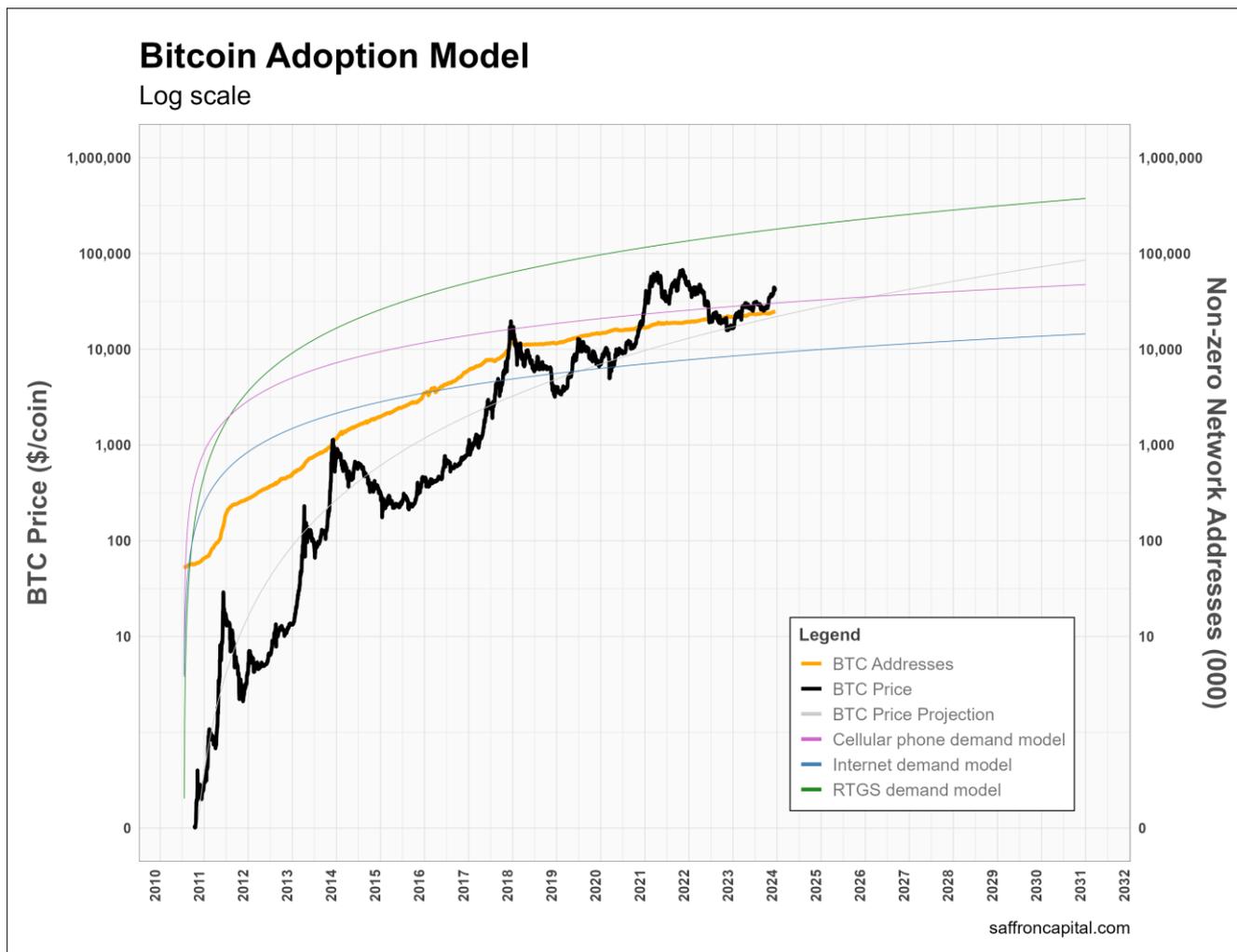
# Bitcoin Ownership Distribution



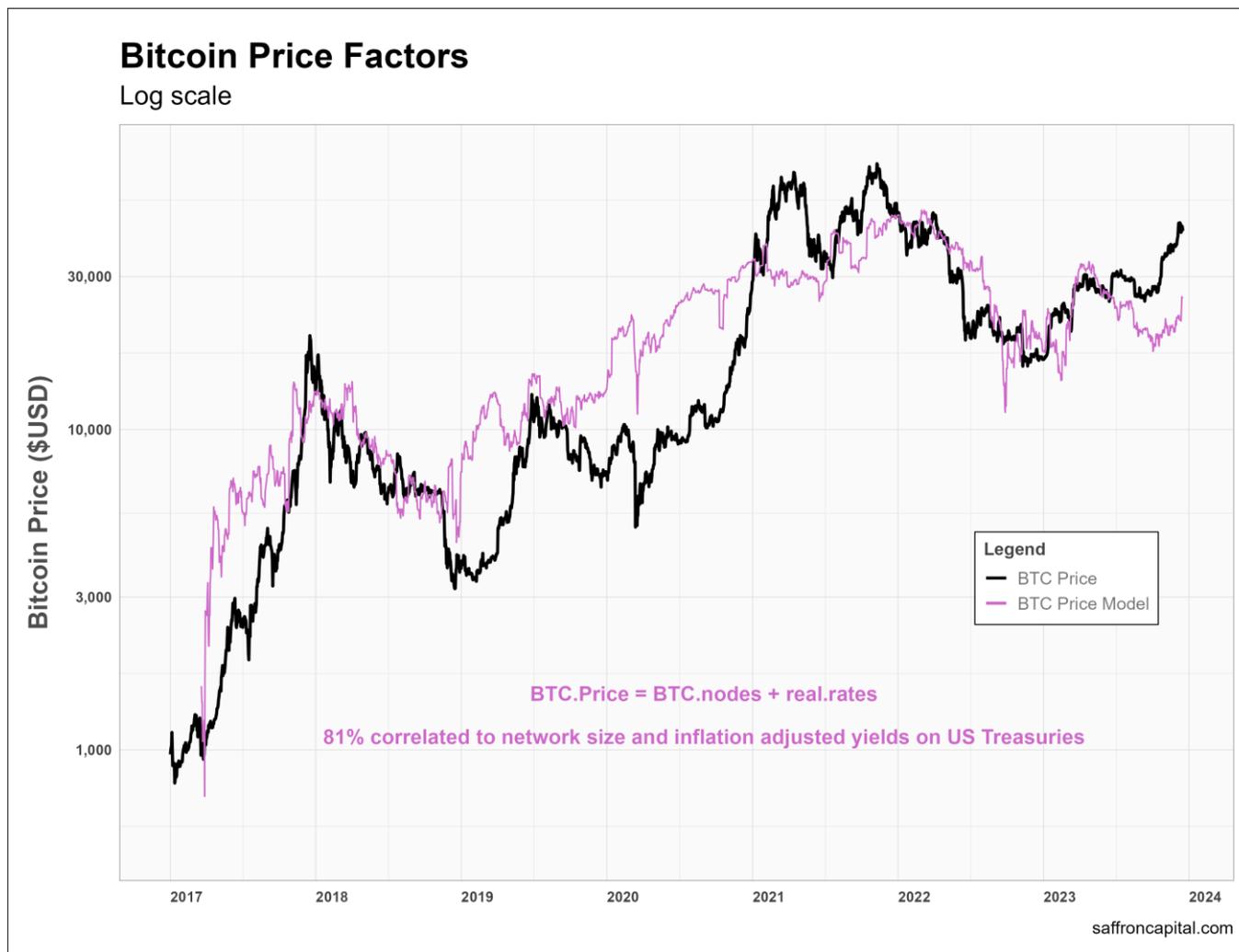
# Technology Adoption Curves



# Adoption Modeling



# What Factors Explain Bitcoin Prices?



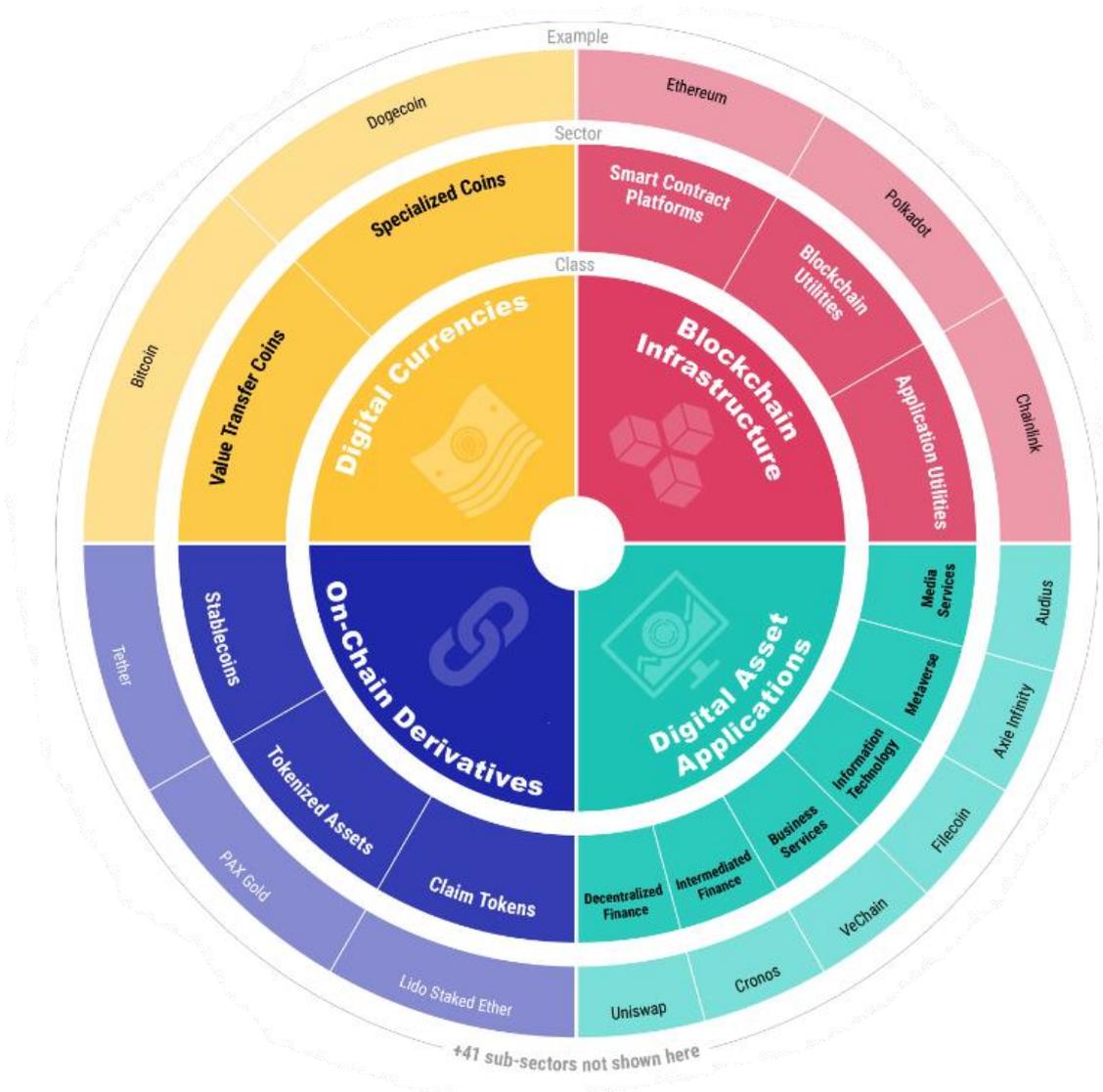
Part 4

# The Cryptocurrency Ecosystem

A Classification Framework

# MSCI Datanomy

## A Framework for Classifying Digital Assets



The framework aims to provide a consistent, standardized way to view and analyze a digital ecosystem with over 23,000 crypto currencies and many commercial services

