

# Cryptocurrencies Demystified

Presented by

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"This presentation is for informational purposes only and is not intended to promote cryptocurrencies."



# What Is Bitcoin?





# October 31, 2008

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Satoshi Nakamoto's Whitepaper

I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party.

The paper is available at:

<http://www.bitcoin.org/bitcoin.pdf>

The main properties:

Double-spending is prevented with a peer-to-peer network.

No mint or other trusted parties. \*

Participants can be anonymous.

New coins are made from Hashcash style proof-of-work.

The proof-of-work for new coin generation also powers the network to prevent double-spending.

# What is Bitcoin?

***Bitcoin is a form of digital currency, entirely created and held in digital form without any management by a central bank or government.***

- It achieves this status by managing a distributed database (distributed ledger).
- In addition, users or holders of the tokens use encryption to secure their access to the entries in this database.
- Each transaction or movement of tokens is then updated to the database and a copy of this transaction is recorded to the ledger—hence, the database has the entire history of each token and its movement from its inception.
- To ensure security, a majority of the databases (nodes) needs to accept or acknowledge each transaction—this work is done by miners as “proof of work.”
- Each new bitcoin is mined by solving an encrypted message and the difficulty is increased over time—making each additional coin more difficult to mine.

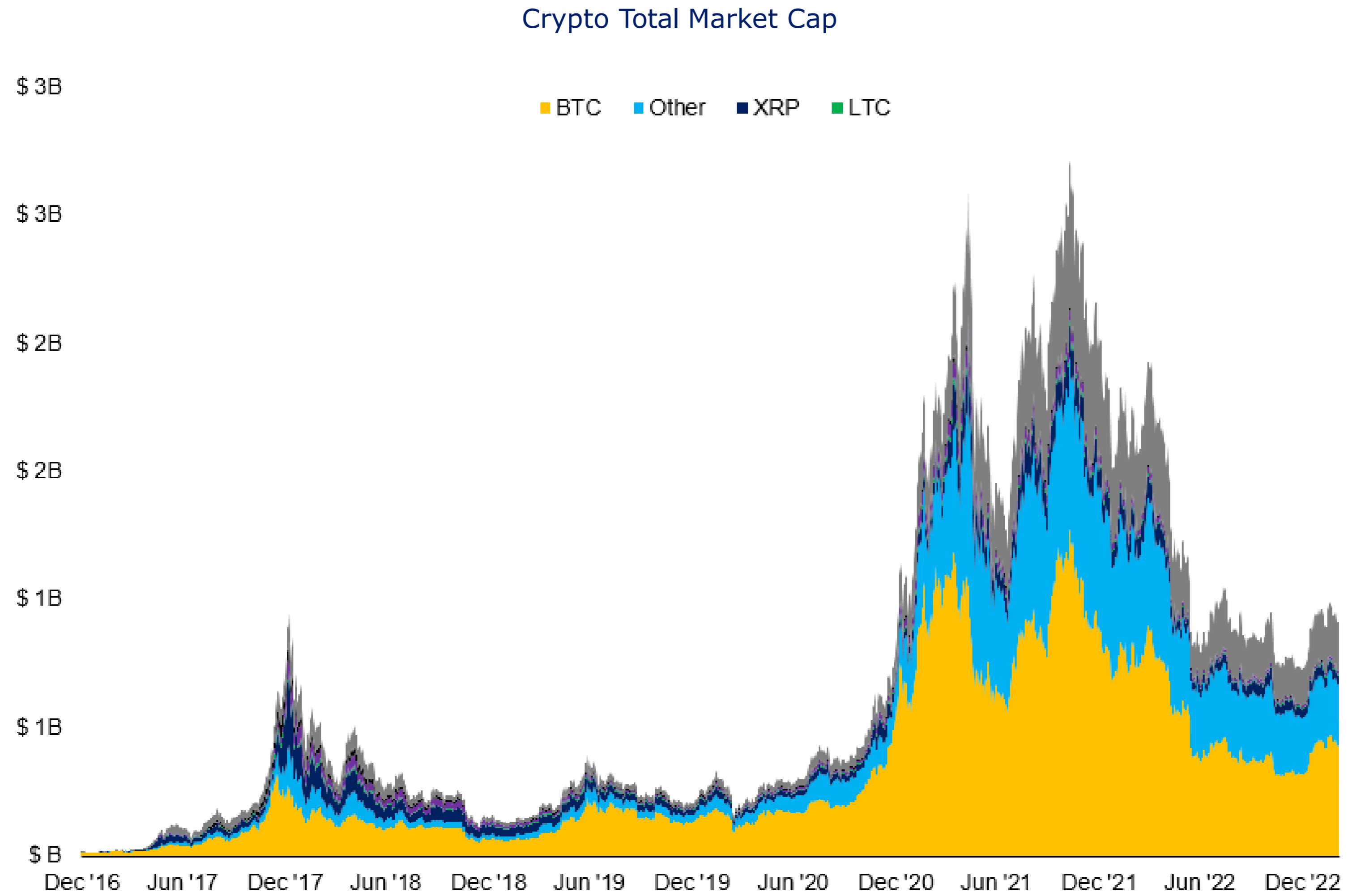
# The three categories of cryptocurrencies

Cryptocurrency Examples

	Cryptocurrency	Blockchain	Backing	Fixed Quantity?	Smart Contracts	Application
Standalone	Bitcoin	Bitcoin	None	Yes	No	
	Ether	Ethereum	None	No	Yes	
Asset-Backed (Stablecoins)	Tether	Bitcoin	USD	No	No	
	Dai	Ethereum	USD	No	Yes	
	Facebook/Diem	LibraBFT	USD	No	Yes	
	Tether Gold	Ethereum	Gold	Yes	No	
Utility	Stellar Lumens	Stellar	None	Yes	Yes	Payments
	Basic Attention Token	Ethereum	None	Yes	Yes	Advertising
	OX (ZRX)	Ethereum	None	Yes	Yes	Exchanges

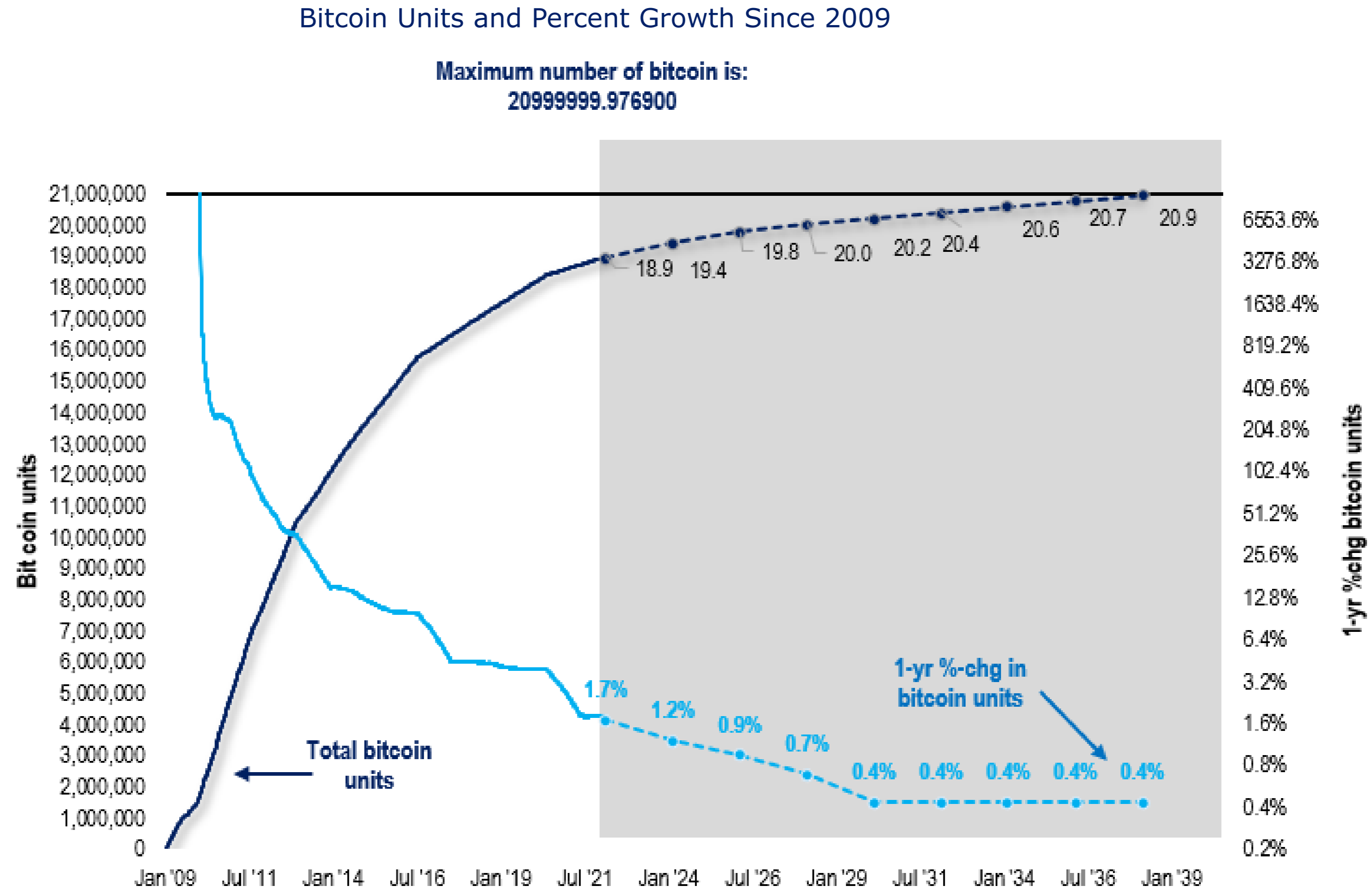
Source: Redburn. January 14, 2021

# Crypto market capitalization — It's winter



Note: BTC=Bitcoin; XRP=Ripple; LTC=Litecoin; XLM=Stellar; BCH=Bitcoin Cash; ETH=Ethereum  
Source: Fundstrat, Coinmetrics. March 7, 2023

