

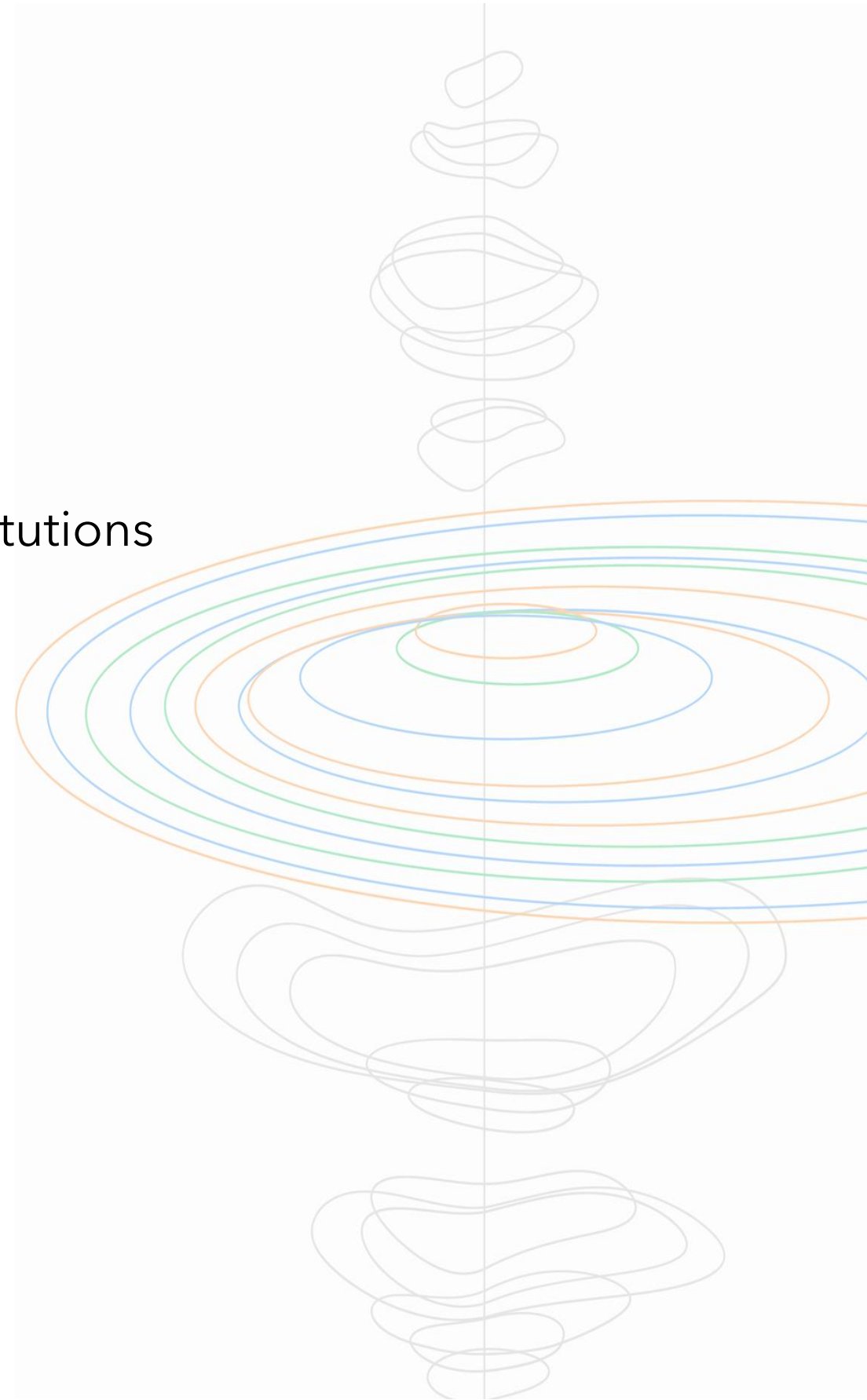
# TOBAM INSTITUTIONAL BITCOIN CO2 OFFSET FUND

Our mission: "Provide rational and professional solutions to long term investors in the context of efficient markets"

This presentation is marketing material and is not intended as a recommendation to buy or sell any particular asset class, security or strategy.

December 2024

1. **Intro to TOBAM & crypTOBAM**
2. Bitcoin investment case
3. Accessing the opportunity: alternatives for institutions
4. TOBAM Bitcoin CO2 Offset Fund
5. Conclusion & appendix



## MIGRATING TOBAM FROM A MONO-CORE ...

**TOBAM\***  
CORE INVESTMENTS

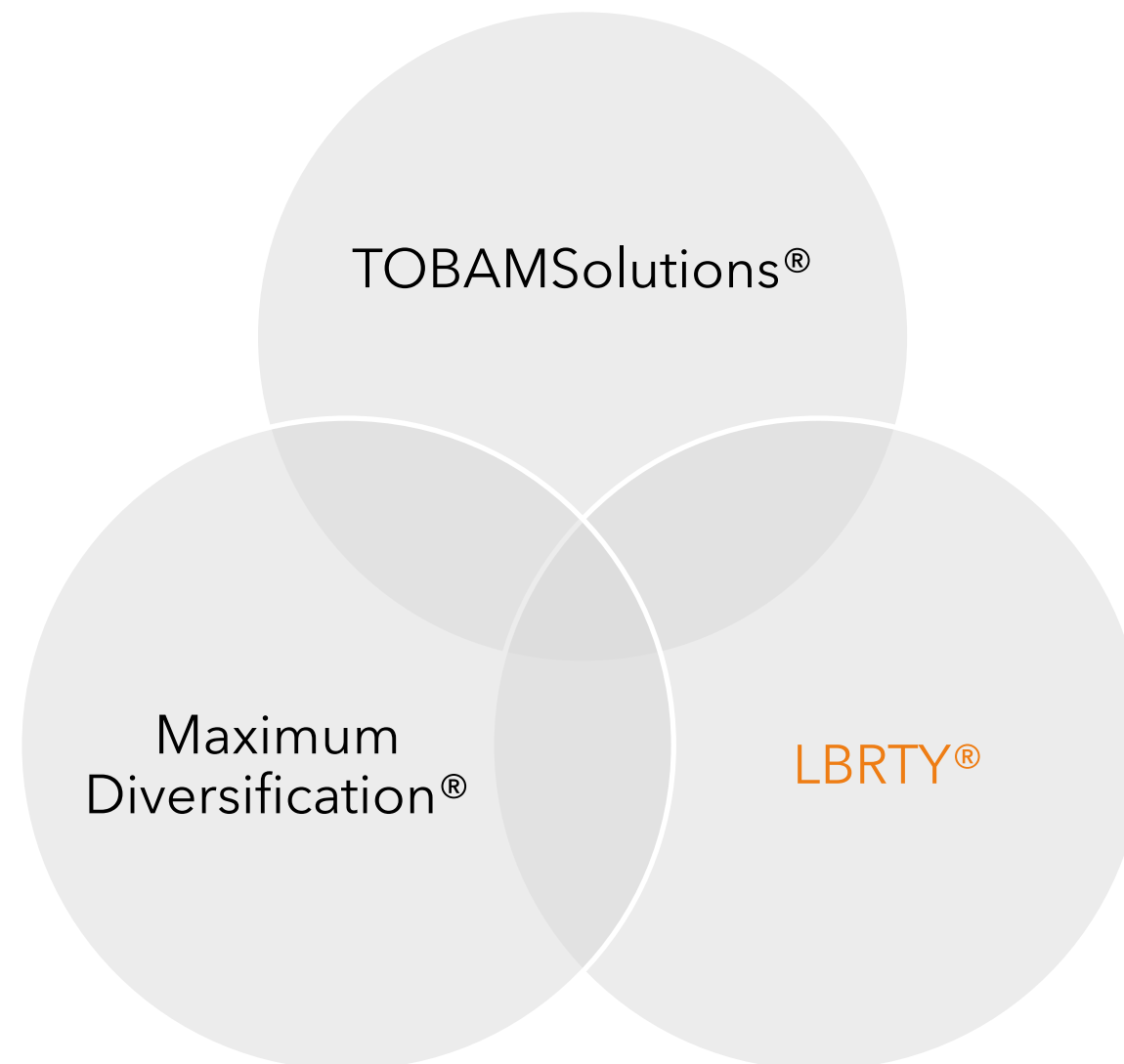


tobam\*  
unbiased.