Designed with 3 levels of classification

- 4 classes
- 14 sectors
- 41 sub-sectors

### Classes

Describe an asset's purpose at a fundamental level

### Sectors

Separate assets by high level specialization or focus area

### Sub-sectors

Delineate assets by specific products, service, or function

# MSCI Datanomy Definitions

## Digital Currencies

Class	Sectors	Sub-Sectors
<b>Digital Currencies</b>	<p><b><u>Value Transfer Coins</u></b> Assets to transfer value for on-chain payments</p>	<p><b><u>Value Transfer Coins</u></b> Digital currencies whose primary purpose is to transfer value for on chain payments</p>
	<p><b><u>Specialized Coins</u></b> Assets to transfer value for a special purpose or with specific enhancements</p>	<p><b><u>Meme Coins</u></b> Digital currencies that derive value from memes and the social community that supports it on the internet. Value is tied to the real, though intangible, value of the social network</p>
		<p><b><u>Privacy Coins</u></b> Digital currencies that offer privacy enhancement for anonymous transfer of value for on-chain payment.</p>
		<p><b><u>Remittance Coins</u></b> Digital coins that prioritize velocity for the transfer of value domestically and across borders for payments.</p>

# MSCI Datanomy Definitions

## Blockchain Infrastructure

Class	Sectors	Sub-Sectors
Blockchain Infrastructure	<b><u>Smart Contract Platforms</u></b> Tokens to execute contracts	<b><u>Smart Contract Platforms</u></b> Tokens to facilitate the execution of a smart contract and to power a diverse set of decentralized apps
	<b><u>Blockchain Utilities</u></b> Tokens to improve blockchain infrastructure or functionality	<b><u>Network Scaling</u></b> Tokens that aim to improve a blockchain’s core infrastructure for increased scale, consistency, and cost efficiency
		<b><u>Cross-Chain Interoperability</u></b> Tokens that allow blockchains and their applications or assets to interact via cross-chain bridges
		<b><u>Blockchain Networks</u></b> Tokens that allow users to build and run their own blockchains
	<b><u>Application Utilities</u></b> Tokens to support developers to build digital asset applications	<b><u>Oracles</u></b> Tokens that allow for app development to connect data from the outside world (off-chain) into blockchain apps (on-chain).
		<b><u>Digital Identity</u></b> Tokens that designate, assign and validate a name, person, or domain on the blockchain.
		<b><u>Governance Tools</u></b> Tokens to improve the operation of decentralized autonomous organizations
		<b><u>Software Development</u></b> Tokens with software development kits (SDKs)

# MSCI Datanomy Definitions

## Digital Asset Applications

Class	Sectors	Sub-Sectors
Digital Asset Applications	<b>Decentralized Finance</b> Tokens that serve as an alternative to traditional financial services and products	<b>Decentralized Exchanges</b> Tokens for peer-to-peer transfer of assets
		<b>Derivative Trading</b> Tokens for the creation and transfer of derivative contracts
		<b>Decentralized Lending</b> Tokens that facilitate activity in derivatives trading
		<b>Stablecoin Issuers</b> Tokens to issue, lend or borrow stable coins
		<b>Prediction Markets</b> Tokens to place bets on events or data, and to issue rewards
		<b>Asset Management</b> Tokens for portfolio services to optimize yield or to manage risk
		<b>Crowd Funding</b> Tokens for peer-to-peer investments and fund-raising
	<b>Insurance</b> Tokens to share and cover various blockchain risks	
	<b>Intermediated Finance</b> Custodial financial services facilitated by an intermediary	<b>Intermediated Lending</b> Tokens for lending that requires custody of assets
		<b>Payment Platforms</b> Tokens to facilitate payment via the blockchain
<b>Private Exchanges</b> Tokens for private cryptocurrency exchanges		

# MSCI Datanomy Definitions

## Blockchain Infrastructure

Classens	Sectors	Sub-Sectors
Digital Asset Applications	<b><u>Business Services</u></b> Tokens for products and services to develop blockchain-based platforms	<b><u>Professional Services</u></b> Tokens for special resources to build platforms or applications
	<b><u>Information Technology</u></b> Tokens for storage, sharing aggregation, computation and manipulation of on-chain data	<b><u>Enterprise</u></b> Tokens for the development of services on an enterprise basis
		<b><u>Data Services</u></b> Tokens to apps for various data-related activities
		<b><u>Compute, Storage &amp; Privacy</u></b> Tokens for shared compute and private storage
		<b><u>Wallets &amp; Messaging</u></b> Tokens to privately interact, transact and communicate
		<b><u>Internet of Things</u></b> Tokens to transfer data between machines and physical objects
	<b><u>Metaverse</u></b> Tokens for the ownership and transfer of digital property in a virtual ecosystem	<b><u>Virtual Worlds</u></b> Tokens to transfer and interact with digital land or property
		<b><u>Gaming</u></b> Tokens for blockchain gaming and rewards
		<b><u>NFT Ecosystem</u></b> Tokens NFTs are created, bought, sold and transferred
	<b><u>Media Services</u></b> Tokens for the distribution of content and communication across mediums	<b><u>Advertising</u></b> Tokens for viewing adds and getting viewership rewards
		<b><u>Content &amp; Streaming</u></b> Tokens for the creation and broadcasting of content

# MSCI Datanomy Definitions

## On-chain Derivatives

Class	Sectors	Sub-Sectors
On-Chain Derivatives	<b>Stablecoins</b> Tokens pegged to the value of a specific sovereign-issued currency	<b>Fiat-backed Stablecoins</b> Stablecoins backed by fiat cash and cash-like equivalents.
		<b>Crypto-backed Stablecoins</b> Tokens that are backed by reserves of cryptocurrencies
		<b>Algorithmic Stablecoins</b> Stablecoins that maintain a formula-based peg to another asset
	<b>Tokenized Assets</b> Tokens that provide exposure to another asset, on-chain or off-chain	<b>Asset-backed Tokens</b> Tokenized assets backed by an asset held in segregated account
		<b>Synthetic Tokens</b> Tokens that mimic the one-to-one price of another asset
	<b>Claim Tokens</b> Tokens that entitle the holder to credit toward an underlying asset.	<b>Liquidity Provider Tokens</b> Tokens with a claims to a share of a liquidity pool
		<b>Staked Assets</b> Tokens with a claim to an asset staked on a blockchain or app