# Maximum number of Bitcoin is: 20999999.976900



Source: Fundstrat; Bloomberg. February 17, 2022



# Used For Currency

## Bitcoin only lacks acceptability and perhaps durability

Characteristics of a Currency According to the St. Louis Fed

Characteristic	U.S. Dollar	Gold	Bitcoin
Durability	✓	✓	X (?)
Portability	✓	X	✓
Divisibility	✓	X	✓
Uniformity	✓	✓	✓
Limited Supply	X (?)	✓	✓
Acceptability	✓	X	X



# Used For Currency

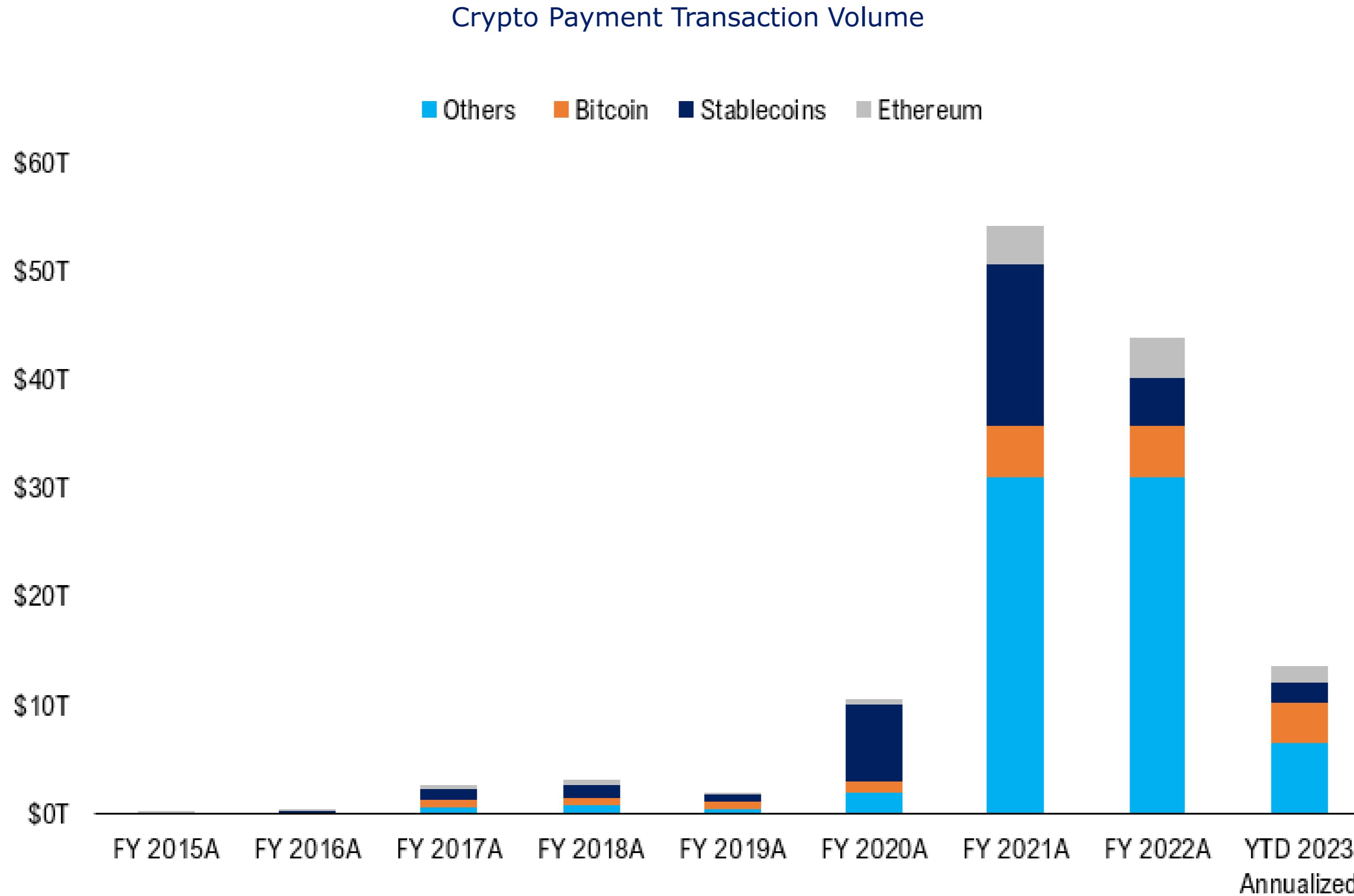
## Acceptance is a necessary step for Bitcoin's future

### Companies That Accept Bitcoin As Payment

<b>Ticker</b>	<b>Company</b>
T	AT&T Inc.
TSLA	Tesla Inc
OSTK	Overstock.com, Inc.
HD	Home Depot, Inc.
SBUX	Starbucks Corporation
YUM	Yum! Brands, Inc.
RKUNY	Rakuten Group, Inc Sponsored ADR
WFM	Whole Foods Market, Inc.
PYPL	PayPal Holdings, Inc.
V	Visa Inc. Class A
SHOP	Shopify, Inc. Class A
MSFT	Microsoft Corporation
AMC	AMC Entertainment Holdings, Inc. Class A
NWARF	Norwegian Air Shuttle ASA
EXPE	Expedia Group, Inc.
MA	Mastercard Incorporated Class A
AXAHY	AXA SA Sponsored ADR
KO	Coca-Cola Company
INTU	Intuit Inc.
SPCE	Virgin Galactic Holdings Inc

# Used For Currency

## Crypto payment transaction volume seeing incredible growth





## Used For Currency

Nine of the top 10 countries in terms of crypto adoption are emerging markets

Crypto Currency Adoption Globally (Relative to Purchasing Power Parity Adjusted GDP)

Country	Index Score	Overall Index Ranking
Vietnam	1.000	1
Philippines	0.753	2
Ukraine	0.694	3
India	0.663	4
United States	0.653	5
Pakistan	0.609	6
Brazil	0.562	7
Thailand	0.560	8
Russia	0.541	9
China	0.535	10

# Used For Currency Financial inclusion

Population Statistics in Income Tiers Using World Bank Definitions, As Well as Allocation of Economic Activity, the Role of Remittances, and Shadow Economic Activity; Units as Indicated

Population Segment	Income Category				World
	High	Upper middle	Lower middle	Low	
Total	730	2,618	2,896	584	6,828
Adults (15+ years old)	601	2,071	2,023	331	5,027
Unbanked	57	565	823	218	1,663
own a mobile phone	49	439	499	92	1,079
receive cash only govt pmts	5	41	38	6	90
receive cash only wages	6	73	123	16	217
receive cash only ag pmts	0	34	117	65	216
cash or OTC remittances	3	62	140	43	248
% of adult population	12%	41%	40%	7%	100%
% of economic activity	51%	38%	11%	1%	100%
Remittances as % of GDP*	0.3%	0.9%	4.2%	5.5%	1.0%
Shadow activity as % of total†	12%	20%	23%	29%	17%

65% of the "unbanked" own a mobile phone

Almost half of the unbanked receives cash-only payments

Heavily cash-based

Note Statistics for the unbanked population from the [Global Findex Database](#) provided by the World Bank Group. Data as of 2017.

\* [Migration and Remittances Data](#) as of October 2019.

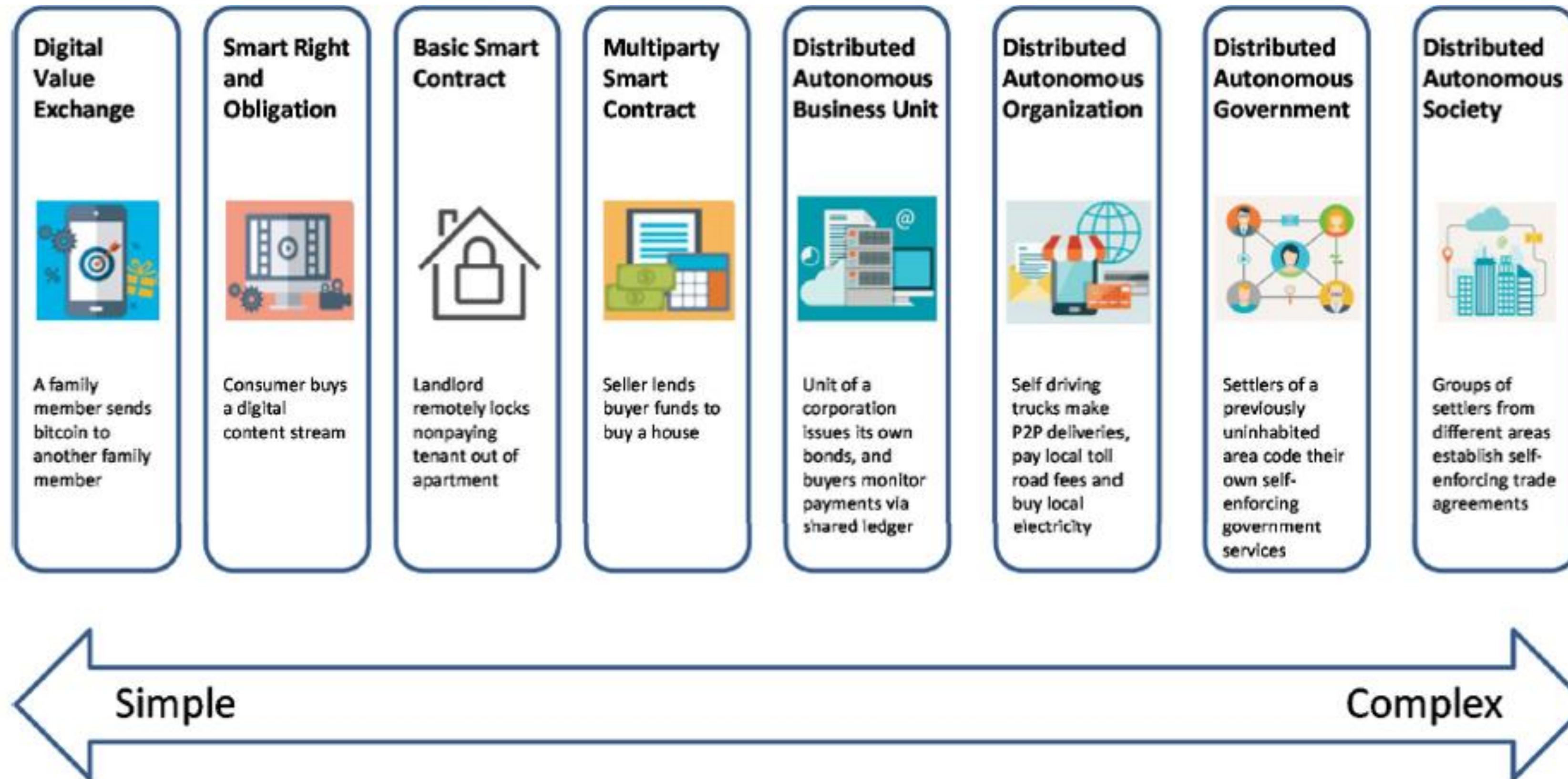
† Shadow activity based on estimates as a % of GDP as of 2015 by L. Median & F. Schneider, [Shadow Economies Around the World](#), IMF Working Paper 18/17, 2018, which covers 92% of the World Bank sample by count and more than 99% by GDP  
Source: J.P. Morgan, World Bank, Median & Schneider