.... To Multi-Core



CrypTOBAM®



## THE COMPANY

Independent and employee-owned

- Created in 2005
- Part of CalPERS' EMD program (2011 - 2021)
- Approx. USD\$ 2 billion under management
- 31 financial professionals, 11 nationalities
- Regulated in France and SEC-registered

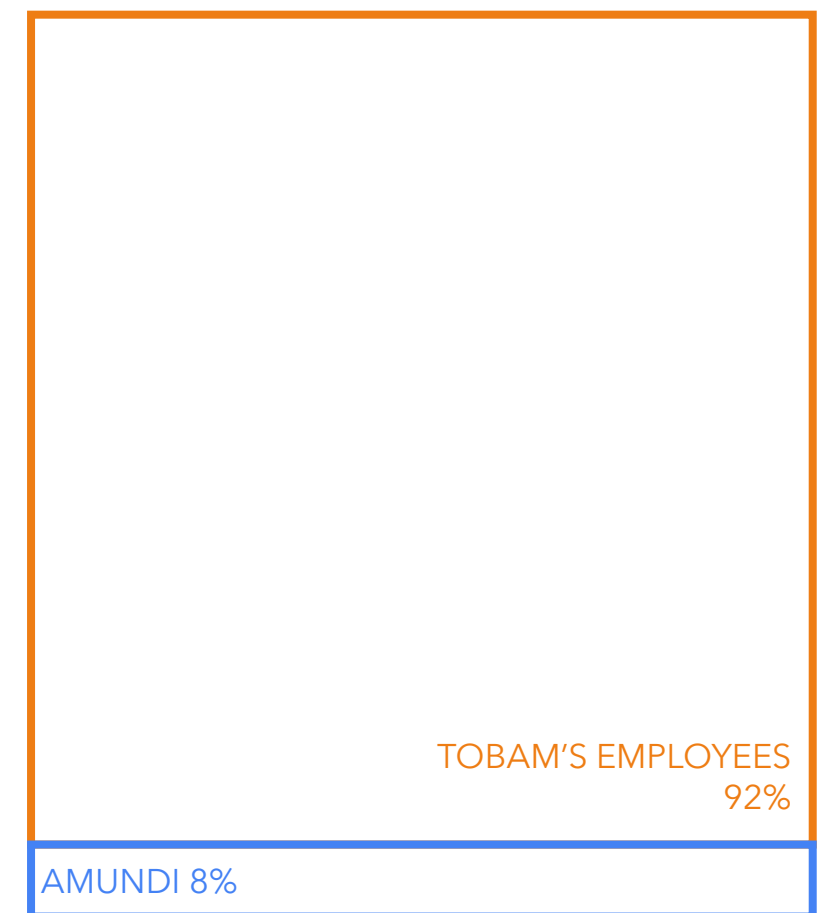
The Maximum Diversification<sup>®</sup> approach, supported by original research and a mathematical definition of diversification, provides investors with diversified core exposure, both in equity and fixed income markets.

## THE FOUNDER

Yves Choueifaty, President & CIO  
(30 years investment experience), previously:

- CEO of Credit Lyonnais Asset Management (AuM €70bn)
- Graduated in 1992 from ENSAE in Statistics, Actuarial Studies Finance and Artificial Intelligence

## SHAREHOLDERS STRUCTURE



Source: TOBAM. Figures as of Dec 31 2024.

# RESEARCH DRIVEN ASSET MANAGEMENT

42% of the team involved in  
portfolio management & research (13 people)

- Identify issues, create solutions and guarantee the rationality of solutions
- Product research & development
- Implementation innovation

// *The team is encouraged to think out of the box in its approach to ‘conventional wisdom’ to the greatest extent possible. As such, the team’s diversity is a critical part of how well it functions.*

*We have a large range of expertise, from mathematicians to engineers, economists and traders, all of which feeds in to the team’s ability to look at problems or assumptions from a very broad spectrum of viewpoints.*