Part 5

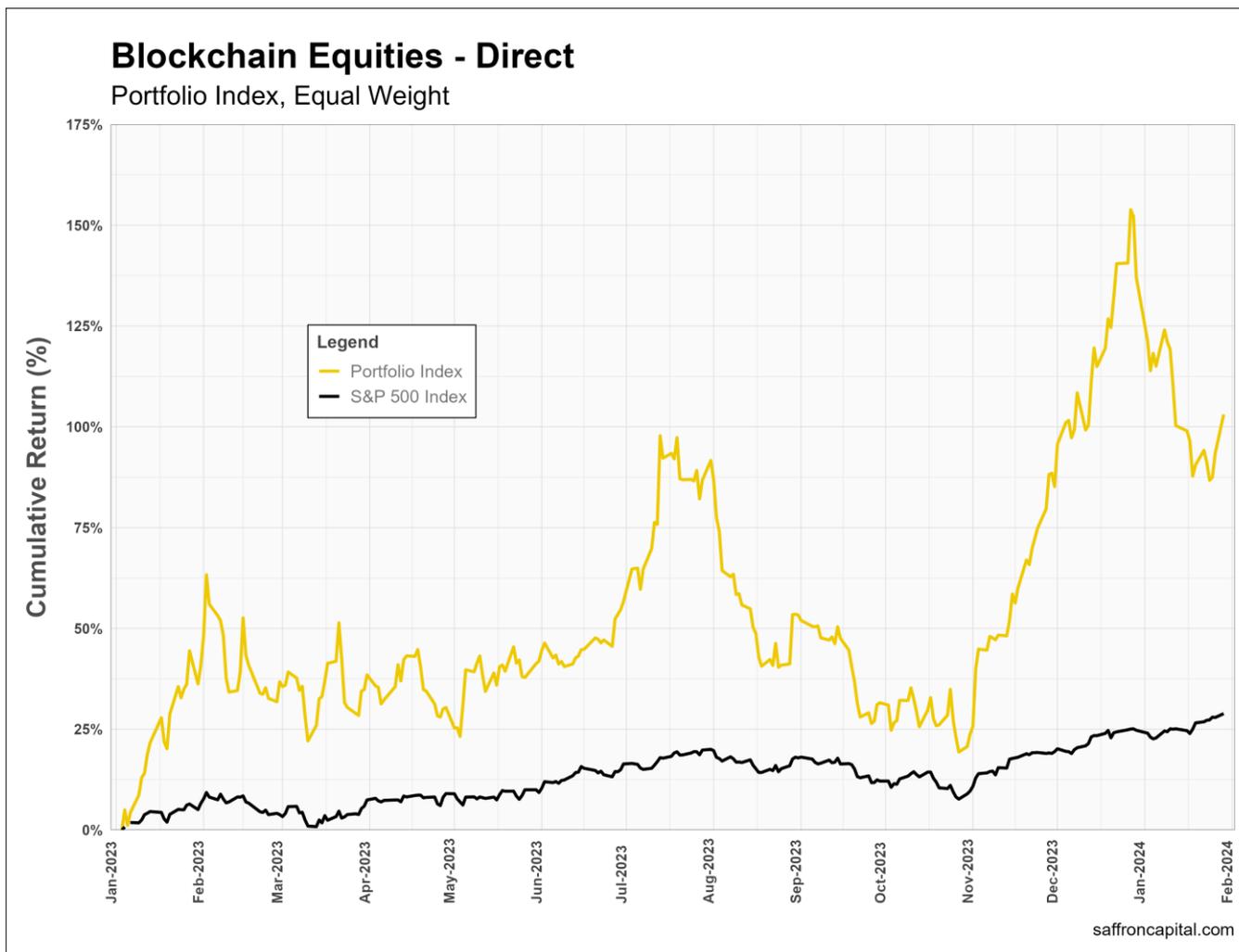
# Blockchain Equities

# Top 15 Blockchain Equities – Direct Plays

							Analyst Survey					Factor Summary				
	Name	DeFi	Ticker	Price	Country	Sector	WStreet	SMedia	Quants	Average	Saffron	Value	Growth	Profits	Moment	EPSrev
1	SURGEPAYS INC.	Direct	SURG	\$ 82.33	United States	Communication Services	4.00	4.00	4.91	4.30	4.80	A	A+	A	A	A+
2	SHOPIFY INC.	Direct	SHOP	\$ 1.83	Canada	Information Technology	3.60	3.35	3.44	3.46	3.67	F	A	C	A	B
3	DIGIHOST TECHNOLOGIES	Direct	DGHI	\$ 6.94	United States	Information Technology	4.00	#N/A	2.98	#N/A	3.51	B+	D-	C	A	#N/A
4	BLOCK INC CLASS A	Direct	SQ	\$ 68.24	United States	Financials	4.20	3.94	3.45	3.86	3.50	D-	A+	B-	B+	B+
5	IRIS ENERGY PTY LTD	Direct	IREN	\$ 4.33	Australia	Information Technology	4.71	4.00	2.90	3.87	3.45	A-	A-	F	A+	C-
6	CLEANSARK INC	Direct	CLSK	\$ 8.42	United States	Information Technology	4.50	4.33	3.25	4.03	3.31	B-	A	D	A+	D
7	BITFARMS LTD	Direct	BITF	\$ 10.55	Canada	Information Technology	4.60	4.00	3.29	3.96	3.14	B	B+	D+	A+	D+
8	EVERI HOLDINGS INC	Direct	EVRI	\$ 5.40	United States	Consumer Discretionary	5.00	4.00	2.65	3.88	3.12	A-	D+	B+	D	C+
9	APPLIED DIGITAL CORP	Direct	APLD	\$ 0.85	United States	Information Technology	4.57	4.00	2.72	3.76	3.11	A	A	D-	A-	F
10	THE OLB GROUP INC.	Direct	OLB	\$ 2.31	United States	Financials	5.00	#N/A	2.92	#N/A	3.07	B+	B	D-	C-	C+
11	BIT DIGITAL INC	Direct	BTBT	\$ 2.82	China	Information Technology	4.50	3.00	2.64	3.38	3.02	C+	C-	F	B+	C-
12	RIOT PLATFORMS INC	Direct	RIOT	\$ 11.34	United States	Information Technology	4.54	4.00	2.87	3.80	3.00	C	C+	D-	B-	C+
13	STRONGHOLD DIGITAL MINING, INC.	Direct	SDIG	\$ 1.49	United Kingdom	Information Technology	4.00	#N/A	2.73	#N/A	2.92	A+	C-	D	B	F
14	COINBASE GLOBAL INC CLASS A	Direct	COIN	\$ 5.21	United States	Financials	3.12	2.77	3.48	3.12	2.90	F	D-	B	A+	A+
15	CANAAN INC	Direct	CAN	\$ 1.52	China	Information Technology	4.50	3.00	2.53	3.34	2.89	B+	B-	D-	C-	D-

Data: SimFin API. Zachs Investment Research. Data as of 23-Jan-2024. Factor scores use a proprietary scoring model and derive from company income and balance sheet statements. Copyright Saffron Capital. All rights reserved.

# Top 15 Blockchain Equities – Direct Plays

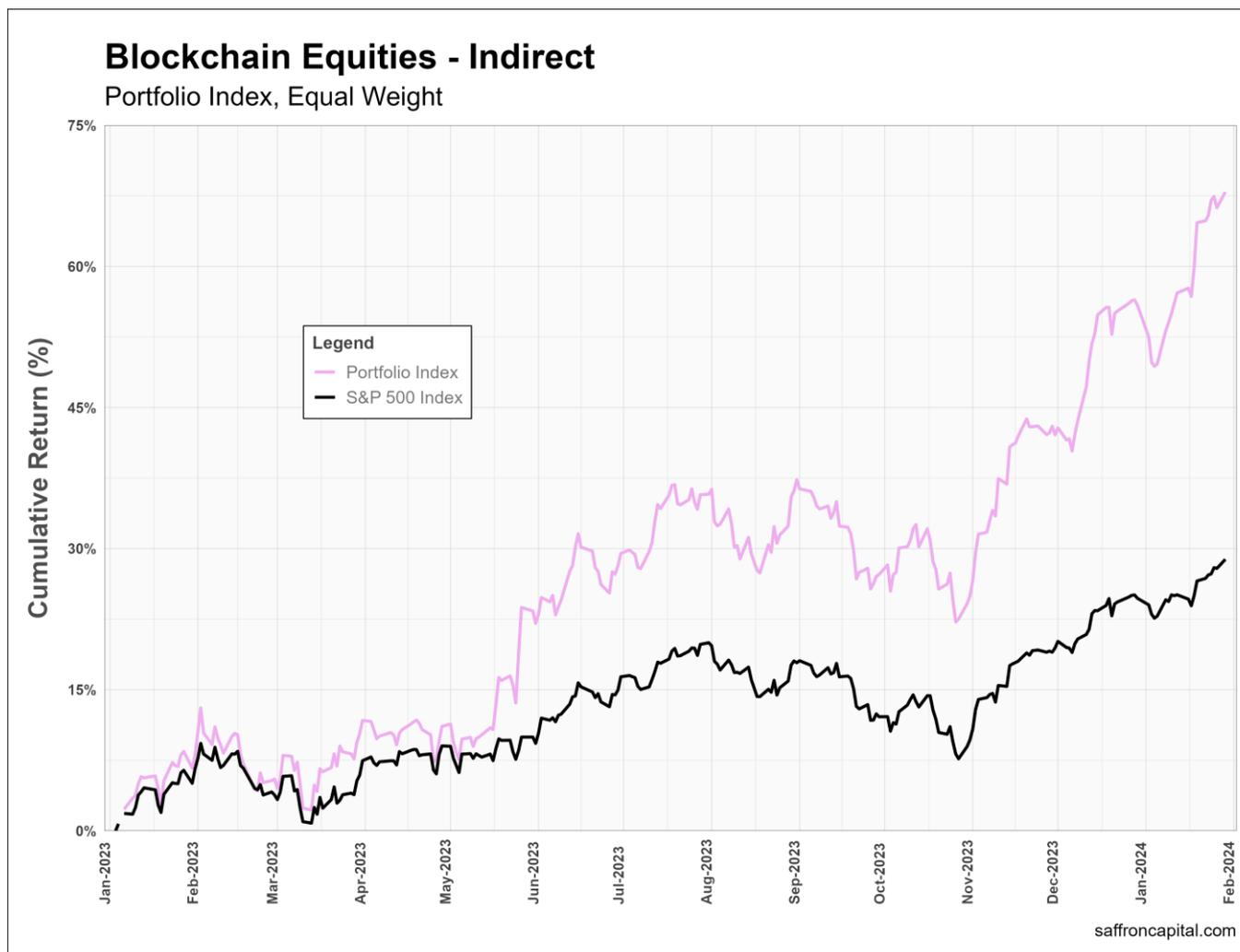


The portfolio index comprised of the top 15 bitcoin stocks (direct plays) consistently beat and outperformed the S&P 500 index over the sample period since Jan 1, 2023. At the same time, the portfolio was more volatile than the index.

# Top 15 Blockchain Equities – Indirect Plays

							Analyst Survey					Factor Summary				
	Name	DeFi	Ticker	Price	Country	Sector	WStreet	SMedia	Quants	Average	Saffron	Value	Growth	Profits	Moment	EPSrev
1	DOCUSIGN INC.	Indirect	DOCU	\$ 61.61	United States	Information Technology	3.19	3.50	4.87	3.85	4.46	C-	B+	A	A	A+
2	BANK OF AMERICA CORP.	Indirect	BAC	\$ 34.80	United States	Financials	3.80	3.81	4.00	3.87	4.17	C+	C+	A+	B	C
3	EPLUS	Indirect	PLUS	\$ 77.63	United States	Information Technology	3.66	3.00	2.73	3.13	4.06	B	C-	B-	A-	D+
4	AMAZON.COM INC.	Indirect	AMZN	\$ 159.00	United States	Consumer Discretionary	4.69	4.14	3.49	4.11	3.74	D-	A-	A+	A-	A+
5	NVIDIA CORP.	Indirect	NVDA	\$ 627.74	United States	Information Technology	4.62	3.33	3.49	3.81	3.68	F	A+	A+	A-	B+
6	INTUIT INC.	Indirect	INTU	\$ 647.72	United States	Information Technology	4.23	3.40	3.24	3.62	3.61	F	B	A+	A-	C+
7	BROADCOM INC	Indirect	AVGO	\$ 1,208.16	United States	Industrials	4.39	3.52	4.74	4.22	3.57	D+	B-	A+	A-	C+
8	MASTERCARD	Indirect	MA	\$ 445.20	United States	Financials	4.50	4.00	3.31	3.94	3.56	F	A-	A+	C-	B-
9	ACCENTURE PLC	Indirect	ACN	\$ 371.38	Ireland	Information Technology	4.00	2.80	3.26	3.35	3.49	D	C-	A+	B	C+
10	BLACKROCK INC	Indirect	BLK	\$ 781.40	United States	Financials	4.23	3.60	3.46	3.76	3.48	D-	C+	A	C-	C-
11	MICROSOFT CORP.	Indirect	MSFT	\$ 408.59	United States	Information Technology	4.58	3.60	3.49	3.89	3.45	D-	C+	A+	B+	B
12	INTERNATIONAL BUSINESS MACHINES CO	Indirect	IBM	\$ 187.83	United States	Information Technology	3.15	3.22	3.28	3.22	3.41	B	D-	A+	B+	C-
13	DXC TECHNOLOGY	Indirect	DXC	\$ 22.74	United States	Information Technology	2.69	3.00	3.01	2.90	3.38	A	D	C	C-	C-
14	TAIWAN SEMICONDUCTOR MANUFACTURING CO	Indirect	TSM	\$ 116.08	Taiwan	Information Technology	4.61	4.00	3.45	4.02	3.34	C	D+	A+	C+	B-
15	ADVANCED MICRO DEVICES	Indirect	AMD	\$ 172.06	United States	Information Technology	4.27	3.66	3.26	3.73	3.30	D-	B+	B+	A-	D+

# Top 15 Blockchain Equities – Indirect Plays



The portfolio index comprised of the top 15 bitcoin stocks (indirect plays) also outperformed the S&P 500 index over the sample period. Price volatility is also higher than index, albeit not as high as for direct play blockchain shares.