# Ethereum

## What is a Smart Contract?

Smart Contracts-Simple to Complex

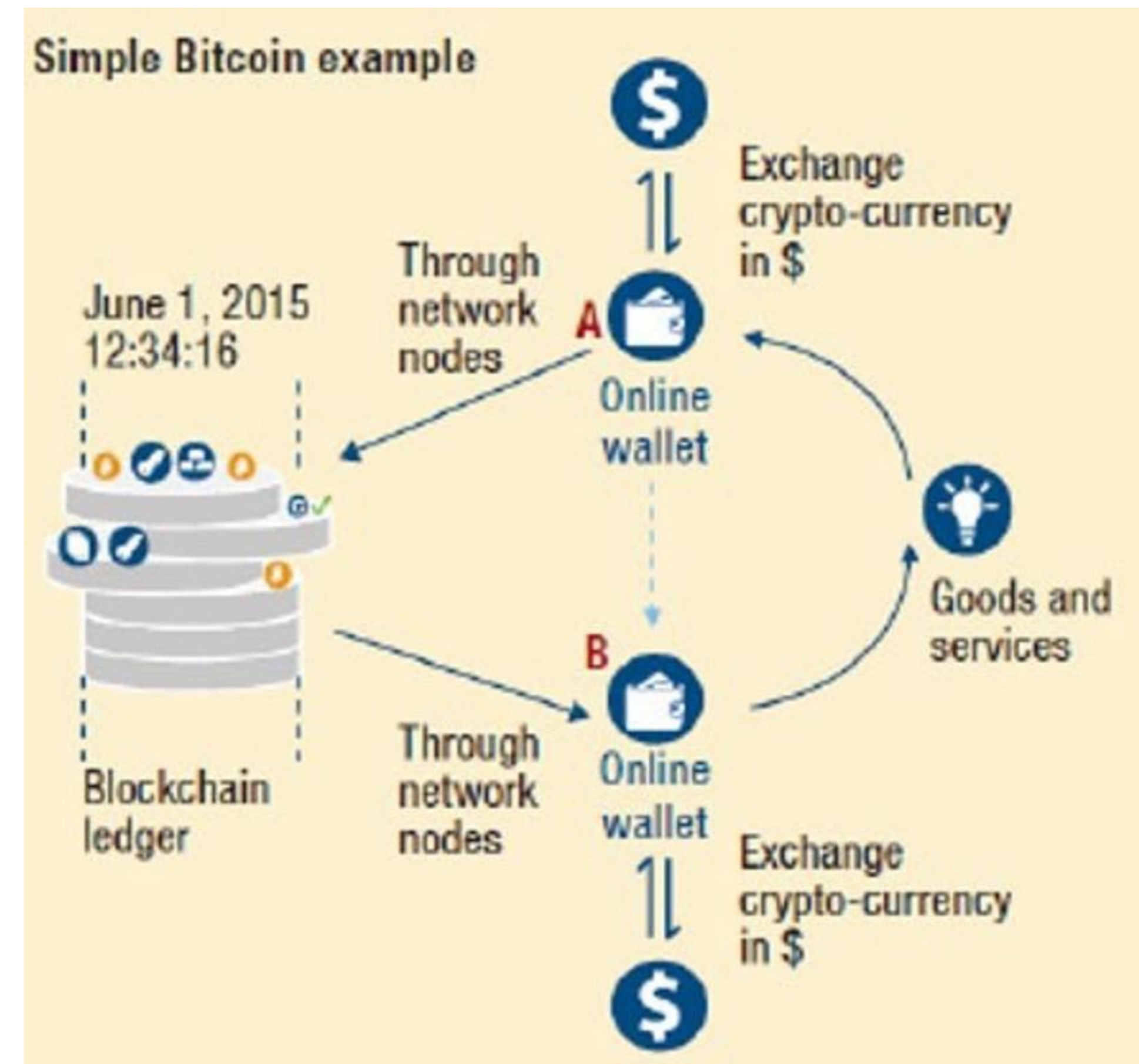


# Blockchain

## McKinsey sees the blockchain as one of the most disruptive innovations since the advent of the internet

### The Blockchain

- A distributed public digital ledger that maintains, through cryptographic proof, a continuously growing secure list of transactions that is replicated repeatedly.
- A transaction network that potentially can be used by financial institutions and consumers to transact directly.
- Well-suited for applications requiring a rapid, permanent time and date stamp such as:
  - Payments
  - Financial asset transfers
  - Smart contracts
  - Ownership splits and notary services
- A technology that brings substantial benefits in terms of speed, security, transparency, convenience and cost.
- The decentralization of the transaction system will have an important impact on the way business is conducted throughout many industries.





# Blockchain

## Incumbency makes existing players skeptical of technology innovation

	Mid-1980's	Mid-1990's	Mid-2000's	Mid-2010s	Today
<b>New Entrants</b>	PCs	Internet-based Online Search Subscription Services Mobile Phones	Social Media Online Commerce Digital Only	Video Streaming Amazon again Subscription-based	Blockchain
<b>Incumbents</b>	Mainframes	Technology Hardware Software/CD Landline telephony	Retail Print and Media Newspapers	Cable/Media Retail Brands Grocery	Banks Security Companies Transaction platforms Trading, etc.

# Blockchain

## The non-fungible token (NFT) internet vs. the internet today – A compare and contrast

An NFT Internet	The Internet Today
<p><b>NFTs are digitally unique</b>, no two NTFs are the same.</p>	<p><b>A copy of a file</b>, like an .mp3 or .jpg is the same as the original.</p>
<p><b>Every NFT must have an owner and this is of public record</b> and easy for anyone to verify.</p>	<p><b>Ownership records</b> of digital items are stored on servers <b>controlled by institutions- you must</b> take their word for it.</p>
<p><b>NFTs are compatible with anything built using Ethereum.</b> An NFT Ticker for an event can be traded on every Ethereum marketplace, for an entirely different NFT. You could trade a piece of art for a ticket!</p>	<p><b>Companies with digital items build their own infrastructure.</b> For example an app that issues digital tickets for events would have to build their own ticket exchange.</p>
<p><b>Content creators can sell their work anywhere</b> and can access a global market.</p>	<p><b>Creators rely on the infrastructure and distribution of the platforms they use.</b> These are often subject to terms of use and geographical restrictions.</p>
<p><b>Creators can retain ownership rights</b> over their own work, and claim resale royalties directly.</p>	<p><b>Platforms, such as music streaming services, retain the majority of profits</b> from sales.</p>
<p><b>Items can be used in surprising ways.</b> For example, you can use digital artwork as collateral in a decentralized loan.</p>	