Tristan Froidure, Head of Research

31

employees

11

nationalities

03

locations

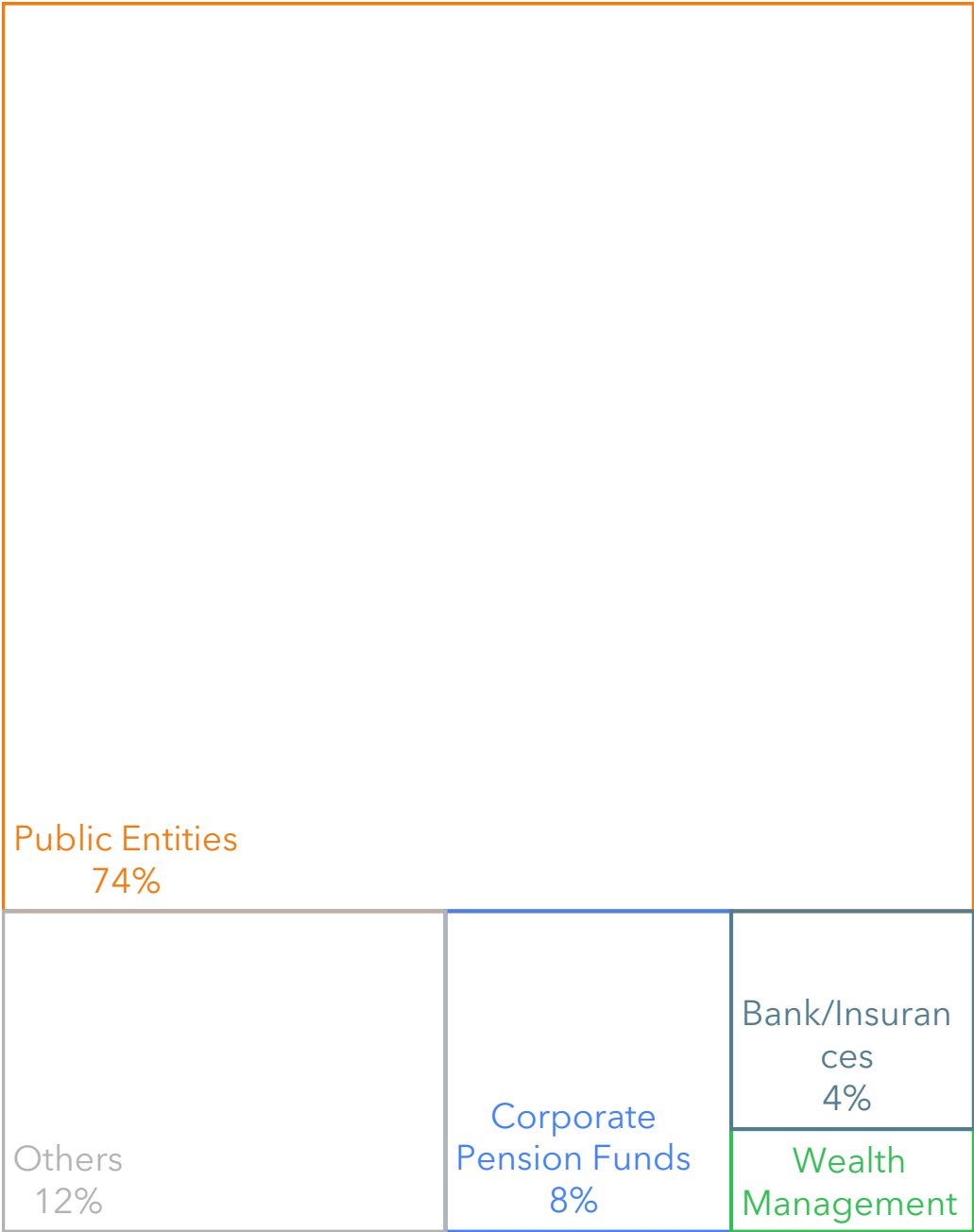
- Paris
- Dublin
- New York



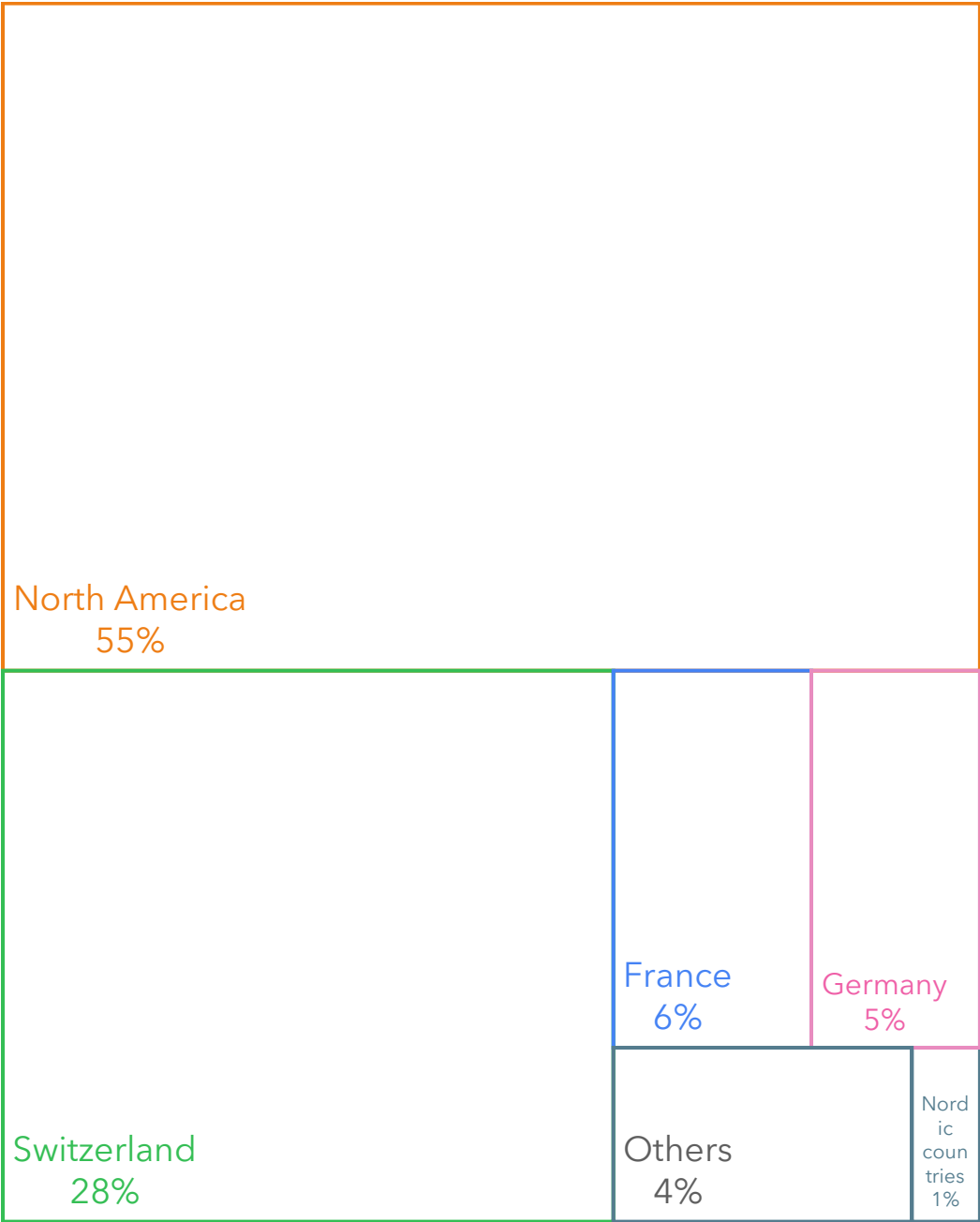
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# ASSET UNDER MANAGEMENT BREAKDOWN

AuM by **Clients Type**



AuM By **Clients Geography**



Source: TOBAM, figures as of Dec 31, 2024, including Maximum Diversification® ETF

# AWARDS

## 2023 - 2024

- "Best Fund Manager for Digital Assets"  
The Digital Banker, Oct 2024 Singapore
- "Equities Manager of the year"  
Wealth & AM Awards, May 2024, London
- Multi Asset Portfolio Awards  
CIO Industry Innovation Awards, Dec 2023, NYC
- "Grand Prix de la Philanthropie"  
"Justice and Peace" category, Ficafe Group, Nov 2023, Paris



GRAND PRIX  
DE LA PHILANTHROPIE

## 2022

- Multi Strategy investing Awards  
CIO Industry Innovation Awards, Dec 2022, NYC
- "Grand Prix de la Finance" US Equity  
"Best funds to choose in the next 12 months"  
H24 Finance, July 2022, Paris
- "Sustainability Provider of the Year"  
Asset Management Awards 2022  
MoneyAge, May 2022, London



## 2021

- "Multi Asset Manager of the Year"  
European Pensions Awards 2021  
October 2021, London
- "Smart Beta Manager of the year"  
Pension and Investment provider Awards 2021  
June 2021, London
- "Multi Asset Manager of the Year"  
Asset Management Awards 2021  
MoneyAge, May 2021, London



## 2020

- European Asset Management Firm of the Year"  
(assets under €20bn)  
Funds Europe Awards 2020, London
- TOBAM's Anti-Benchmark® Multi Asset:  
"Best Flexible Fund"  
Grands Prix de la Gestion d'Actifs 2020, Paris