# Bitcoin ETFs – Key Insights

## Ishares Bitcoin Trust (IBIT)

23.80 +0.46 (+1.97%) 01/19/24 [NASDAQ]  
 23.79 x 2 23.85 x 1 POST-MARKET 23.79 -0.01 (-0.04%) 19:59 ET  
 INTERACTIVE CHART for Fri, Jan 19th, 2024



The chart shows that the new bitcoin ETF from Blackrock is not tracking well to the actual bitcoin price. Cash flows from both are supposed to be the same...not 10% apart!

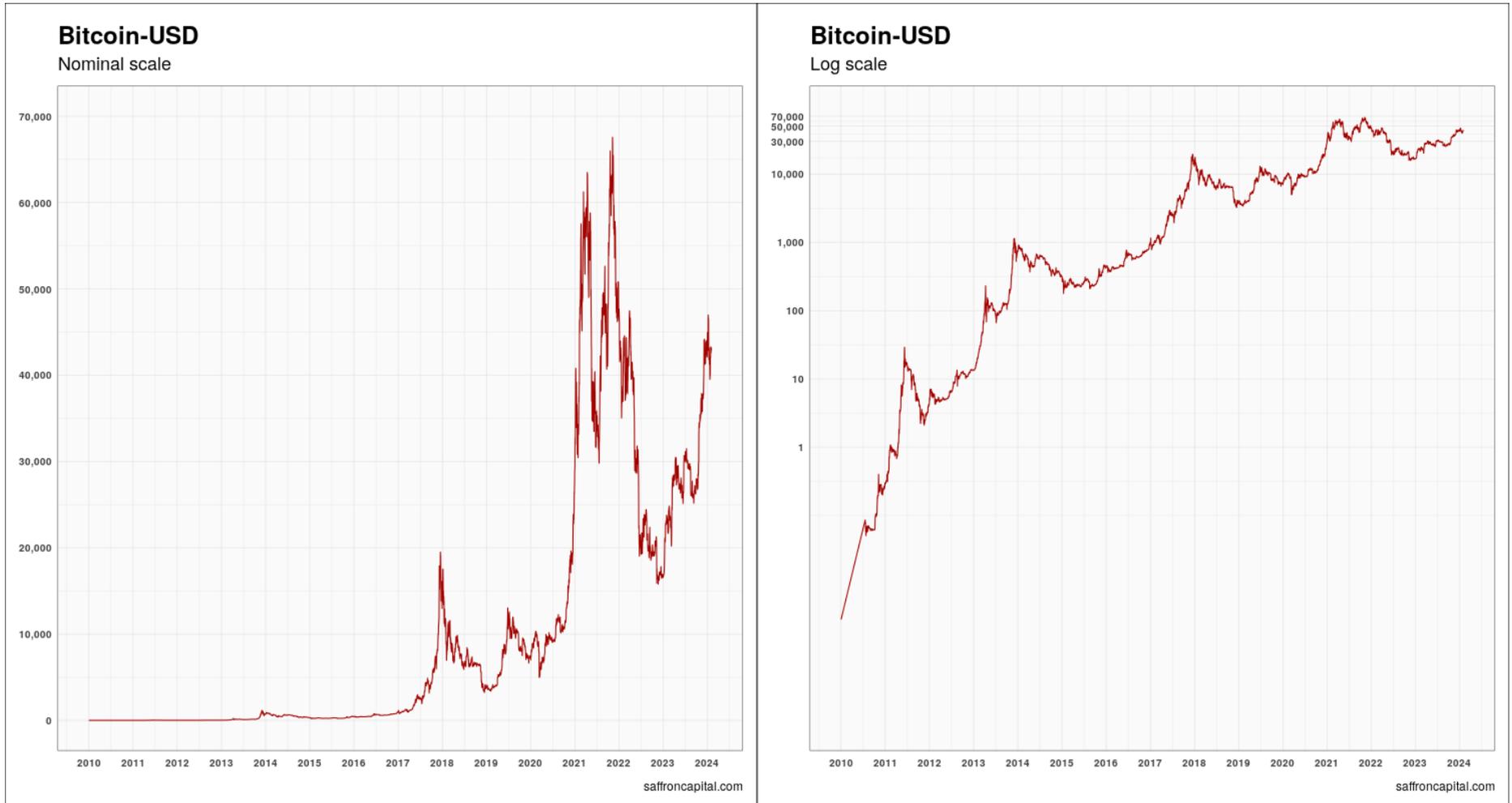
The pricing mismatch confirms the fears of the SEC that bitcoin liquidity will impact market pricing.

The gap also confirms an arbitrage opportunity, where well positioned traders will sell physical bitcoin and purchase the financial ETF. That selling pressure will continue to be a key driver behind physical market prices.