# Bitcoin Risks

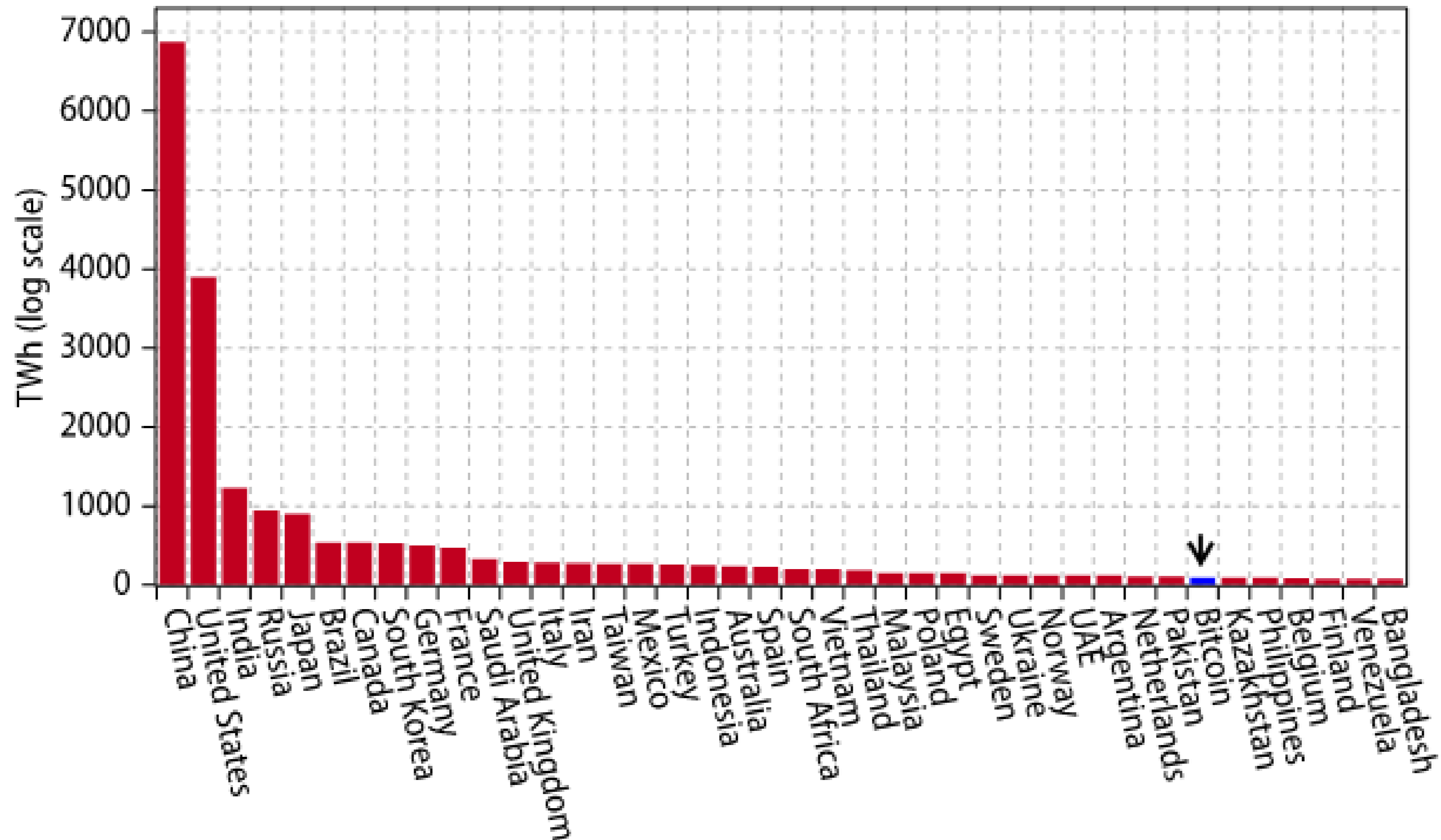




# Mining And ESG Considerations

## Bitcoin needs a lot of power

If Bitcoin Were a Country, It Would Be in the Top 30 Annual Electricity Consumers

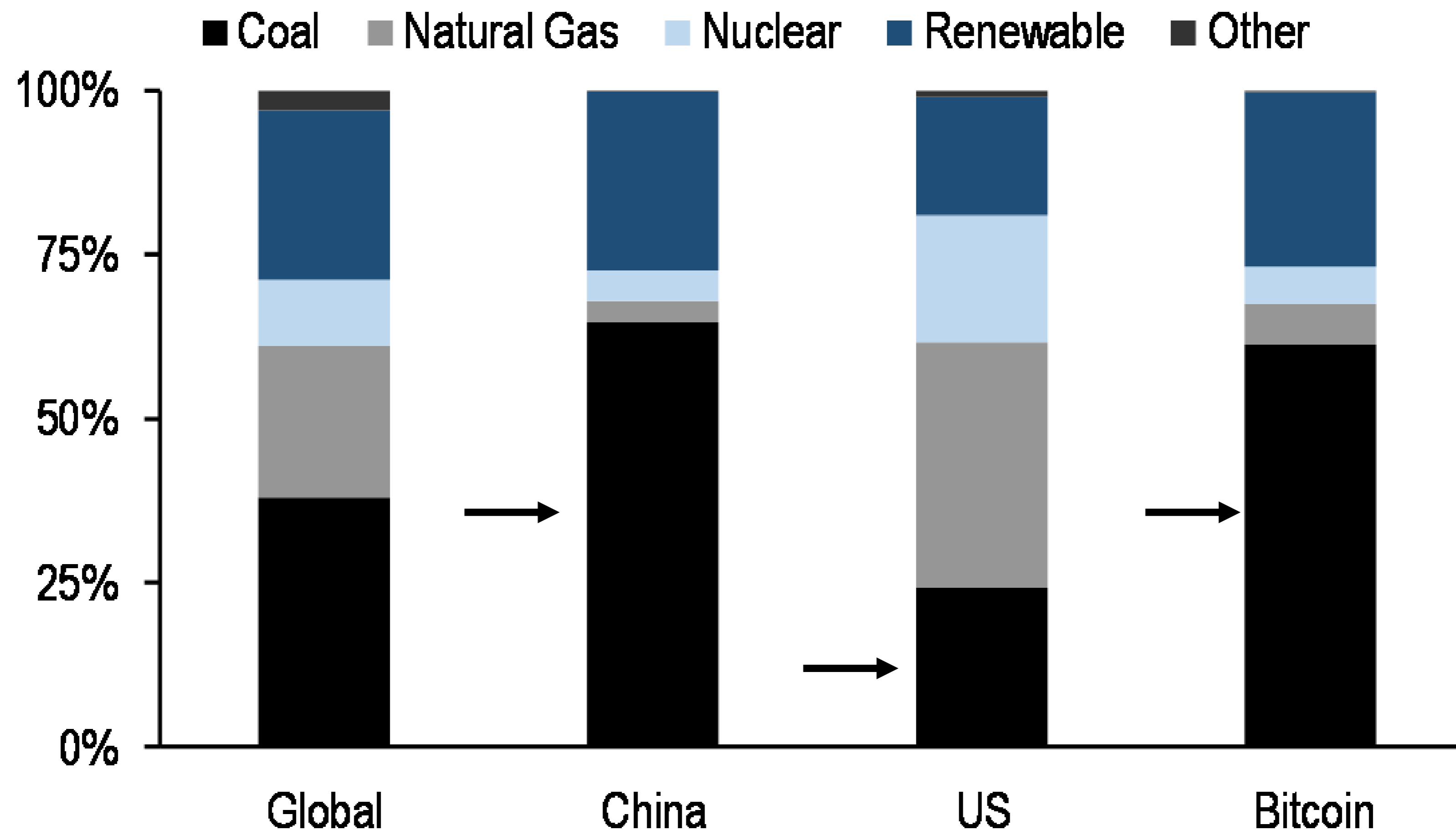




# Mining And ESG Considerations

## China's kicking out the Bitcoin miners, and Texas is becoming a mecca for them

Fraction of Gross Electricity Supply by Fuel Type Globally As Compared to China, the United States, and the Bitcoin Network



Source: J.P. Morgan, CBECI, IEA. April 9, 2021

# Regulation

World governments will not relinquish hard-fought monopolies over money supply

COUNTRY POSITIONS ON CRYPTO-CURRENCIES					
COUNTRY	CRYPTO-CURRENCIES				
	LEGAL TENDER?	TRADING PERMITTED?	OWNERSHIP PERMITTED?	CRYPTO-EXCHANGES	INITIAL COIN OFFERINGS (ICOs)
CANADA	NO, BUT PARTIALLY ACCEPTED	YES	YES	LEGAL, REGULATION VARIES BY PROVINCE	REGULATED
CHINA	NO	NO	YES	ILLEGAL	BANNED
INDIA	NO	YES	YES	LEGAL	BANNED
JAPAN	NO, BUT WIDELY ACCEPTED	YES	YES	LEGAL, REGULATED BY PSA	REGULATED
RUSSIA	NO	NO	YES	ILLEGAL	GREY AREA
SWITZERLAND	NO, BUT WIDELY ACCEPTED	YES	YES	LEGAL, REGULATED BY SFTA AND FINMA	REGULATED
UK	NO, BUT PARTIALLY ACCEPTED	YES	YES	LEGAL, REGISTER WITH THE FCA	GREY AREA
US	NO, BUT PARTIALLY ACCEPTED	YES	YES	LEGAL, REGULATION VARIES BY STATE	REGULATED

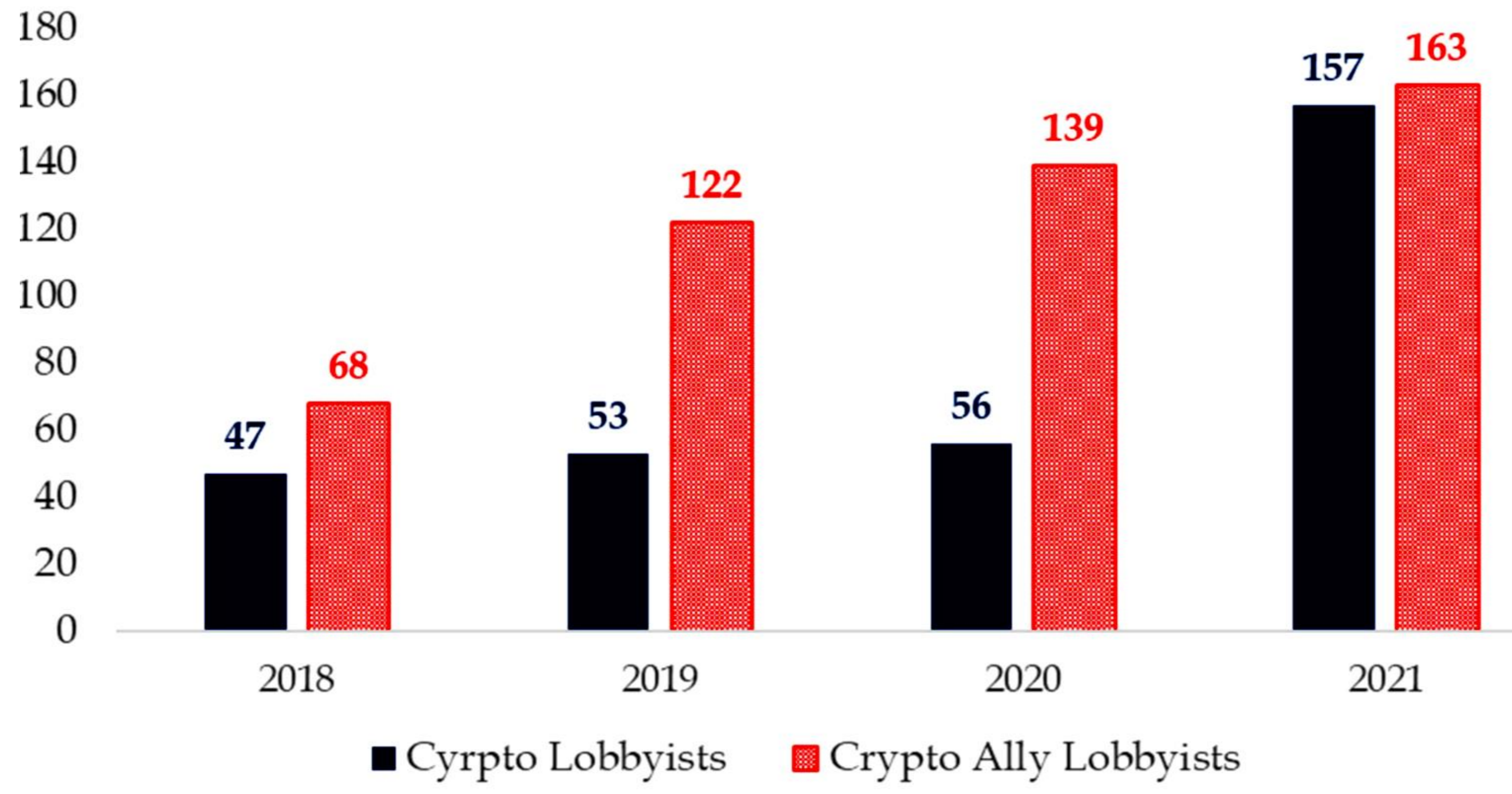
Source: VisualCapitalist, Chain Analysis, Comply Advantage and The SEC; BCA Research. February 22, 2022