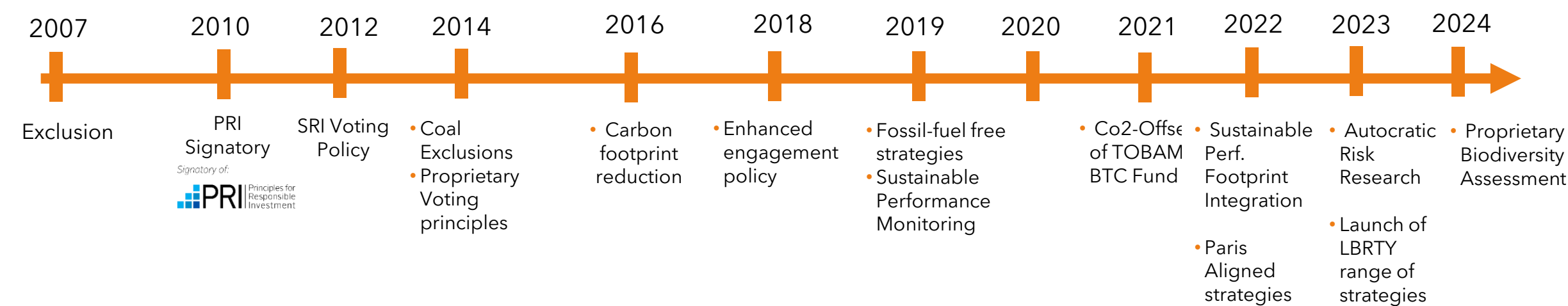
## Other Awards

- "Most Sustainable Company in the Investment Industry"  
World Finance Sustainability Awards, 2019
- "Emerging Equity Manager of the Year"  
UK Pensions Awards 2019, London
- "European Smart Beta Manager of the Year"  
Funds Europe Awards 2018, London
- "European Asset Management Firm of the Year"  
Funds Europe Awards 2017, London
- "AM Leader of the Year"  
Grands Prix de la Gestion d'Actifs 2016, Paris
- "European Asset Manager of the Year"  
Funds Europe Awards 2016, London
- "Equities Manager of the Year"  
CIO Industry Innovation Awards 2015  
New York
- "CIO of the Year"  
Funds Europe Awards 2015
- "Profit for Non Profit Special Award, TOBAM  
Anti-Benchmark Emerging Markets Equity Fund"  
Profit for Non Profit Awards 2014, Paris





# TOBAM'S SUSTAINABLE APPROACH (1) RESPONSIBLE INVESTMENT



## 01. EXCLUSION POLICY

Proprietary exclusion list (controversial products and behaviours)

100% of Anti-Benchmark strategies are **SFDR Article 8** + **LBRTY strategies are Article 9**

## 02. SYSTEMATIC CARBON FOOTPRINT REDUCTION

Average 52% reduction across flagship Anti-Benchmark strategies\*

44% of TOBAM'S AuM are **Paris Agreement Aligned**

## 03. SUSTAINABLE PERFORMANCE FOOTPRINT INTEGRATION

Using officially published data, monitoring of the key sustainability criteria for all listed companies of our universe, systematic matching of benchmark's sustainability performance footprint

**PRI Scores** **5 stars on all pillars**

## 04. ACTIVE OWNERSHIP & ENGAGEMENT

Proprietary SRI Voting Policy & Direct & Collaborative Engagement

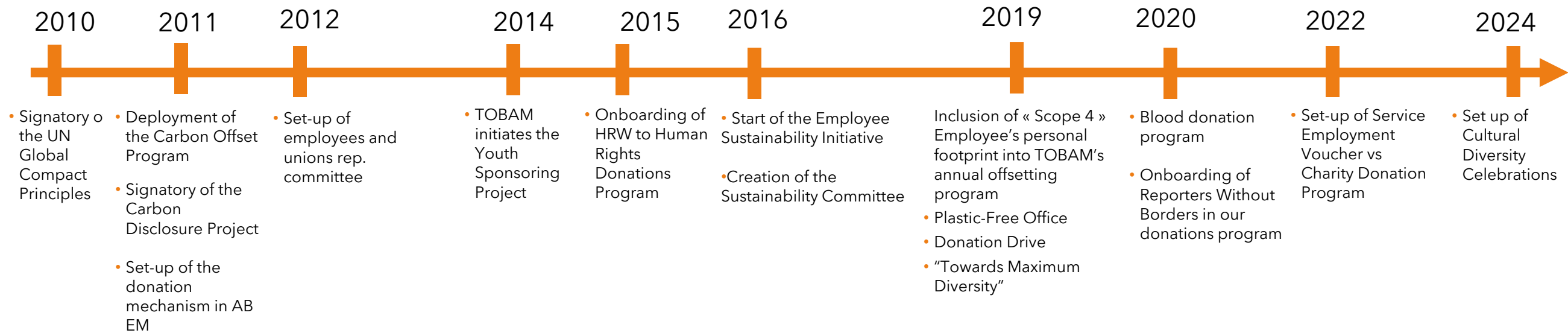
\*Weighted average carbon footprint reduction of 52% across our Anti-Benchmark® strategies versus their respective reference index. Strategies' realised reduction ranges between 24% and 72%.  
Source: TOBAM, Data as of Dec 2024.

Full PRI summary score card: <https://www.tobam.fr/wp-content/uploads/2024/01/Summary-Scorecard-TOBAM.pdf>

Policy Governance & Strategy: \*\*\*\*\*  
Direct Listed Equity -Active Quantitative: \*\*\*\*\*  
Direct Fixed Income - Corporate: \*\*\*\*\*  
Confidence Building Measures: \*\*\*\*\*



## TOBAM'S SUSTAINABLE APPROACH (2) RESPONSIBLE COMPANY



### MANAGING TOBAM'S ENVIRONMENTAL IMPACT

- Measure / Mitigate / Offset
- In 2023, 230% of TOBAM's carbon footprint Scope 1/2/3 is offset via reforestation and renewable energy projects
- Pioneering by including "Scope 4" employees' personal emissions in TOBAM's total calculations

### PROMOTION OF HUMAN RIGHTS

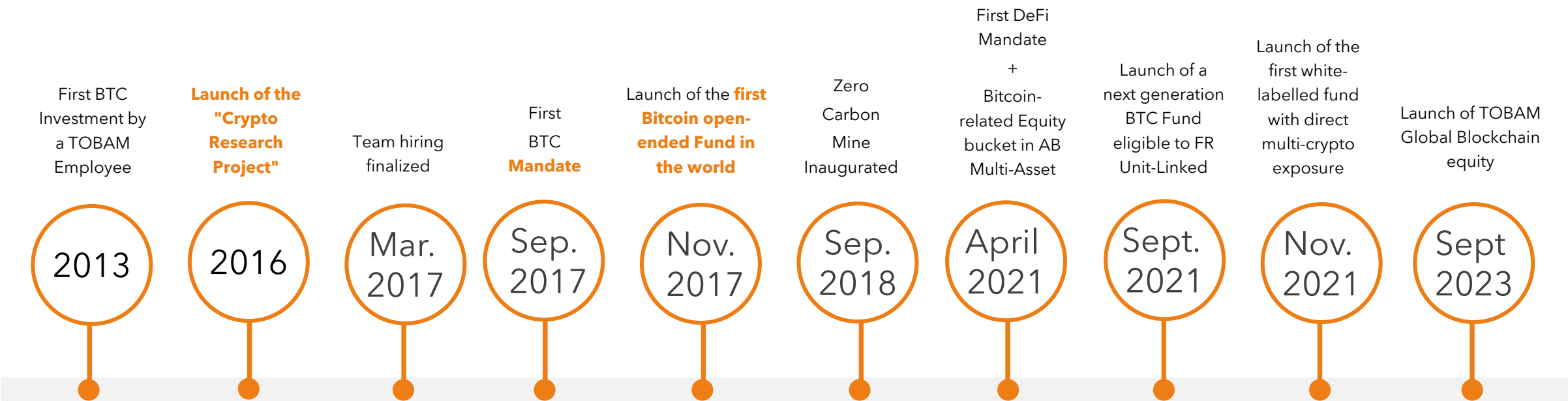
- Human Rights NGOs donation mechanism in our EM equity fund



### EMPLOYEE PROGRAMS

- Employee shareholding program & alignment of interest
- Sustainability committee

TOBAM'S JOURNEY INTO CRYPTO



Research projects

Market impact      Forks      CO2      Time Diversification      Crypto Anti-Benchmarks      ...