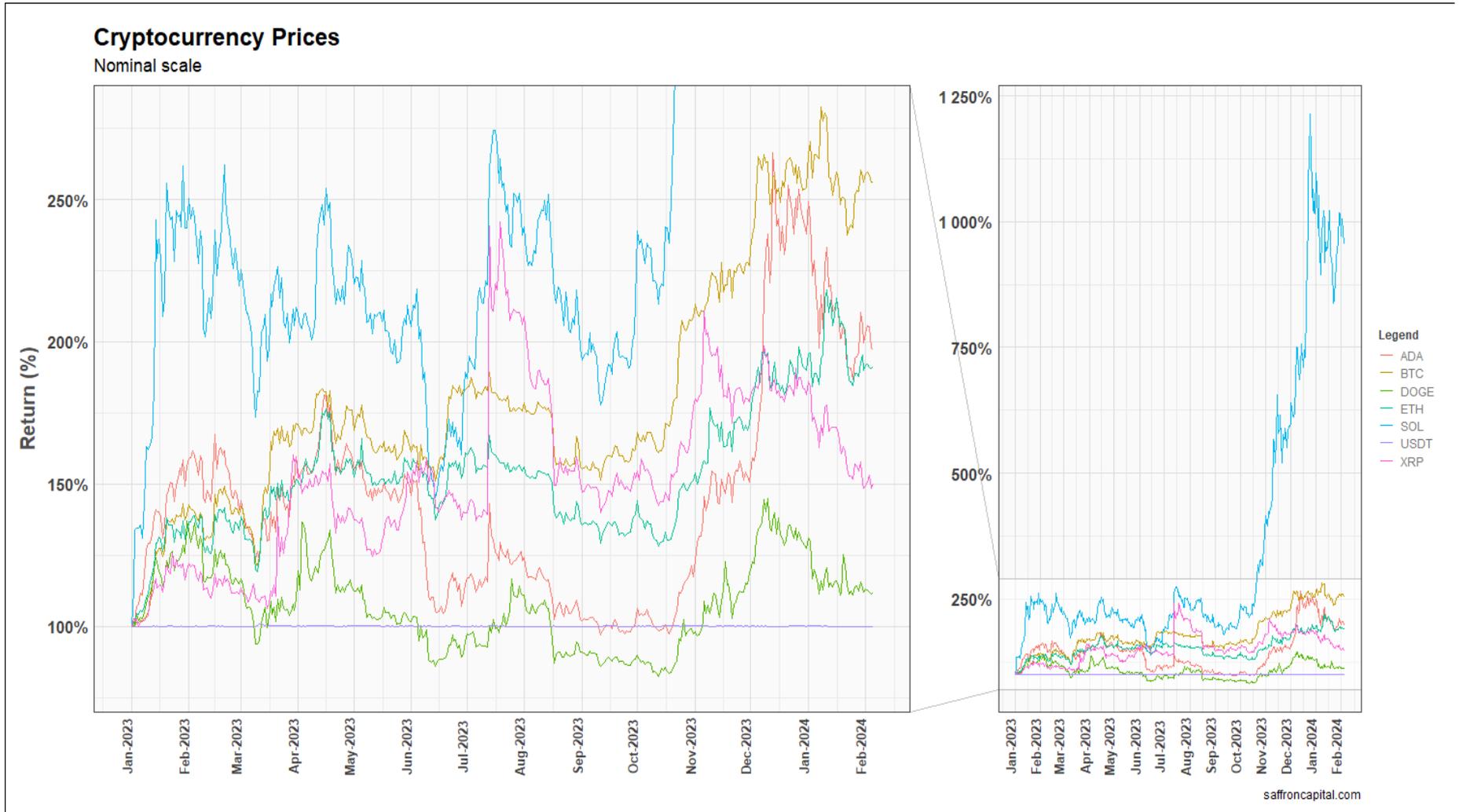
Part 6

# Market Prices and Returns

# BTC Price as a Function of Scale



# Cryptocurrency Price Comparison

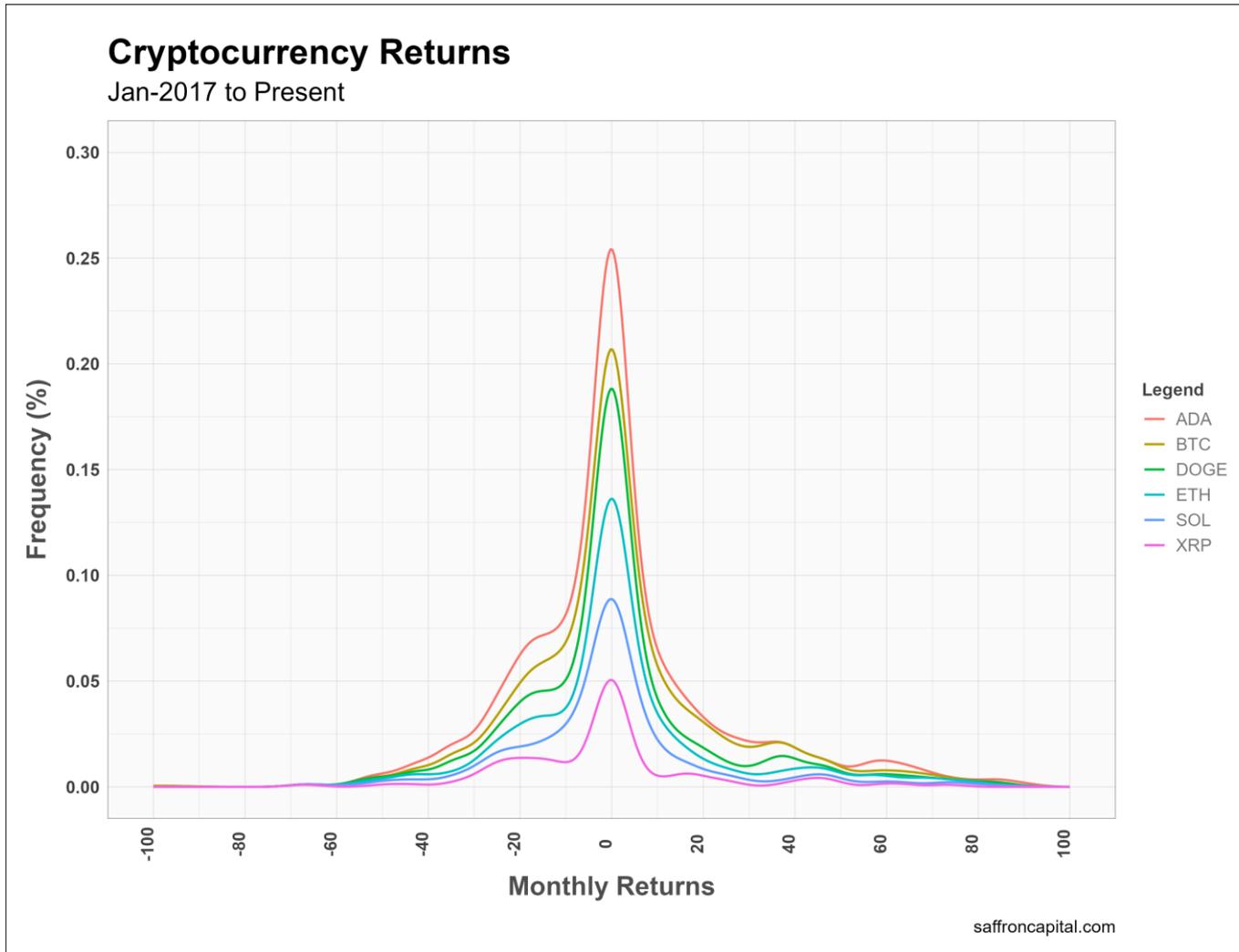


# Cryptocurrency Annual Returns

	Bitcoin BTC-USD	Ethereum ETH-USD	Tether USDT-USD	XRP XRP-USD	Solana SOL-USD	Avalanche ADA-USD
2010	9,900.0%					
2011	1,337.9%					
2012	211.9%					
2013	5,372.2%					
2014	(56.5%)					
2015	34.5%					
2016	123.8%					
2017	1,368.9%	135.8%	0.4%	957.8%		2,145.1%
2018	(73.6%)	(82.4%)	0.1%	(84.7%)		(94.3%)
2019	92.2%	(2.8%)	(1.4%)	(45.3%)		(20.0%)
2020	303.2%	469.2%	0.1%	14.0%	58.9%	452.3%
2021	59.7%	399.1%	(0.1%)	278.1%	11,171.0%	622.3%
2022	(64.3%)	(67.5%)	(0.1%)	(59.1%)	(94.2%)	(81.2%)
2023	155.4%	90.6%	0.0%	80.9%	919.0%	141.1%
<b>Cumulative Return of \$1 Invested on Day 1</b>						
	\$14,196,486	\$7.15	\$0.99	\$2.33	\$100.50	\$15.37

Regardless of market, the road to cumulative returns can be impressive but also very bumpy

# Cryptocurrency Monthly Returns



The distribution of monthly returns shows which of the coins have a high peak or relatively low distribution of returns and which have a low peak or a relatively high distribution of returns.

The display range is limited to +/- 100%. Monthly returns for some coins over the sample period were as high as +/-800%.