# Regulation

## Regulation is evidence of cryptocurrencies gaining credibility

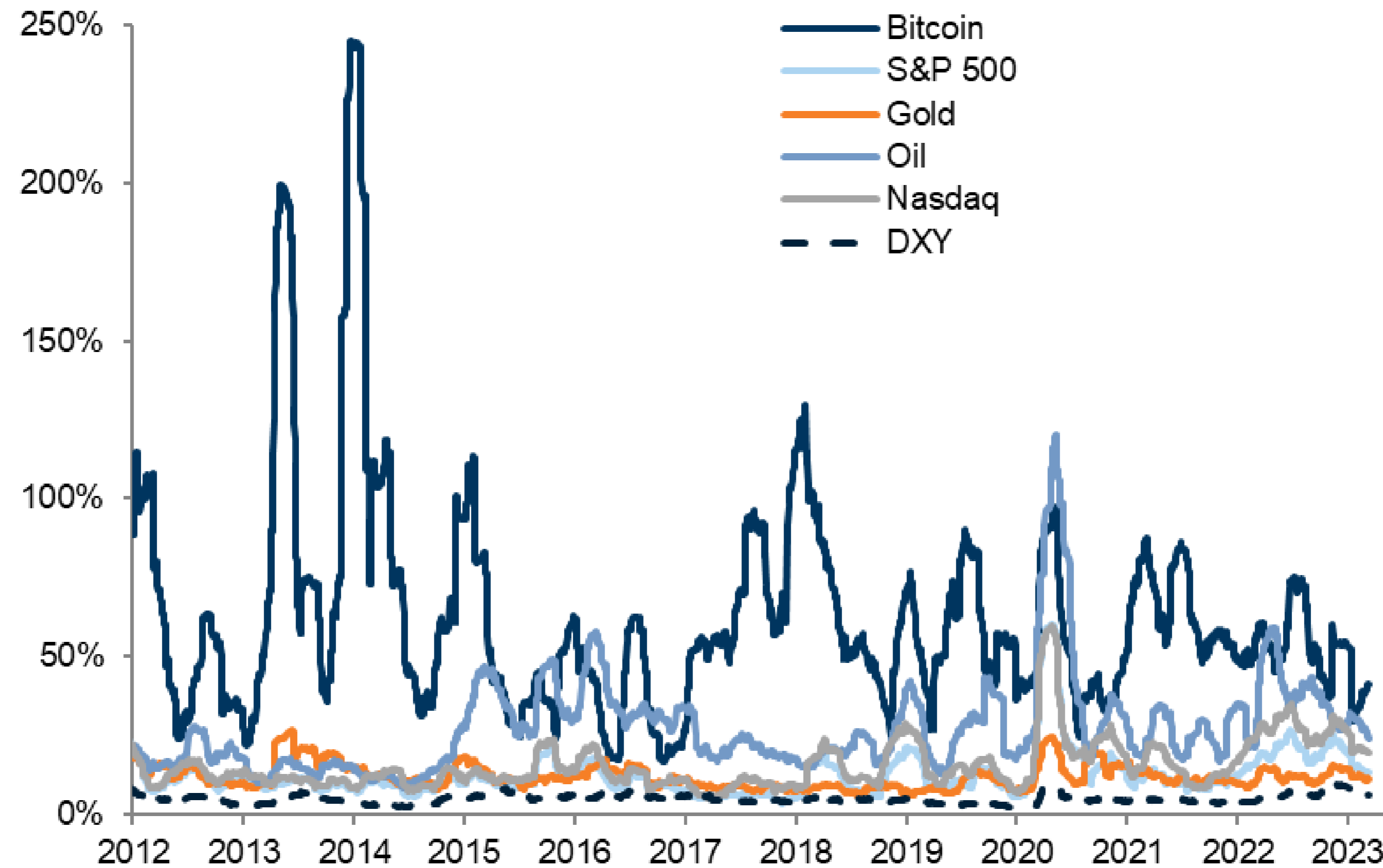
Number of Crypto Lobbyists



# Volatility

## Bitcoin, not quite a safe haven

One Year Rolling Volatility, Daily Returns



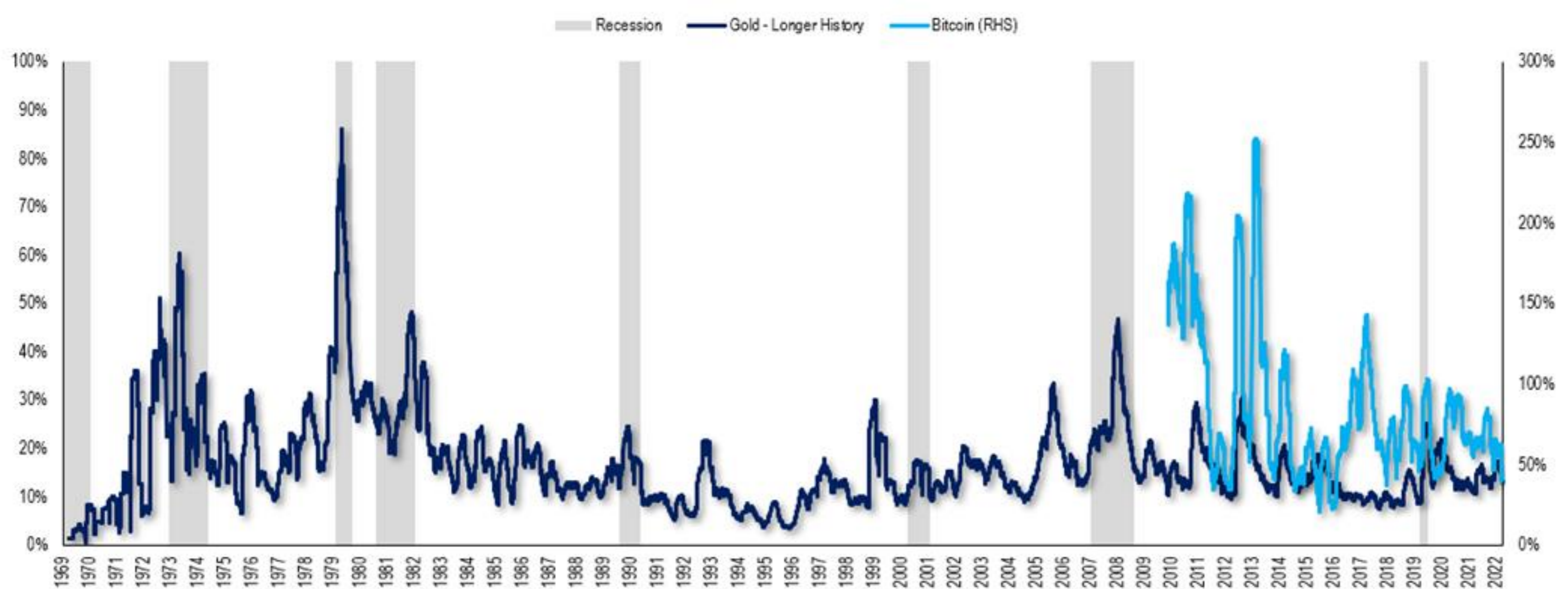
Source: Bloomberg, Goldman Sachs Global Investment Research. March 8, 2023



# Volatility

## Interestingly, gold was volatile back in the day

90 Days Rolling Volatility on Daily Return (Annualized) Since 1969



## CBDCs

# Are central banks a threat to Bitcoin?

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Most central banks are doing active work on Central Bank Digital Currencies (CBDCs).

- Different central banks are at different stages in their work, but for the most part we are still early in the game.
- The final outcome for CBDC will likely be highly diversified by country.