## TOBAM – CRYPTOBAM: A UNIQUE COMBINATION

1. TOBAM is a global international institutional Asset Manager with a long track record (16 years) of serving the most demanding clients in the world.
2. TOBAM successfully entered the wealth management space 5 years ago via partnerships.
3. It has a strong track record as a Crypto asset manager.

Which other Asset Manager, has around 60% of its AuM sourced from the **most sophisticated clients in the world** (Public entities: SWF, Central Banks And Public Pensions) **and is a reference player in Cryptos?**

1. Intro to TOBAM & crypTOBAM

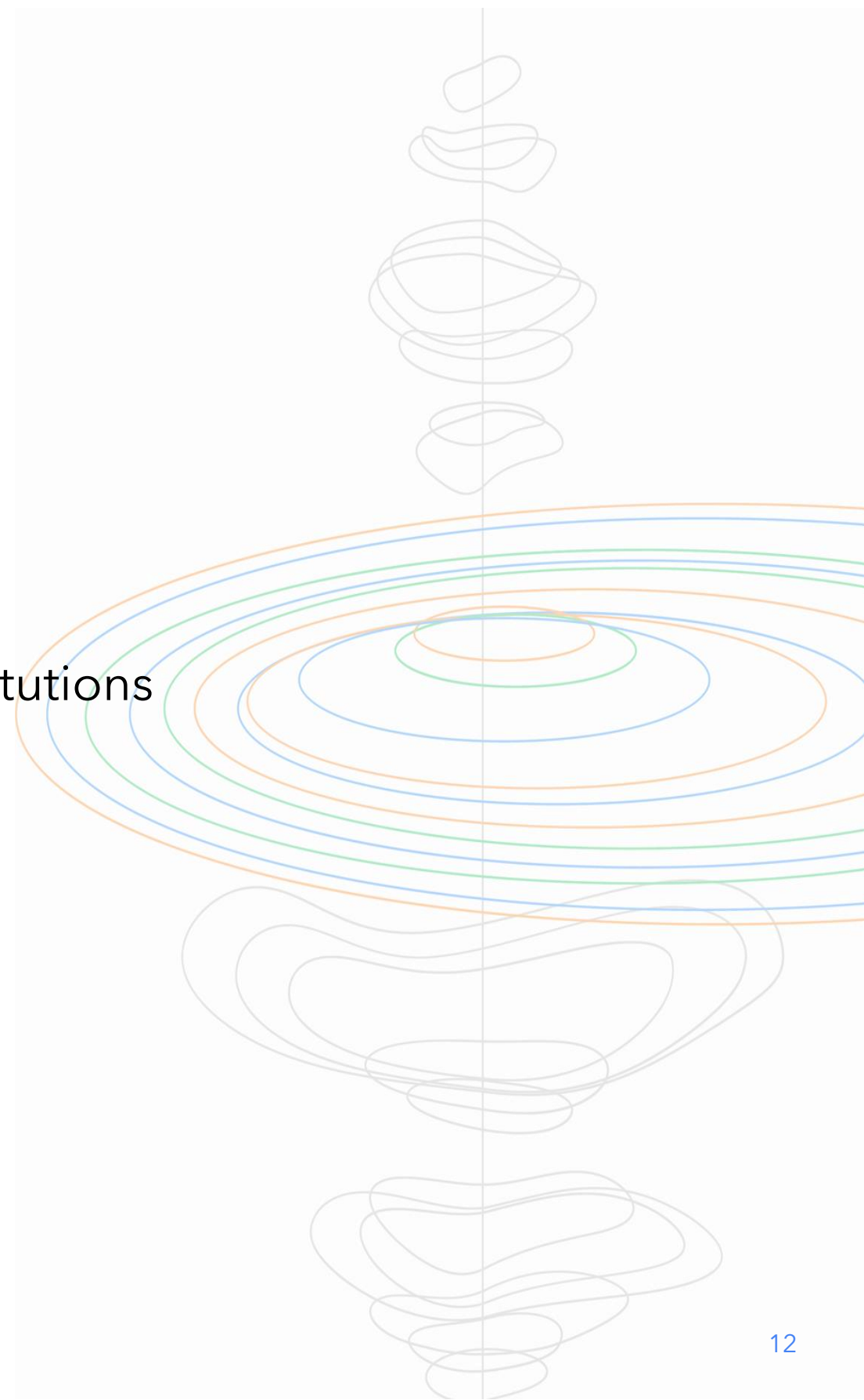
2. Bitcoin investment case

- **Warning**
- Fundamental characteristics
- Empirical characteristics

3. Accessing the opportunity: alternatives for institutions

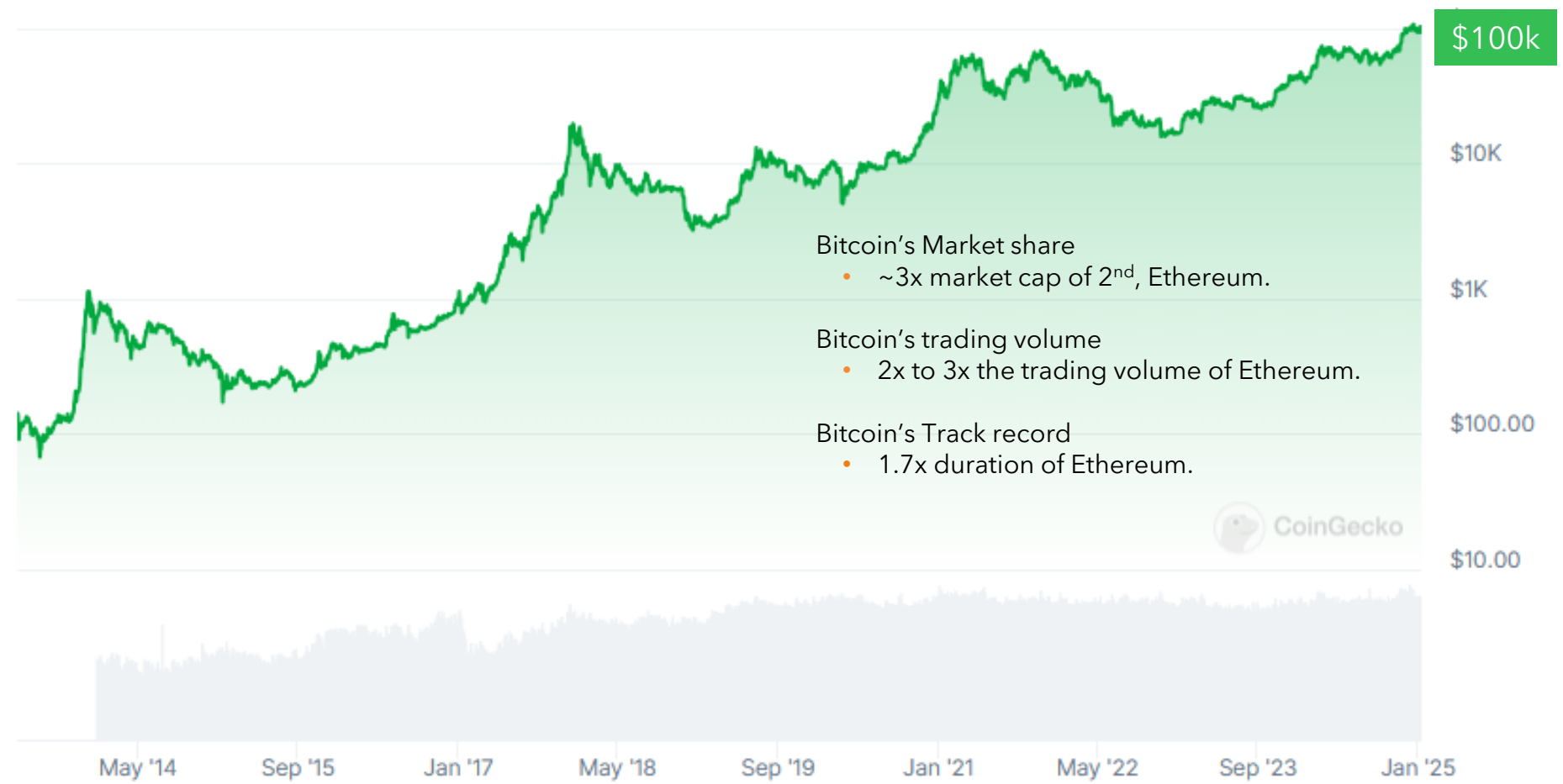
4. TOBAM Bitcoin CO2 Offset Fund