# Multi-Asset Return Quilt

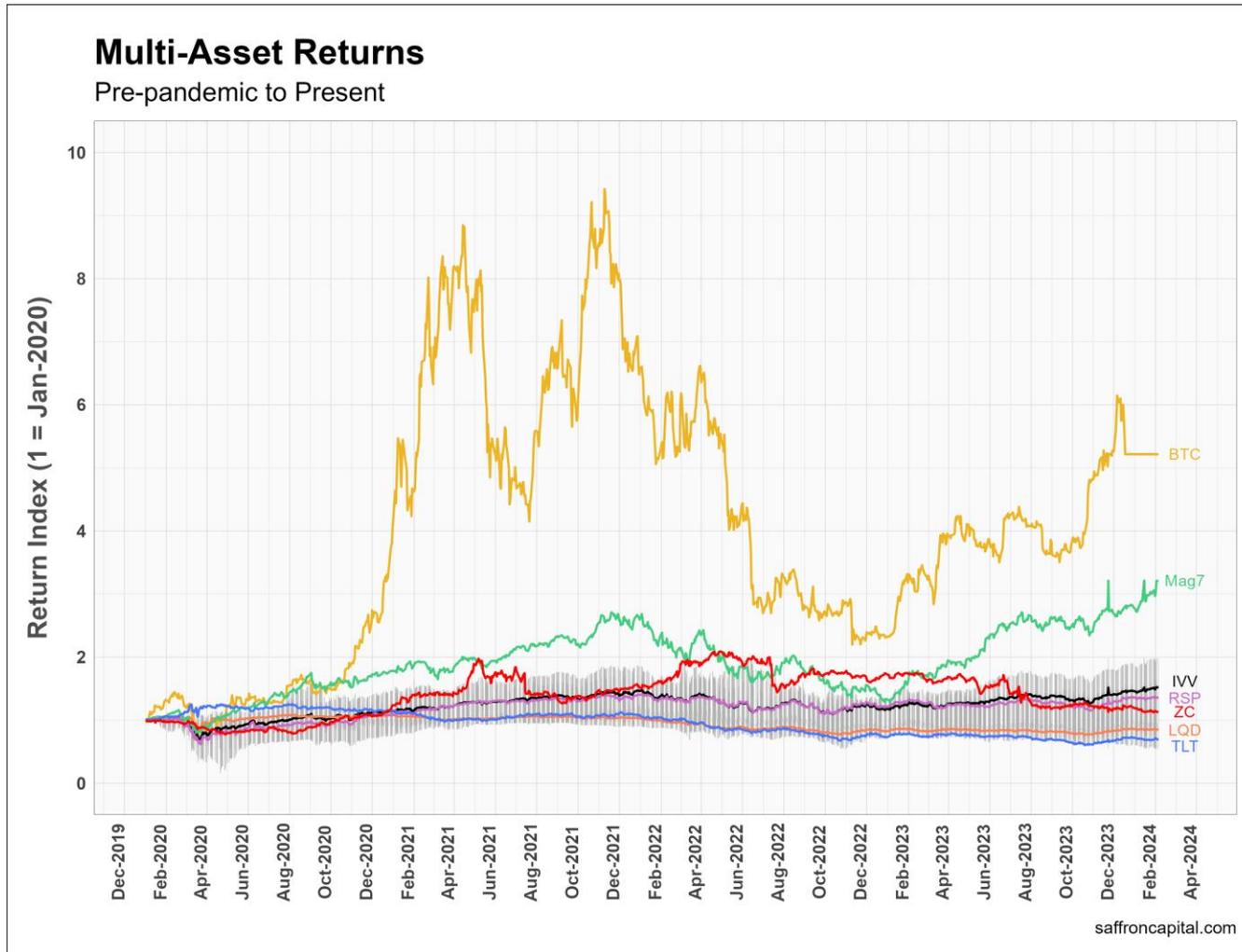


Rank	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	BTC	BTC	BTC	BTC	REZ	BTC	BTC	BTC	ZC	BTC	BTC	BTC	GSG	BTC	MTUM
2	SI	TLT	PSP	IJR	USRT	DXY	CL	MCHI	DXY	QQQ	SI	CL	ZC	QQQ	IWW
3	ZC	REZ	MCHI	QQQ	TLT	QQQ	IJR	MTUM	IAGG	CL	QQQ	REZ	DXY	PSP	QUAL
4	HG	GC	EZU	RSP	QQQ	EWJ	IJH	IEMG	REZ	QUAL	IWW	USRT	CL	QUAL	QQQ
5	REZ	HDV	QQQ	IJH	MTUM	REZ	HG	QQQ	SGOV	IVE	MTUM	GSG	HDV	IWW	IWW
6	GC	TIP	IJH	IWW	DXY	MTUM	SI	HG	QQQ	IWW	MCHI	IWW	SI	IWW	EWJ
7	IJH	CL	RSP	IWW	IWW	IWW	IVE	IWW	IWW	IWW	HG	RSP	SGOV	EZU	GSG
8	USRT	LQD	IVE	IVE	RSP	QUAL	RSP	EZU	GC	PSP	ZC	IFRA	GC	IVE	DXY
9	IJR	USRT	IJR	EWJ	IWW	USRT	HDV	EWJ	AGG	RSP	GC	IWW	IGF	EWJ	HDV
10	RSP	AGG	EMHY	EZU	QUAL	IDEV	GSG	QUAL	MTUM	MTUM	TLT	QQQ	IFRA	IJH	GC
11	QQQ	ZC	IWW	PSP	IVE	IFRA	IWW	IWW	TIP	IFRA	IWW	HG	IVE	IJR	IVE
12	PSP	IWW	USRT	HDV	HDV	SGOV	IGF	RSP	TLT	IJH	IEMG	QUAL	IAGG	IDEV	SGOV
13	CL	QQQ	IWW	MTUM	IGF	IAGG	GC	IGF	HDV	MCHI	QUAL	IJR	RSP	RSP	BTC
14	IWW	EMB	EMB	QUAL	IJH	IWW	EMHY	IDEV	IWW	USRT	EWJ	IJH	IJH	GC	RSP
15	IWW	DXY	REZ	IGF	LQD	AGG	IEMG	IJH	HYG	IGF	IJH	ZC	HG	IFRA	IAGG
16	IVE	EMHY	IEMG	CL	IJR	TIP	HYG	GC	LQD	IJR	RSP	IVE	AGG	USRT	HYG
17	EWJ	IAGG	SI	DXY	MCHI	IJR	QUAL	IVE	QUAL	REZ	IJR	HDV	HYG	IEMG	EZU
18	EMB	IDEV	ZC	IAGG	AGG	EZU	QQQ	CL	RSP	EZU	TIP	PSP	IDEV	REZ	TIP
19	TLT	IEMG	IGF	IDEV	TIP	EMB	PSP	PSP	SI	IDEV	LQD	MTUM	IJR	MTUM	EMHY
20	GSG	IFRA	EWJ	IFRA	EMB	IJH	IWW	IJR	USRT	GC	IDEV	EZU	TIP	EMB	IDEV
21	LQD	MTUM	GC	SGOV	IAGG	HDV	EMB	HDV	IJR	EWJ	PSP	IDEV	EWJ	HYG	IJH
22	TIP	QUAL	LQD	HYG	IDEV	PSP	DXY	SI	EMB	HDV	AGG	IGF	EMHY	LQD	AGG
23	AGG	SGOV	HG	MCHI	IFRA	TLT	MTUM	TLT	IFRA	GSG	EZU	DXY	EZU	IAGG	LQD
24	HYG	IWW	HDV	GSG	SGOV	RSP	IAGG	EMB	EMHY	SI	IFRA	TIP	IWW	EMHY	PSP
25	DXY	IJR	HYG	AGG	GC	LQD	TIP	GSG	IVE	IEMG	IAGG	SGOV	MTUM	IGF	EMB
26	EMHY	HYG	TIP	USRT	HYG	EMHY	USRT	LQD	IJH	LQD	EMB	HYG	LQD	AGG	HG
27	HDV	RSP	AGG	IEMG	EMHY	IVE	LQD	EMHY	IGF	TLT	SGOV	EWJ	QUAL	HG	IEMG
28	IAGG	IVE	IAGG	HG	IEMG	ZC	EWJ	USRT	GSG	EMB	HYG	IAGG	IEMG	TIP	CL
29	IDEV	GSG	IDEV	LQD	ZC	HYG	AGG	AGG	EWJ	HYG	IVE	GC	EMB	SGOV	IGF
30	IEMG	IJH	IFRA	REZ	EWJ	GC	IDEV	HYG	IDEV	EMHY	EMHY	AGG	MCHI	SI	IFRA
31	IFRA	IGF	MTUM	TIP	PSP	MCHI	IFRA	TIP	IEMG	TIP	DXY	IEMG	USRT	TLT	TLT
32	MCHI	SI	QUAL	EMHY	EZU	SI	SGOV	REZ	EZU	HG	IGF	LQD	IWW	HDV	IJR
33	MTUM	EWJ	SGOV	EMB	HG	IGF	TLT	IAGG	PSP	AGG	REZ	EMB	REZ	DXY	USRT
34	QUAL	EZU	TLT	TLT	SI	IEMG	EZU	IFRA	HG	IAGG	HDV	TLT	TLT	GSG	ZC
35	SGOV	MCHI	GSG	GC	GSG	HG	ZC	SGOV	MCHI	ZC	USRT	EMHY	QQQ	CL	SI
36	IGF	HG	DXY	SI	CL	CL	MCHI	ZC	CL	DXY	CL	SI	PSP	MCHI	REZ
37	EZU	PSP	CL	ZC	BTC	GSG	REZ	DXY	BTC	SGOV	GSG	MCHI	BTC	ZC	MCHI

## Legend

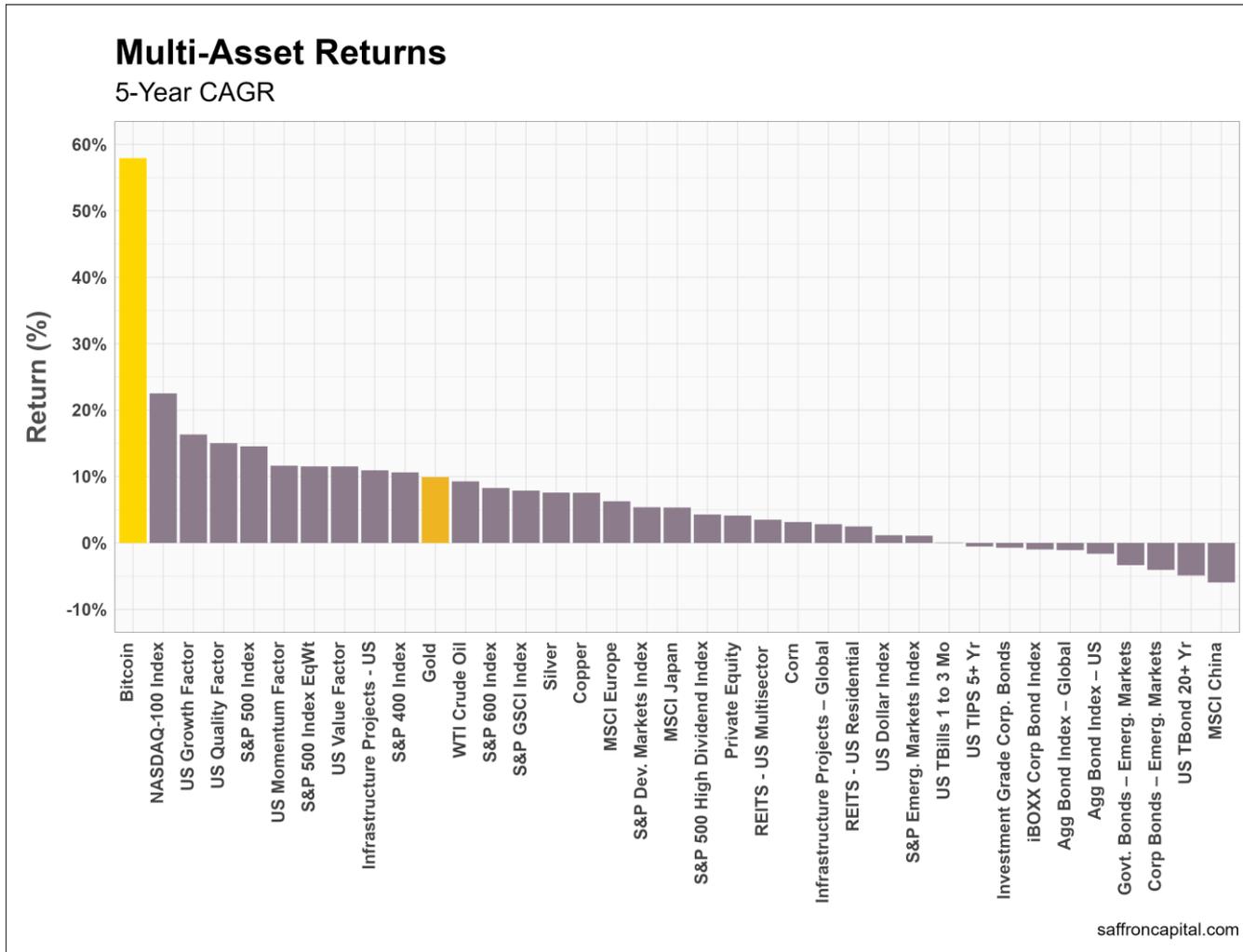
IWW	S&P 500 Index
RSP	S&P 500 Index EqWt
QQQ	NASDAQ-100 Index
HDV	S&P 500 High Dividend Index
IJH	S&P 400 Index
IJR	S&P 600 Index
IWW	US Growth Factor
IVE	US Value Factor
QUAL	US Quality Factor
MTUM	US Momentum Factor
IDEV	S&P Dev. Markets Index
IEMG	S&P Emerg. Markets Index
MCHI	MSCI China
EZU	MSCI Europe
EWJ	MSCI Japan
SGOV	US TBills 1 to 3 Mo
AGG	Agg Bond Index - US
TLT	US TBond 20+ Yr
TIP	US TIPS 5+ Yr
IAGG	Agg Bond Index - Global
EMB	Govt. Bonds - Emerg. Markets
LQD	Investment Grade Corp. Bonds
HYG	iBOXX Corp Bond Index
EMHY	Corp Bonds - Emerg. Markets
REZ	REITS - US Residential
USRT	REITS - US Multisector
IGF	Infrastructure Projects - Global
IFRA	Infrastructure Projects - US
GSG	S&P GSCI Index
PSP	Private Equity
GC	Gold
SI	Silver
HG	Copper
CL	WTI Crude Oil
ZC	Corn
DXY	US Dollar Index
BTC	Bitcoin