→ **In any case, we are years away from implementation.**

The Bank for International Settlements is coordinating CBDC work among a group of large central banks. Core principles include:

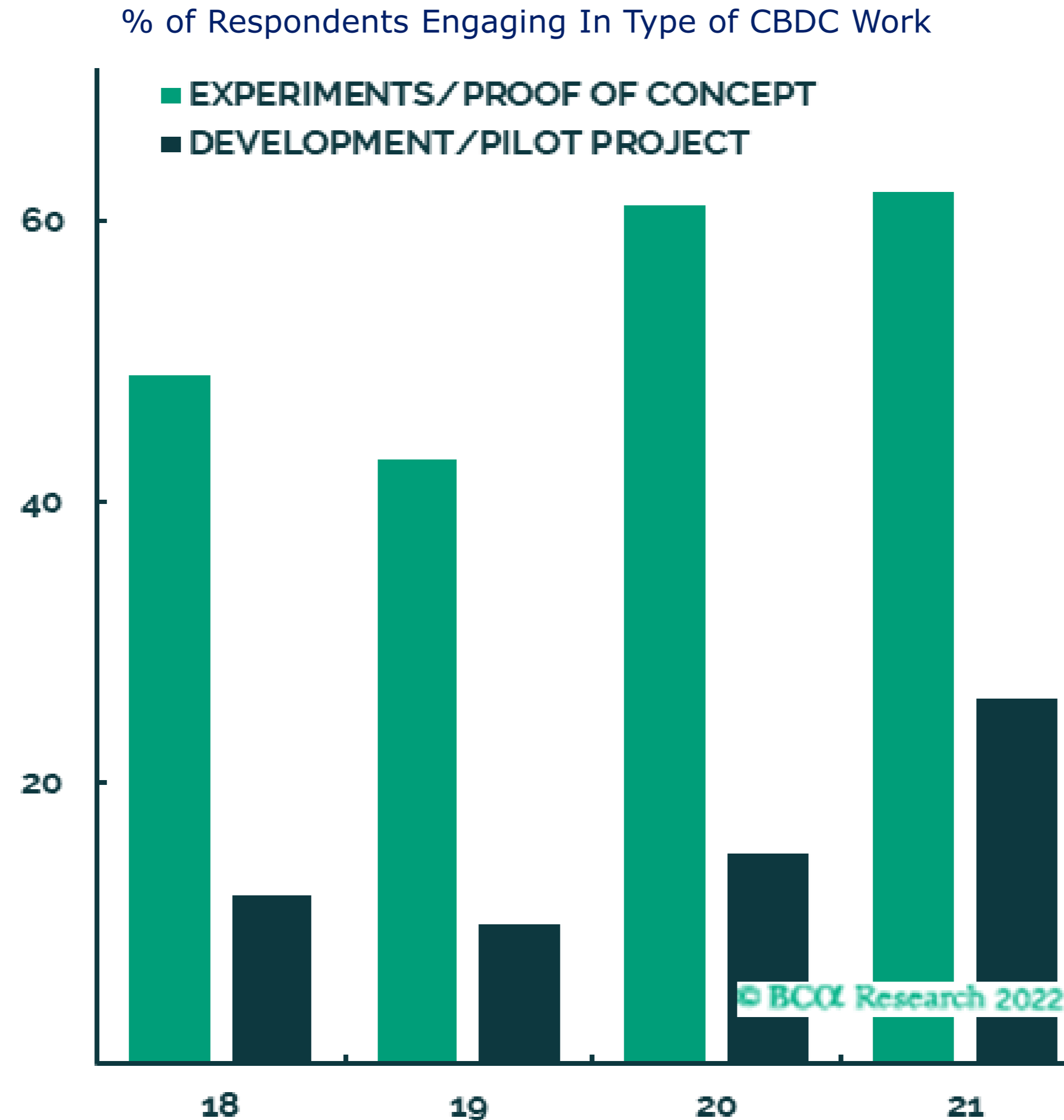
- CBDCs should not compromise monetary and financial stability;
- CBDCs need to coexist with and compliment existing forms of money;
- CBDC should promote innovation and efficiency.

→ **The second point would have been phrased very differently if the goal was to regulate Bitcoin out of existence.**



# CBDCs

## Central banks advancing on CBDC work



Source: Based on Results of the Third Annual Bank for International Settlements Survey on Central Digital Currency, BIS.org; BCA Research. September 8, 2022

# CBDCs

## Why are central bank digital currencies being studied?

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### **Modern Means of Payment**

- Compliment to cash.
- More efficient payments than provided by current systems (safe, immediate clearing, etc.).
- The final outcome for CBDC will likely be highly diversified by country.

### **Monetary Policy Efficiency**

- Interest-bearing CBDC's can pass on monetary policy decisions quickly to CBDC holders (i.e., ideally to every single household and business).
- CBDC facilitate new forms of monetary policy stimulus (e.g., "helicopter drops," which are cumbersome to implement under the current system).

### **Financial Stability Challenges**

- Potential disintermediation of banks.
- Reduce risk that alternative units of account dominate.

➔ **Most central banks are operating in a context of coexistence with Bitcoin and similar, rather than in a context of "us vs. them" conflict. CBDCs and Bitcoin will live together and perform different functions.**



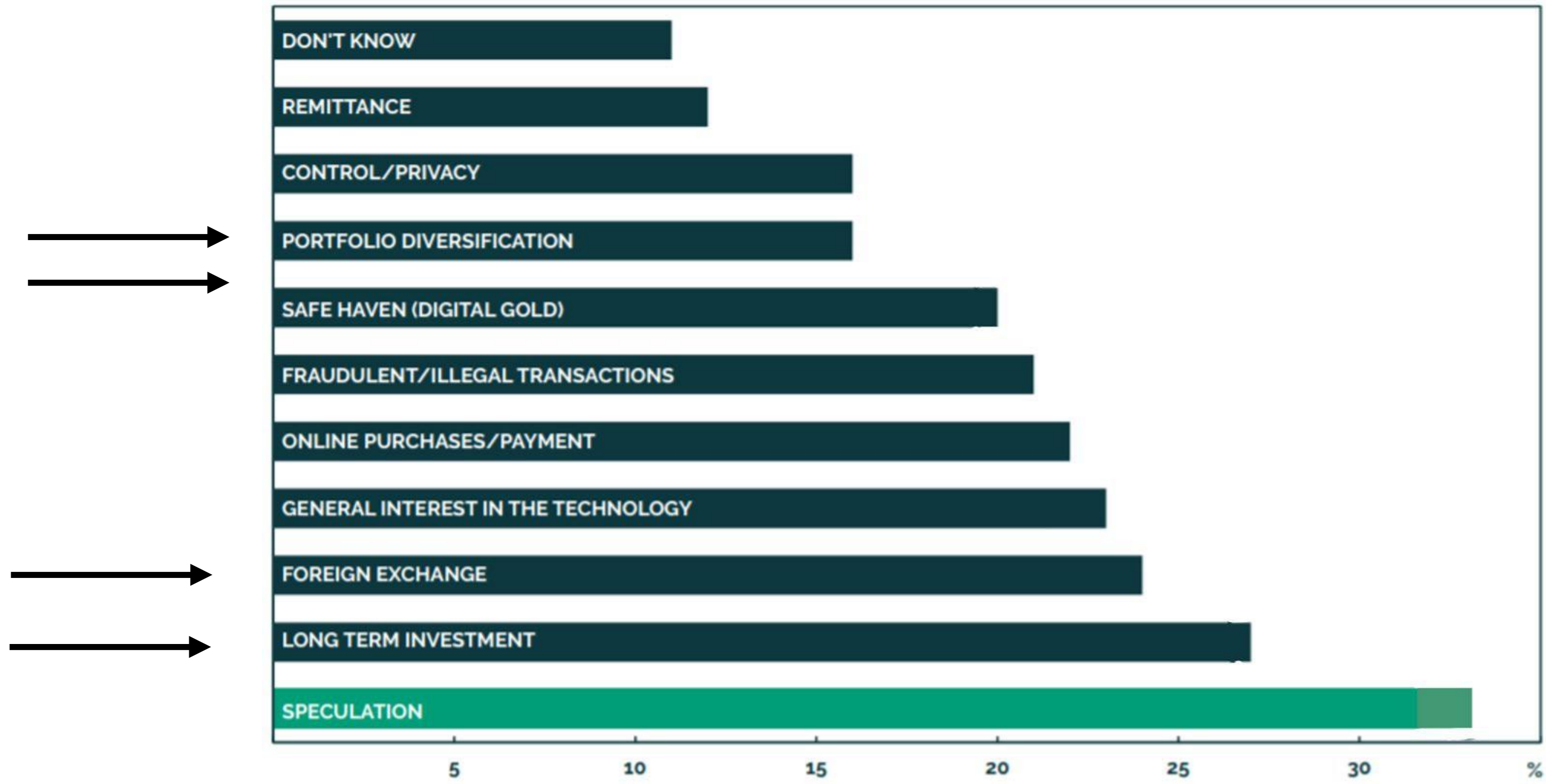
Should You Own Bitcoin?





# Why would you want to own Bitcoin?

U.S.: Reasons for Using/Buying a Cryptocurrency



NOTE: SURVEY DATA DOES NOT ADD UP TO 100% AS RESPONDENTS WERE PERMITTED TO MORE THAN ONE RESPONSE. RESPONDENTS AGES VARIED FROM 18YRS TO 45YRS.