5. Conclusion & appendix



WARNING: DIGITAL CURRENCIES ARE NOT EQUAL  
WE WILL ADRESS ONLY BITCOIN INVESTMENT CASE

- Market price of Bitcoin (USD)  
Since 2013

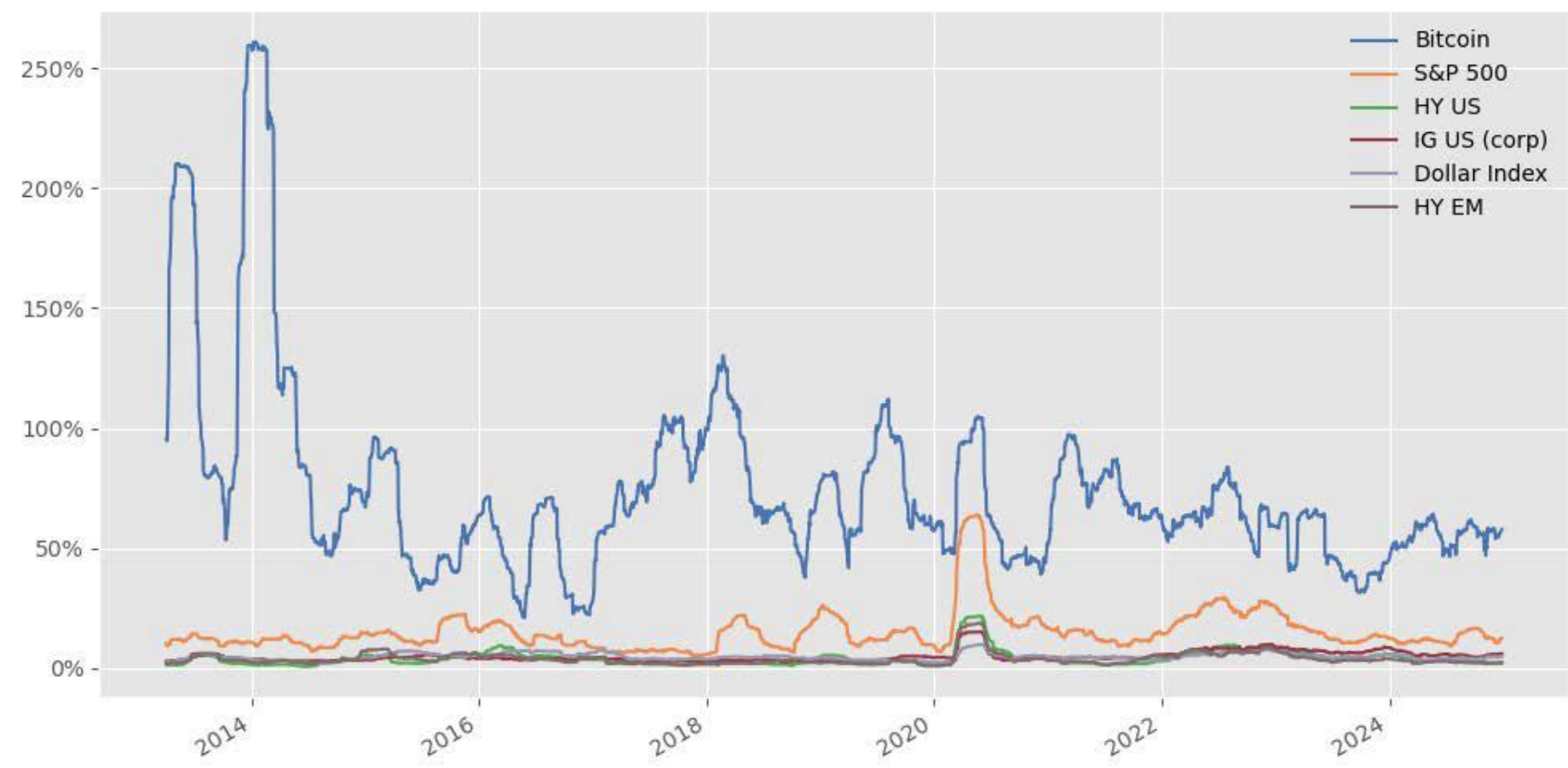


Source: CBOE, CME, coinmarketcap.com and coingecko.com, data as of Dec 31, 2024, considering major cryptocurrency platforms (Coinbase, Bitstamp, Kraken, Gemini) as well as futures. Past performance, risk and behavior are not indicative of future performance, risk and behavior.

Bitcoin is the only digital currency already offering enough liquidity/  
capacity for institutional investors

WARNING: BAD NEWS, BITCOIN IS A VERY VERY VERY RISKY ASSET

- Rolling 3 month volatility



Source: TOBAM, FRED. 3-month volatility calculated on daily returns from, 29/03/2013 to 31/12/2024.  
Past performance, risk and behaviour are not indicative of future performance, risk and behaviour.