# Multi-Asset Return Performance



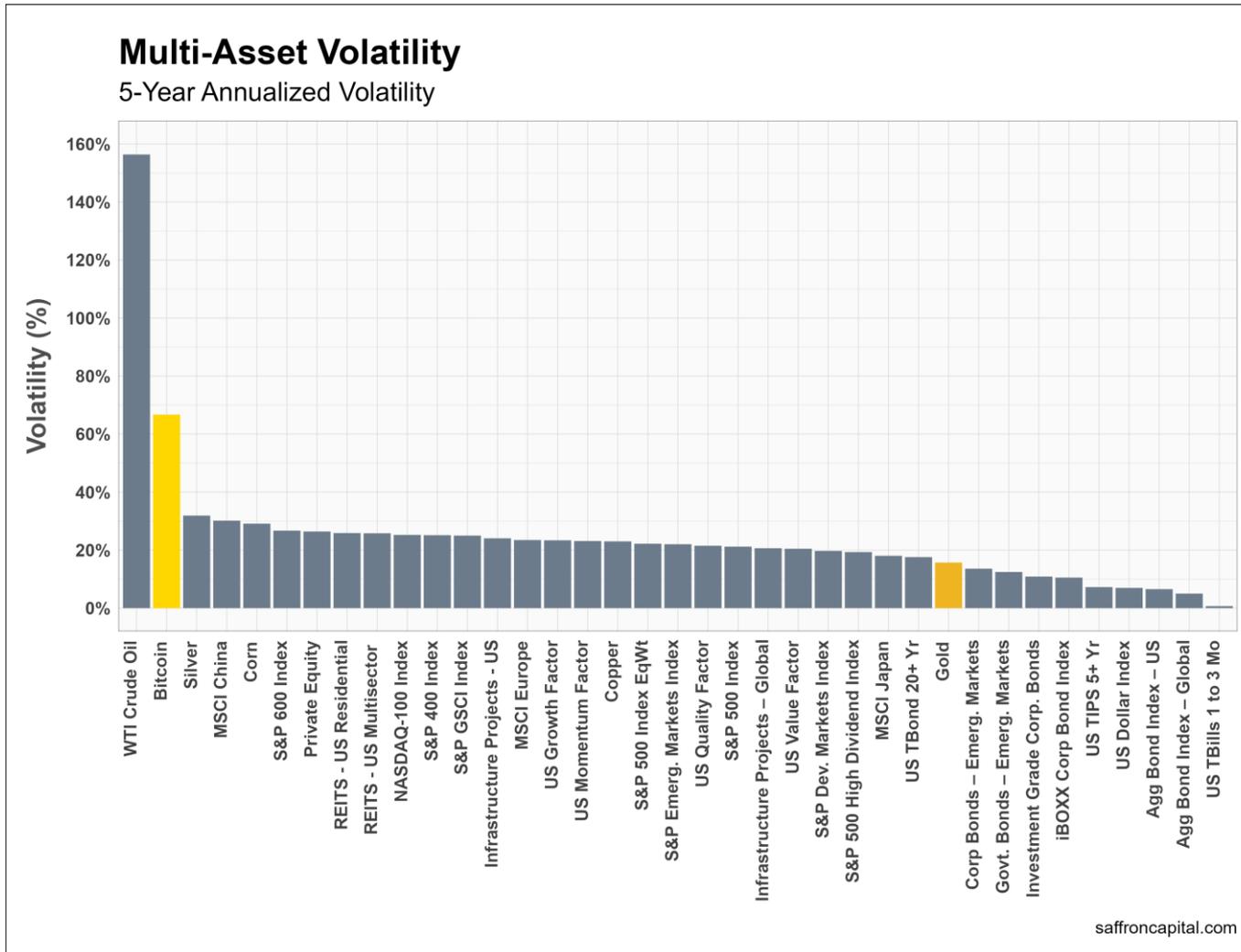
The chart depicts returns for 37 common benchmarks beginning at the start of the COVID-19 pandemic. Selected assets are shown (in color), while the returns for more than 30 other assets are also shown (in gray). Bitcoin returns clearly dominated all other asset classes and indices, as we saw on the return mosaic.

# Benchmarking Bitcoin Returns



The chart depicts the realized compound annual growth rate (CAGR) achieved over the last 5 years for selected assets versus Bitcoin and gold.

# Benchmarking Bitcoin Risk

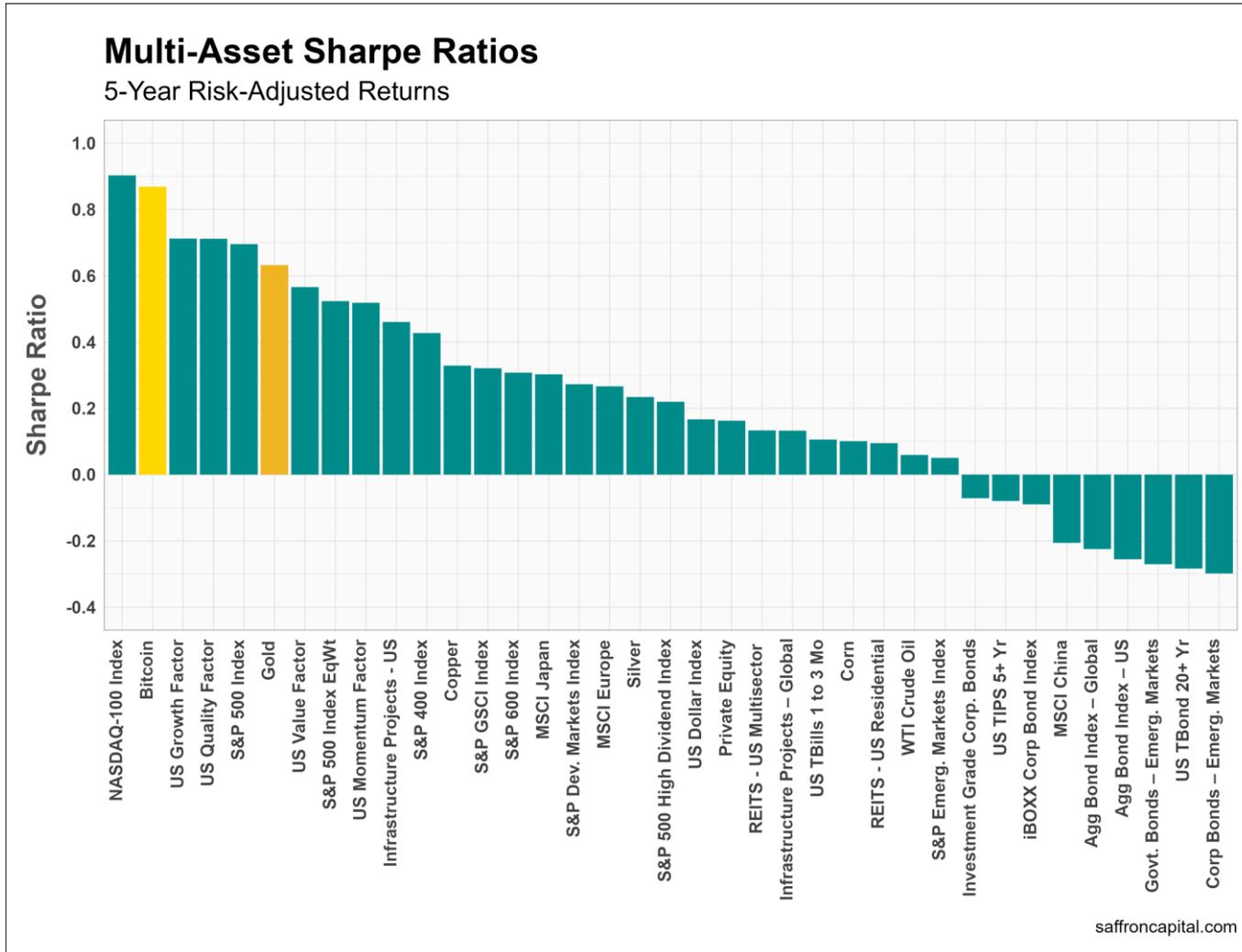


The chart depicts the realized risk (or the annualized standard deviation of returns) over the last 5 years. Result by asset are compared to Bitcoin and gold.

Part 7

# Portfolio Considerations

# Benchmarking Risk-Adjusted Returns



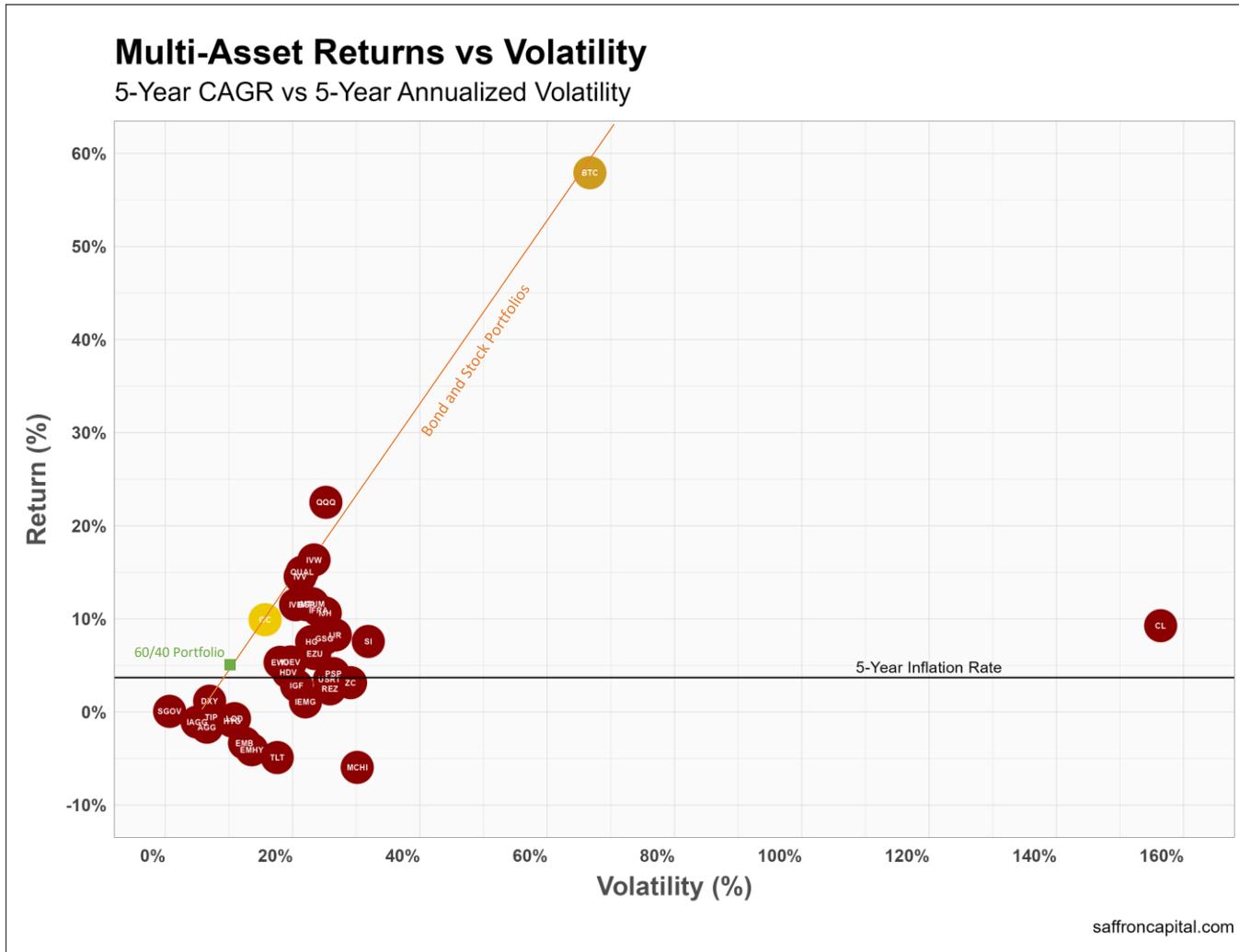
Risk-adjusted returns are shown next as defined by the Sharpe Ratio. The Sharpe ratio defines the excess historical return achieved for every \$1 in risk assumed.