# Diversifier

## Bitcoin was uncorrelated to other asset classes until 2022

Correlation of Weekly Returns Over Past Five Years, Ending December 2021

	S&P500	USTs	US HG Credit	EM Local	TIPS	USD trade-wtd	Commodities	Gold	Yen cash	BTC
S&P500	1	-0.25	0.45	0.51	0.15	-0.44	0.56	0.20	-0.12	0.14
USTs		1	0.54	0.08	0.76	-0.09	-0.20	0.46	0.54	0.03
US HG Credit			1	0.52	0.70	-0.48	0.31	0.49	0.41	0.12
EM Local				1	0.37	-0.85	0.51	0.49	0.28	0.17
TIPS					1	-0.35	0.20	0.61	0.45	0.16
USD trade-wtd						1	-0.51	-0.52	-0.43	-0.17
Commodities							1	0.27	-0.01	0.17
Gold								1	0.54	0.19
Yen cash									1	0.11
Bitcoin										1

Source: JP Morgan; Bloomberg Finance February 18, 2021



# Long Term Investment Investment opportunities in Blockchain

Type	Company	Ticker	Type	Company	Ticker
<b>Bitcoin/Crypto Balance Sheet Plays</b>	Grayscale Bitcoin Trust	GBTC	<b>Exchanges</b>	Coinbase	COIN
	Microstrategy	MSTR		Bakkt Holdings	BKKT
	ProShares Bitcoin ETF	BITO		Mogo	MOGO
	Bitwise 10 Index Fund	BITW	<b>Banks/Other</b>	Signature Bank	SBNY
VanEck Bitcoin Strategy E	XBTF	Galaxy Digital		GLXY CN	
<b>Miners</b>	Core Scientific	CORZ		Silvergate Bank	SI
	Marathon Digital Holdings	MARA		Metropolitan Bank	MCB
	Riot Blockchain	RIOT	Bitwise Crypto Industry E	BITQ	
	Hut 8 Mining	HUT	<b>Crypto SPACs</b>	Blockchain Coinvestors SF	BCSAU
	Terawulf Inc.	WULF		Power&Digital Infra SPAC	XPDBU
	Cipher Mining Inc	CIFR		Adit EdTech Acquisition C	ADEX
	Hive Blockchain	HIVE		Crypto 1 Acquisition Corp	ADAOOU
	Iris Energy	IREN			
	Bitfarms Ltd.	BITF			
	Canaan Inc	CAN			
	Greenidge Generation	GREE			
	Argo Blockchain	ARBK			
	Stronghold Digital Mining	SDIG			
	Bit Mining Ltd	BTCM			
	Clean Spark Inc	CLSK			
	Bit Digital Inc	BTBT			
	Ebang International	EBON			
	The9 Ltd	NCTY			
	DMG Blockchain Solutions	DMGI CN			
	Taal Distributed Informati	TAAL CN			
Cryptostar Corp	CSTR CN				
Sysorex Inc	SYSX				



# Bitcoin, Crypto/Blockchain ETFs

## AUM of Bitcoin Strategy ETFs

Ticker Name	Underlying	Inception Date	AUM (\$mn)
BITO ProShares Bitcoin Strategy ETF	BTC Futures	19-Oct-21	753
BITI ProShares Short Bitcoin Strategy ETF	BTC Futures	21-Jun-22	114
XBTF VanEck Bitcoin Strategy ETF	BTC Futures	16-Nov-21	28
BTF Valkyrie Bitcoin Strategy ETF	BTC Futures	22-Oct-21	23
MAXI Simplify Bitcoin Strategy PLUS Income ETF	BTC Futures	30-Sep-22	19
DEFI Hashdex Bitcoin Futures ETF	BTC Futures	16-Sep-22	1

## Crypto/Blockchain Based ETFs

Ticker Name	Asset Class	Inception Date	AUM (\$mn)
BLOK Amplify Transformational Data Sharing ETF	Equity	17-Jan-18	418
LEGR First Trust Indxx Innovative Transaction & Proc	Equity	24-Jan-18	109
BLCN Siren ETF Trust Siren Nasdaq NexGen Econo	Equity	17-Jan-18	78
BKCH Global X Blockchain ETF	Equity	14-Jul-21	53
BITQ Bitwise Crypto Industry Innovators ETF	Equity	12-May-21	52
DAPP VanEck Digital Transformation ETF	Equity	14-Apr-21	26
FDIG Fidelity Crypto Industry and Digital Payments	Equity	21-Apr-22	25

# Long Term Investment

Bitcoin has topped the leaderboard of global asset returns for most years since 2010; Otherwise, it's at the bottom

Global Macro Asset Returns

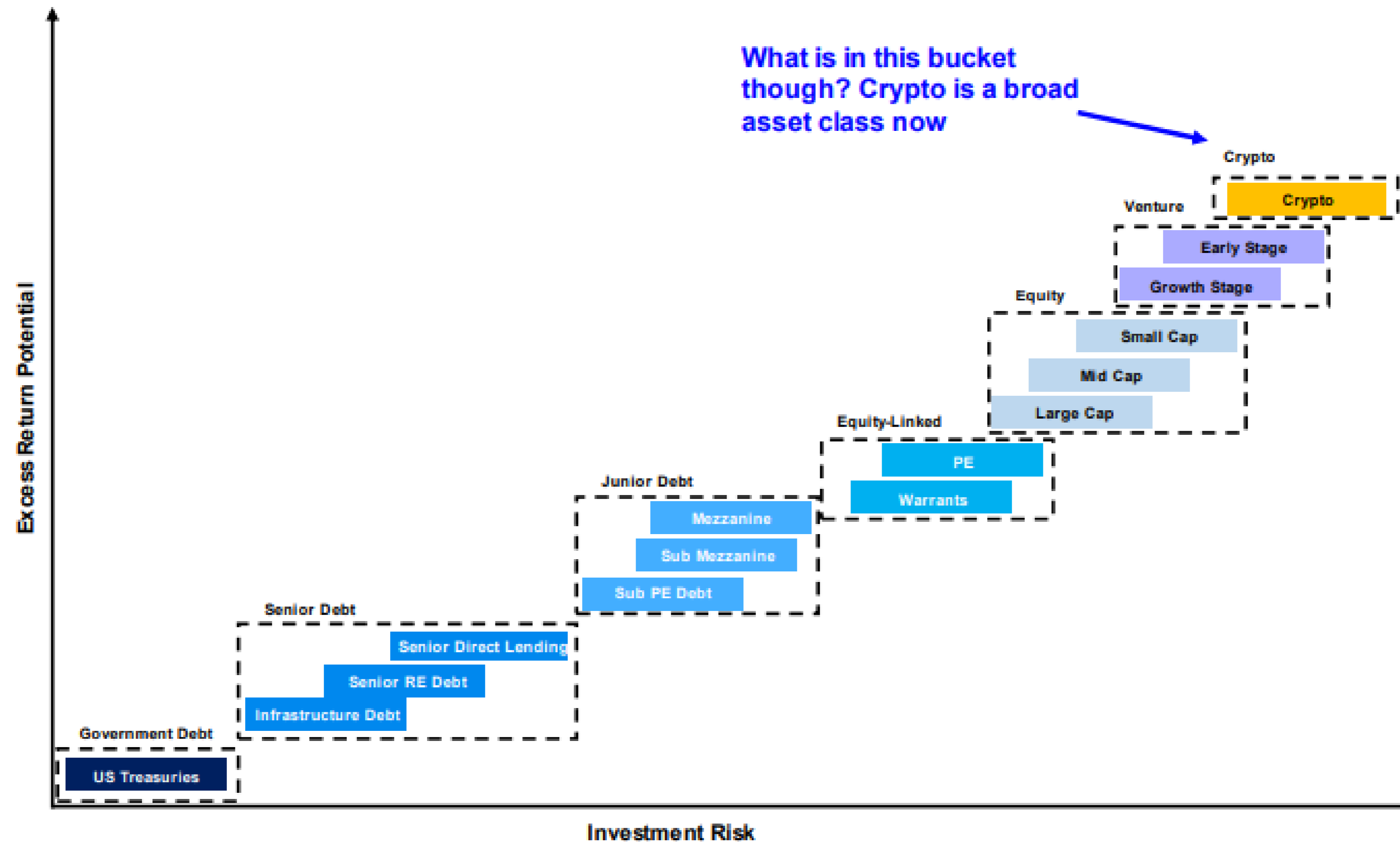
BEST FY 2010	BEST FY 2011	BEST FY 2012	BEST FY 2013	FY 2014	BEST FY 2015	BEST FY 2016	BEST FY 2017	FY 2018	BEST FY 2019	BEST FY 2020	BEST FY 2021	FY 2022	BEST YTD 2023
Bitcoin 39171%	Bitcoin 1471%	Bitcoin 187%	Bitcoin 5286%	Dollar 13%	Bitcoin 34%	Bitcoin 126%	Bitcoin 1337%	Dollar 4%	Bitcoin 94%	Bitcoin 305%	Bitcoin 60%	Commodities 16%	Bitcoin 33%
Gold 30%	Gold 10%	MSCI EM 15%	S&P 500 30%	S&P 500 11%	Dollar 9%	Oil 45%	MSCI EM 34%	US Treasuries 1%	Oil 34%	Gold 25%	Oil 55%	Dollar 8%	MSCI World 5%
Commodities 17%	US Treasuries 10%	MSCI World 13%	MSCI World 20%	US Bonds 6%	US Treasuries 1%	Commodities 12%	MSCI World 22%	US Bonds 0%	S&P 500 29%	S&P 500 16%	Commodities 27%	Oil 7%	S&P 500 4%
MSCI EM 16%	Oil 8%	S&P 500 13%	Oil 7%	US Treasuries 5%	US Bonds 1%	S&P 500 10%	S&P 500 19%	Gold -2%	MSCI World 24%	MSCI EM 16%	S&P 500 27%	Gold 0%	MSCI EM 3%
Oil 15%	US Bonds 8%	Gold 7%	Dollar 0%	MSCI World 2%	S&P 500 -1%	MSCI EM 9%	Gold 14%	S&P 500 -6%	Gold 18%	MSCI World 14%	MSCI World 17%	US Treasuries -12%	Dollar 2%
S&P 500 13%	Dollar 1%	US Bonds 4%	US Bonds -2%	Gold -1%	MSCI World -4%	Gold 8%	Oil 12%	MSCI World -11%	MSCI EM 15%	US Treasuries 8%	Dollar 6%	US Bonds -13%	US Bonds 0%
MSCI World 10%	S&P 500 0%	US Treasuries 2%	US Treasuries -3%	MSCI EM -5%	Gold -10%	MSCI World 6%	US Bonds 4%	Commodities -11%	US Bonds 9%	US Bonds 8%	US Bonds -2%	S&P 500 -19%	US Treasuries 0%
US Bonds 7%	MSCI World -9%	Dollar -1%	MSCI EM -5%	Commodities -17%	MSCI EM -17%	Dollar 4%	US Treasuries 2%	MSCI EM -17%	Commodities 8%	Commodities -3%	US Treasuries -2%	MSCI World -20%	Gold -1%
US Treasuries 6%	Commodities -13%	Commodities -1%	Commodities -10%	Oil -46%	Commodities -25%	US Bonds 3%	Commodities 2%	Oil -25%	US Treasuries 7%	Dollar -7%	Gold -4%	MSCI EM -22%	Oil -3%
Dollar 2%	MSCI EM -20%	Oil -7%	Gold -28%	Bitcoin -56%	Oil -30%	US Treasuries 1%	Dollar -10%	Bitcoin -74%	Dollar 0%	Oil -21%	MSCI EM -5%	Bitcoin -64%	Commodities -5%



# Speculation

## Macro matters: Bitcoin & crypto prices don't move in a vacuum

Crypto on the Investment Risk / Return Curve



Source: Fundstrat, John St

# Speculation

There has been a lot of risk associated with Bitcoin's reward

U.S. Dollar vs. Gold vs. Bitcoin  
Trailing Returns and Standard Deviation

	<b>U.S. Dollar</b>	<b>Gold</b>	<b>Bitcoin</b>
1-Year Annualized Return	19.8%	-6.6%	-63.5%
1-Year Annualized Standard Deviation	7.1%	13.4%	64.3%
3-Year Annualized Return	3.9%	4.1%	22.4%
3-Year Annualized Standard Deviation	6.4%	15.3%	67.6%
5-Year Annualized Return	3.6%	5.0%	32.9%
5-Year Annualized Standard Deviation	6.0%	13.6%	73.6%
10-Year Annualized Return	3.1%	0.0%	110.4%
10-Year Annualized Standard Deviation	6.5%	14.5%	85.7%



# *The DeFi Economy Is Inevitable* > 150 years ago

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The philosopher Schopenhauer once remarked that “All truth passes through three stages. First it is ridiculed. Second it is violently opposed. Third it is accepted as being self-evident.”