## GOOD NEWS: INVESTORS ARE RISK TAKERS

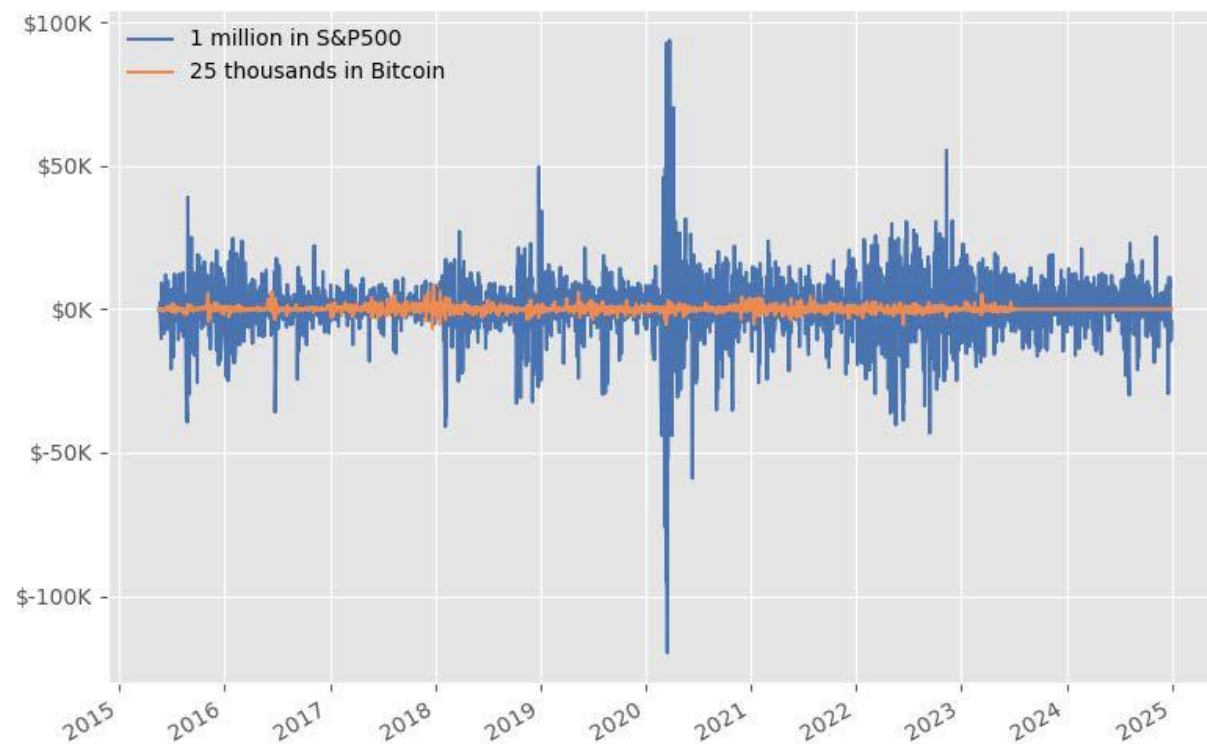
### Theorem:

Risk is not relevant to the Investment case.  
Risk should only determine the Investment size.

US\$ 1 million at 10% volatility is far riskier than US\$ 25 000 at 80% volatility

% volatility is not relevant, what is relevant is the \$ volatility.

### "Size matters!"



- The risk of an asset should determine the size of the investment, not whether to invest or not.
- We should not be able to say "it is too risky for me"

Source: TOBAM and FRED. Hypothetical returns from March 31, 2017 to Dec 31, 2024 provided for illustrative purposes. Hypothetical results do not represent the results of actual trading using client assets. Warning: Past performance is not an indicator or a guarantee of future performance.



## TOBAM'S BITCOIN INVESTMENT THESIS: A POTENTIAL NEW INTERNATIONAL STANDARD MEASUREMENT OF VALUE

Definition of a Standard:  
A unit used as a norm in measurement

- Meter: Standard of length
- Kilogram: Standard of mass
- Celsius: Standard of temperature
- Mole: Standard of quantity



Source: Bureau International des Poids et Mesures, Pavillon de Sèvres (France).

Bitcoin, candidate to become a standard unit of value?

- The economy is about production, exchange and storage of goods, services, risks, labour, innovations, contracts...
- In order for these activities to occur, we need a measurement of value. We need a *standard* of value.

# PAST STANDARDS OF VALUE HAVE ALWAYS HAD A REAL-ASSET UNDERLYING UNTIL ...

- **Bartering & Commodity money**

Commodities Money (bags of salt, tea, tobacco, coconuts, shells..)

- **Coins & Paper Money**

Metals objects introduced as money around 5000 B.C.  
First metal coins introduced by the Lydians by 700 B.C.  
Paper Money introduced in ancient China around A.D. 960

- **Representative Money - Introduction of the precious metal Standard (Silver & Gold)**

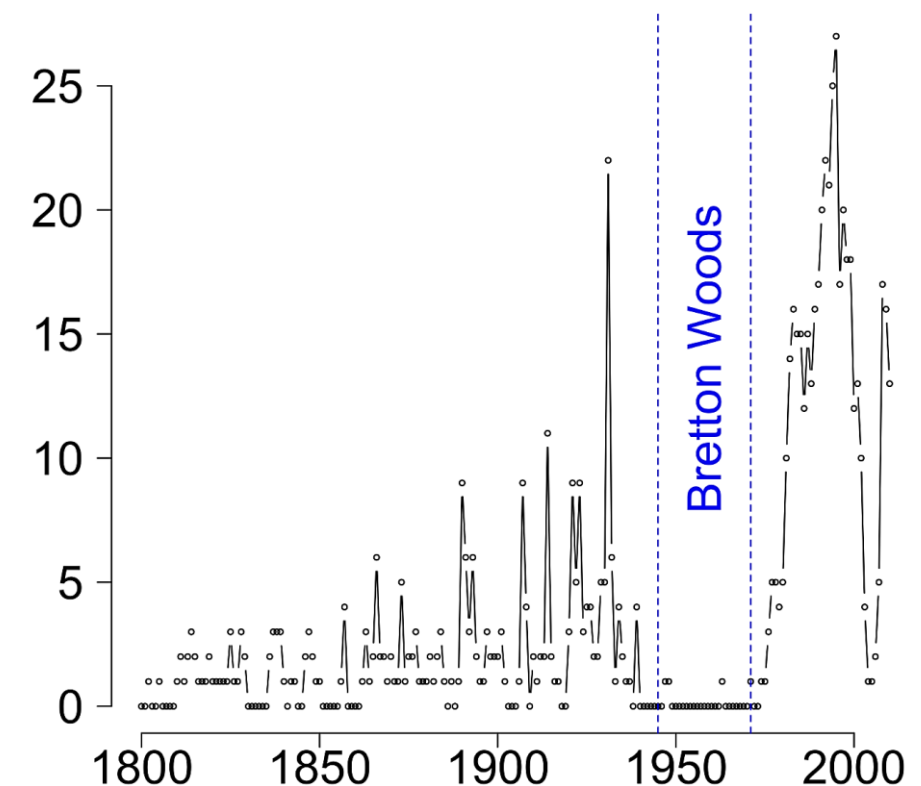
With the introduction of paper currency and non-precious coinage, commodity money evolved into representative money. This meant that what money itself was made of no longer had to be very valuable.

Representative money was backed by a government or bank's promise to exchange it for a certain amount of silver or gold.

- **Fiat Money ("Let it be done" money, 1971)**

Representative money has now been replaced by fiat money. Money is now given value by a government fiat or decree.

- Numbers of countries having a banking crisis in each year since 1800 (70 countries)



...the end of convertibility of the US\$ to Gold (very recent: 1971!)

Bitcoin has fundamental characteristics that position it as a good candidate to become a new international standard

## ANSWERING 99% OF QUESTIONS ABOUT BITCOIN

// 99% of questions about Bitcoin are answered by replacing the word "Bitcoin" by "Gold"

//

- **Bartering & Commodity money**

Commodities Money (bags of salt, tea, tobacco, live cattle..)