The Sharpe Ratio is defined by:

$$\frac{(\text{Realized Return} - \text{Risk-Free Yield})}{\text{Realized Risk}}$$

The chart provides long-term results over the last five years. The rolling 20-day Sharpe Ratio for Bitcoin can be highly variable. The max value observed was 24 and the min value was -20 over the sample period.

# Benchmarking Bitcoin Return and Risk



The risk/return profiles of different assets are compared in the graph, including gold and Bitcoin (in yellow).

The image confirms which assets had growth rates greater than inflation over the 5-year period.

A line is drawn (in orange) to connect the bond and stock markets. The line depicts portfolios where the ratio of bonds to stocks varies. A portfolio with 60% bonds and 40% stocks is shown (in green).

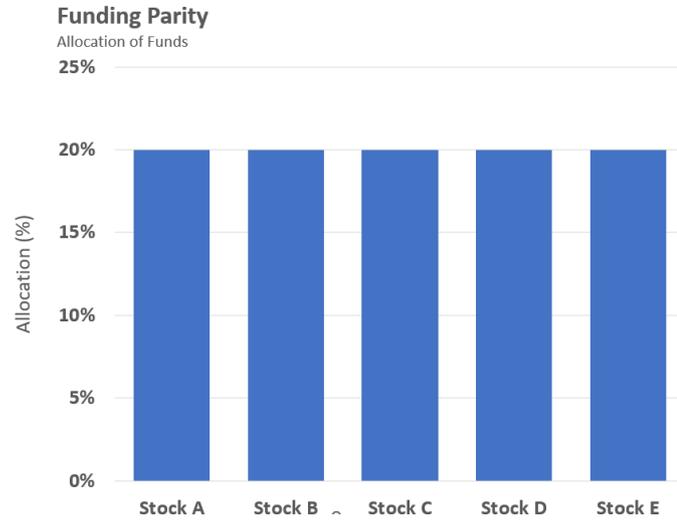
Portfolio construction seeks to achieve risk/return profiles to the left and above the line by varying portfolio weights or the funds allocated to each asset.

# Portfolio Construction and Diversification

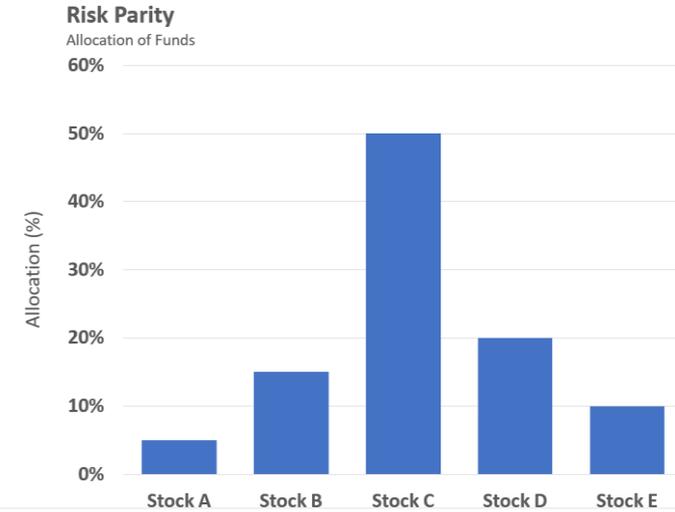
## Fund vs Risk Allocations

Funds

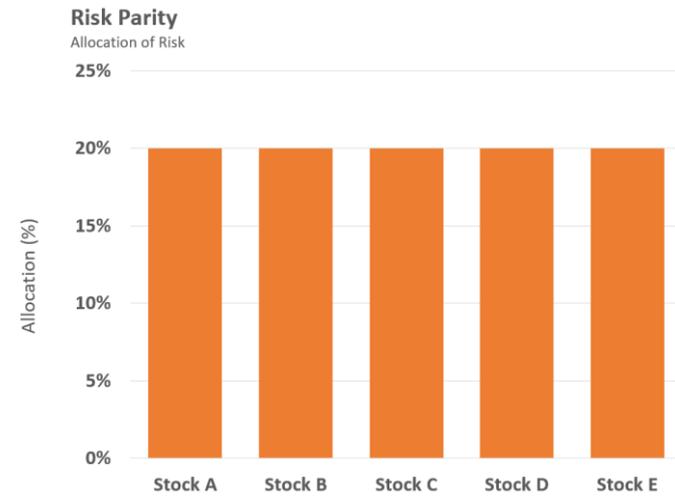
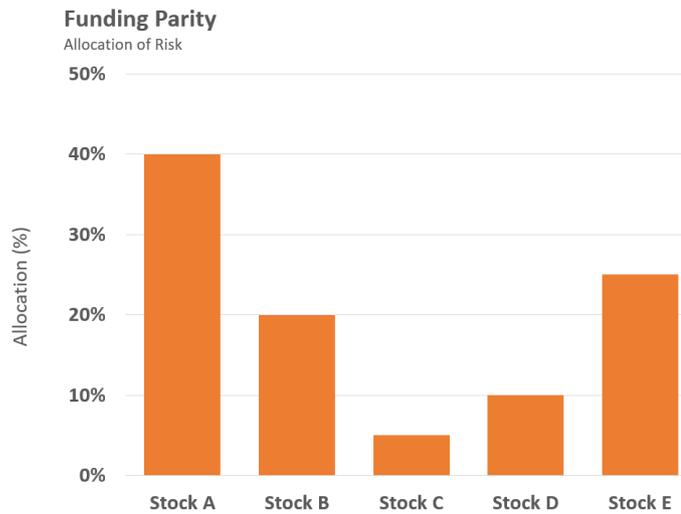
### Funding Parity



### Risk Parity



Risk



# Risk Parity Portfolios - Hypothetical

ticker	Uncon. mp1	Bonds-10% mp2	Bonds-20% mp3	Bonds-30% mp4	Bonds-40% mp5	Bonds-50% mp6	Bonds-60% mp7	Bonds-70% mp8	Bonds-80% mp9	Bonds-90% mp10
AGG	6.88	0.00	2.66	6.97	6.17	8.05	11.53	12.50	12.50	12.50
CL	0.89	0.89	0.80	0.69	0.59	0.64	0.65	0.76	0.92	1.13
DXY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EMB	4.02	1.72	3.22	2.89	2.35	2.71	3.22	4.38	5.90	7.45
EMHY	3.66	1.84	2.89	2.59	2.20	2.56	3.11	4.28	5.80	7.43
EWJ	2.86	3.15	2.76	2.38	2.02	2.11	1.76	1.43	0.57	0.00
EZU	2.04	2.16	1.89	1.62	1.39	1.47	1.33	1.30	1.13	0.68
GC	5.82	8.57	7.25	6.04	4.59	4.46	2.16	0.00	0.00	0.00
GSG	2.82	3.16	2.80	2.41	2.11	2.24	1.94	1.53	0.00	0.00
HDV	2.55	2.76	2.43	2.10	1.84	1.96	1.72	1.51	0.83	0.00
HG	3.26	3.92	3.46	2.99	2.58	2.71	2.21	1.31	0.00	0.00
HYG	4.24	1.63	3.35	3.08	2.69	3.23	4.21	5.99	8.22	10.43
IAGG	0.00	0.00	0.00	2.41	8.78	12.50	12.50	12.50	12.50	12.50
IDEV	2.28	2.44	2.14	1.83	1.57	1.66	1.47	1.37	1.02	0.22
IEMG	2.28	2.41	2.11	1.82	1.56	1.66	1.49	1.39	1.04	0.06
IFRA	2.05	2.13	1.88	1.62	1.39	1.48	1.36	1.34	1.18	0.71
IGF	2.27	2.42	2.12	1.81	1.54	1.62	1.43	1.33	1.04	0.41
IJH	1.89	1.96	1.72	1.48	1.27	1.36	1.25	1.27	1.20	0.93
IJR	1.87	1.93	1.70	1.46	1.26	1.35	1.25	1.27	1.21	0.95
IVE	2.27	2.42	2.13	1.84	1.60	1.70	1.53	1.43	1.08	0.15
IVV	2.18	2.31	2.03	1.74	1.50	1.59	1.43	1.36	1.11	0.48
IVW	2.13	1.52	1.71	1.51	1.32	1.53	1.85	2.52	3.55	4.89
LQD	6.45	9.82	8.09	6.49	4.39	4.09	1.87	0.00	0.00	0.00
MCHI	2.37	2.48	2.19	1.89	1.61	1.72	1.54	1.43	1.01	0.00
MTUM	2.26	2.38	2.09	1.80	1.55	1.65	1.48	1.39	1.08	0.27
PSP	1.79	1.91	1.67	1.43	1.20	1.27	1.16	1.17	1.13	1.01
QQQ	2.08	2.19	1.92	1.65	1.40	1.48	1.33	1.28	1.13	0.71
QUAL	2.19	2.32	2.03	1.75	1.50	1.59	1.42	1.35	1.11	0.50
REZ	2.15	2.28	1.99	1.70	1.42	1.49	1.32	1.25	1.09	0.84
RSP	2.07	1.50	1.68	1.48	1.31	1.52	1.87	2.60	3.73	5.19
SGOV	0.00	12.50	12.50	12.50	12.50	0.63	0.00	0.00	0.00	0.00
SI	2.70	1.78	2.23	1.96	1.64	1.89	2.30	3.17	4.23	5.16
TIP	5.71	0.00	2.27	7.11	6.31	8.27	11.71	12.50	12.50	12.50
TLT	0.00	0.00	0.00	0.00	7.23	7.74	7.70	9.56	11.06	11.94
USRT	2.00	2.10	1.84	1.57	1.32	1.39	1.25	1.22	1.13	0.95
ZC	4.96	5.84	5.27	4.59	3.95	4.16	3.31	0.00	0.00	0.00
BTC	5.00	3.53	3.21	2.79	2.35	2.52	2.34	2.32	0.00	0.00
Sum of Weights	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Risk parity portfolio construction seeks to maximize diversification by ensuring the risk contribution of all line items is equal.

The objective is to ensure no one line item dominates investor returns.

- The first column shows optimal fund allocations for an unconstrained risk parity portfolio.
- The remaining columns solve the portfolio formulation by constraining the fund allocation to bonds.
- The max allocation by security is also limited to 12.5%.

The table highlights optimized allocations to gold and to Bitcoin to show how results vary given different portfolio goals or constraints.