# May 18, 2010 (Laszlo's dubious distinction)

First Real-World Transaction: Bitcoin for Pizza

**laszlo**  
Full Member  
○○○

Activity: 199  
Merit: 487

**Pizza for bitcoins?**  
May 18, 2010, 12:35:20 AM  
Merited by DaRude (50), Seccour (50), Vod (20), alani123 (12), OgNasty (10), Nomad88 (10), Totscha (10), TimtheYoutuber (10), the\_poet (10), arthurbonora (10), leps (10), mnightwaffle (10), suchmoon (9), cheefbuza (7), d5000 (5), Betwrong (5), bitbollo (5), ebeliever (5), krogothmanhattan (5), LiteBit (5), mia\_houston (5), nutildah (3), klondike\_bar (3), vapourminer (2), BitcoinFX (2), LFC\_Bitcoin (2), LoyceV (2), gbianchi (2), cygan (2), bones261 (2), Halab (2), ChiBitCTy (2), filippone (2), crypto\_curious (2), ivaxmm (2), malevolent (1), EFS (1), JayJuanGee (1), iluvbitcoins (1), HI-TEC99 (1), S3cco (1), batang\_bitcoin (1), ETFbitcoin (1), digit (1), coolcoinz (1), Astargath (1), TheQuin (1), jacktheking (1), frankenmint (1), bitart (1), lukax8 (1), Julien\_Olympic (1), apoorvlathey (1), o\_e\_l\_e\_o (1), JanEmil (1), amishmanish (1), elianite (1), Toxic2040 (1), DireWolfM14 (1), VB1001 (1), pushups44 (1), chimk (1), taserz (1), Financisto (1), invincible49 (1), tim-bc (1), fishfishfish313 (1), nullius (1), SimpleFX (1), GazetaBitcoin (1), BobLawblaw (1), thirdprize (1), Toughit (1), barjan (1), M-BTC (1), dektor (1), lonchafina (1), grinbuck (1), alia (1), inkling (1), Kda2018 (1) #1

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I'll pay 10,000 bitcoins for a couple of pizzas.. like maybe 2 large ones so I have some left over for the next day. I like having left over pizza to nibble on later. You can make the pizza yourself and bring it to my house or order it for me from a delivery place, but what I'm aiming for is getting food delivered in exchange for bitcoins where I don't have to order or prepare it myself, kind of like ordering a 'breakfast platter' at a hotel or something, they just bring you something to eat and you're happy!

I like things like onions, peppers, sausage, mushrooms, tomatoes, pepperoni, etc.. just standard stuff no weird fish topping or anything like that. I also like regular cheese pizzas which may be cheaper to prepare or otherwise acquire.

If you're interested please let me know and we can work out a deal.

Thanks,  
Laszlo



# Interested in hearing more?

Visit [federatedinvestors.com/LindaDuessel](https://federatedinvestors.com/LindaDuessel) to sign up for email updates, watch YouTube videos, connect on LinkedIn and more.

LINDA DUESSEL



## Mind on the Market

With more than 30 years of experience, Linda Duessel is nationally recognized for her expertise in analyzing equity market conditions. Linda discusses personal finance with investor groups across the country on topics of interest ranging from the impact of the alternative minimum tax to investing for retirement. Additionally, Linda has been extensively quoted by Associated Press, The Wall Street Journal and Barron's, as well as featured in the annual roundtable for USA Today.

As senior equity market strategist, Linda is part of the equity income team, which is responsible for formulating Federated's views about the market and the firm's positioning strategies within the equity income team. As senior client portfolio manager, she is responsible for articulating the strategy, process, positioning and performance of Federated's equity income products.

Interested in hearing more from Linda? Here are two ways:

1. **Read her weekly market views**  
Look for them on our site and in our weekly email.
2. **Connect with her on LinkedIn**

# Appendix

## Crypto definitions

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- **Active Crypto Users:** Estimated users based on the greater of Blockchain.info Bitcoin wallets or the lower bound of crypto users estimated by Cambridge University.
- **Average Revenue Per User:** Annual transaction fee revenue divided by the number Active Crypto Users.
- **Bitcoin:** The most popular blockchain cryptocurrency, has been evolving into a store of value, while another popular blockchain cryptocurrency, Ethereum, is developing use cases in areas such as decentralized applications, smart contracts and token insurance.
- **Blockchain:** A distributed database existing on multiple computers at the same time. It is constantly growing as new sets of recordings, or “blocks”, are added to it. Each block contains a series of transactions or other information, a timestamp and a link to the previous block, and a cryptographic hash or signature. Any change to a block changes the signature, which affects the header field for the next and subsequent blocks. Thus, any altered block is immediately identifiable, making the blockchain immutable.
- **Consensus:** The process by which all the computers reconcile their version of the database and come to an agreement as to which entries to add into their database in the latest block, and to discard their block and replace it with the one a minimum percentage of other computers (typically 51%-67%) all agree is the valid block.
- **Distributed Ledger:** A more general version of a blockchain, and encompasses other constructs, as long as the ledger is independently replicated across multiple computers with no single computer acting as the source of data in the ledger.
- **Major Central Banks:** Collectively, the Federal Reserve (FED, European Central Bank (ECB), Bank of Japan (BOJ), and the Peoples Bank of China (PBOC).
- **Mining:** The process by which Bitcoin or other token “Miners” process and validate transactions, with the first miner to solve a cryptographic puzzle validating the block and receiving a reward (Currently 6.25 bitcoin each); other miners have to then replicate the result to confirm and move on to the next block.
- **Payment Processing Costs:** Value of all newly issued Bitcoin paid to miners as block rewards which dilute (inflate) the existing supply.



# Appendix

## Central Banks Can Choose a Variety of Design Options

### Design Choices for a Central Bank Digital Currency

- **Accounts at the central bank:** A CBCD can be held and exchanged through accounts. Individuals could access accounts either directly through the central bank or indirectly through commercial banks and other intermediaries. If the CBDC is not account-based, it would instead take the form of exchangeable tokens.
- **Tokens:** A CBDC can take the form of a token, a digital asset that functions as a bearer instrument like cash. Tokens are usually stored in a digital wallet and exchanged via a ledger. Tokens and accounts can coexist to allow both types of transactions, similar to cash and electronic deposit accounts today.
- **Transaction clearing and settlement:** Transactions can be cleared by the central bank or a distributed ledger. This choice is likely to depend on both security considerations and the importance of transactions being visible to the central bank.
- **Access to central bank clearing:** Direct access to central bank clearing can be offered only to banks, to a broader but still limited set of banks and financial technology firms, or even more broadly to households and businesses.
- **Offline transaction capability:** A CBDC that can be exchanged person-to-person via online or uncleared digital transactions would mimic the convenience of cash but also increase the risk of fraud. Possible compromises include setting transaction size limits and requiring offline transaction records to be uploaded later.
- **Pays interest:** A CBDC intended as a pure digital cash replacement would likely not pay interest. A CBDC that paid interest could improve monetary policy transmission but would be more competitive with bank deposits. Both positive and negative interest rates would be possible.
- **Anonymity:** Transactions and user identities could be visible to authorities, or the CBDC platform could allow anonymous transactions to provide privacy. Permitting anonymity on transactions below some threshold amount is a possible compromise.
- **Programmable:** The CBDC platform could be programmable. Examples include automatically deducting tax payments during transactions or adjusting interest rates in response to economic conditions.

# Appendix

## Approaches central banks have taken to managing the risks posed by CBDCs

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### **Risk #1: Disintermediating banks by absorbing customer deposits.**

- No country currently plans to adopt a CBDC that pays interest.
- The ECB is considering imposing balance limits or setting tiered interest rates that would pay less than the rate on safe assets on holdings beyond some threshold.
- Sweden is considering imposing balance caps on wallets and potentially charging negative interest rates on CBDC.
- In China digital wallets have balance caps and transaction limits.
- In the Eastern Caribbean, financial institutions can limit the amount of deposits that can be exchanged for CBDC.

### **Risk #2: Facilitating illicit activity via anonymous transactions that do not require large volumes of cash.**

- A number of countries have determined that financial regulatory laws prohibit fully anonymous CBDC accounts.
- Most countries require ID verification for access to digital wallets, with some exceptions for those subject to strict balance caps and transaction limits.
- Countries generally require commercial bank intermediaries who provide access to CBDC to the public to follow Anti-Money Laundering and Know-Your-Customer laws and to report large or suspicious transactions.
- The ECB is considering granting financial intelligence units access to user identities on individual transactions in special cases when criminal activity is suspected.