- **Coins & Paper Money**

Metals objects introduced as money around 5000 B.C.

First metal coins introduced by the Lydians by 700 B.C.

Paper Money introduced in ancient China around A.D. 960

- **Representative Money - Introduction of the precious metal Standard (Silver & Gold)**

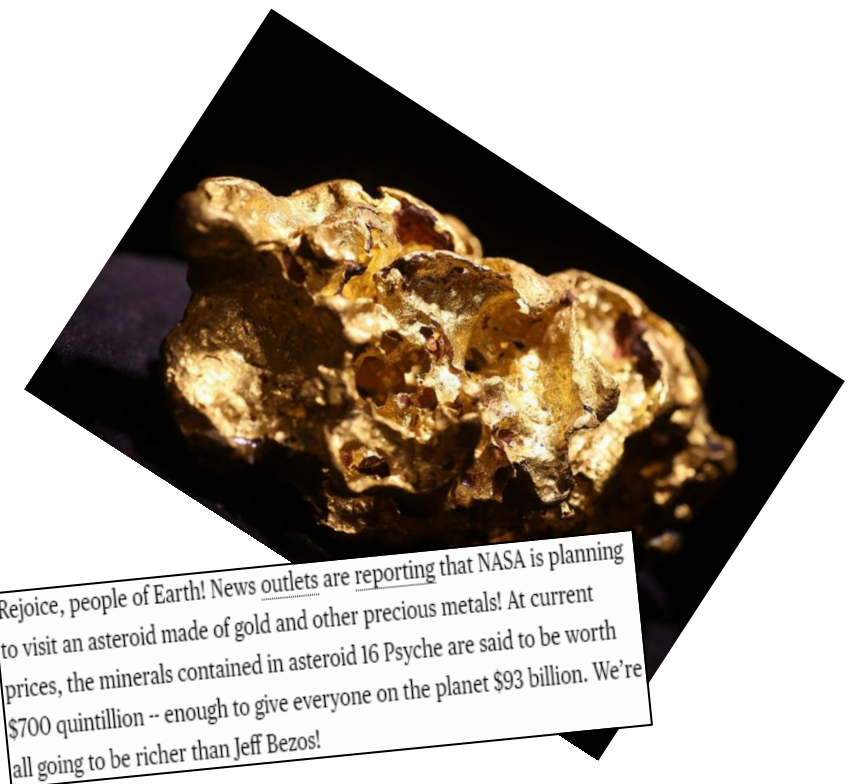
With the introduction of paper currency and non-precious coinage, commodity money evolved into representative money. This meant that what money itself was made of no longer had to be very valuable.

Representative money was backed by a government or bank's promise to exchange it for a certain amount of silver or gold.

- **Fiat Money ("Let it be done" money, 1971)**

Representative money has now been replaced by fiat money. Money is now given value by a government fiat or decree.

- Answering 99% of question about Bitcoin ... except one!



Rejoice, people of Earth! News outlets are reporting that NASA is planning to visit an asteroid made of gold and other precious metals! At current prices, the minerals contained in asteroid 16 Psyche are said to be worth \$700 quintillion -- enough to give everyone on the planet \$93 billion. We're all going to be richer than Jeff Bezos!

Source: <https://www.thoughtco.com/history-of-money-1992150>

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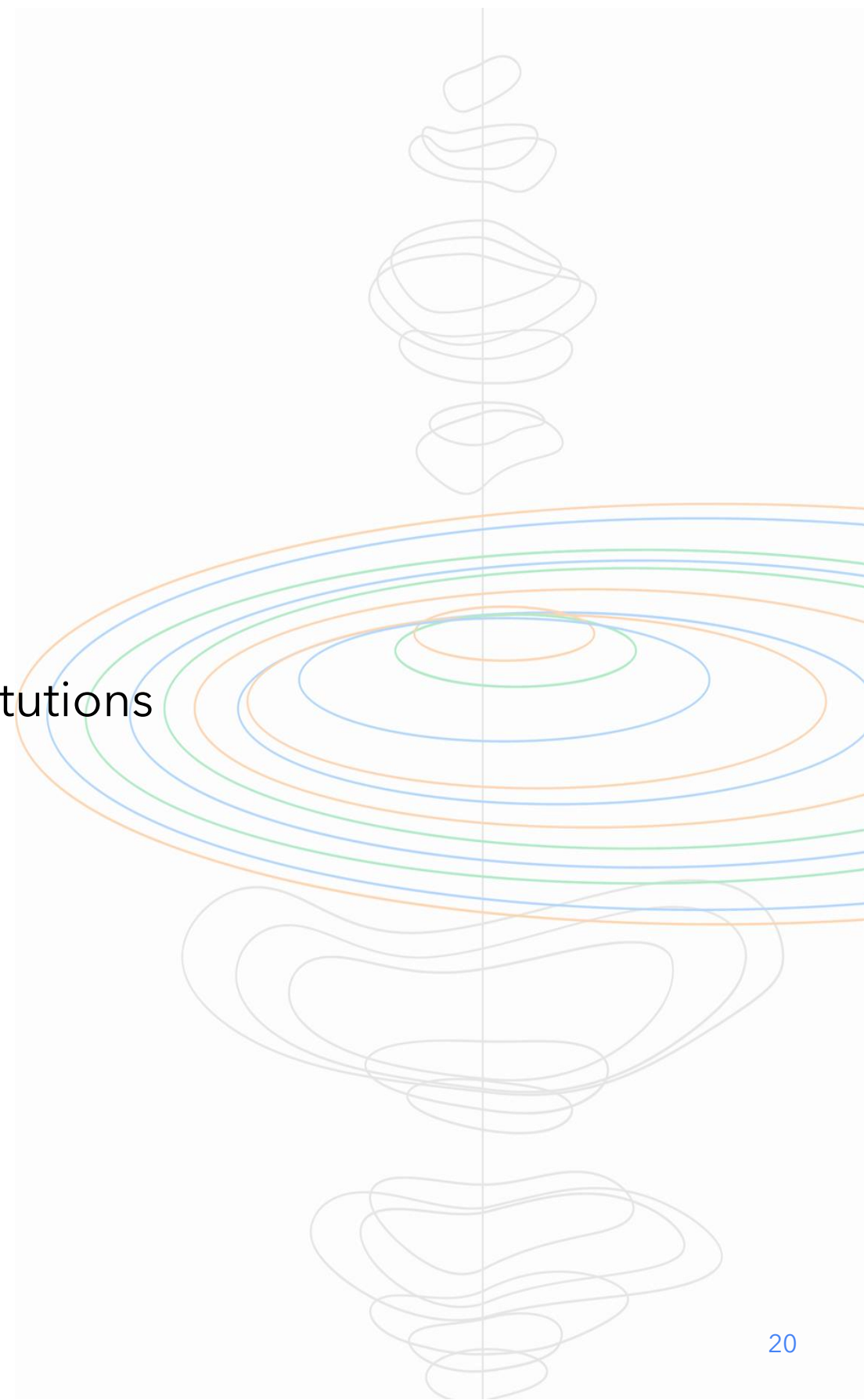
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- Warning
- **Fundamental characteristics**
- Empirical characteristics

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## BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS

Some of the essential characteristics of a standard:

1. Unalterable
2. Non-Forgeable
3. Difficult to seize
4. Not Manipulated by a central authority
5. Non-Inflationary
6. Exchangeable

⇒ TOBAM believes that Bitcoin has the theoretical qualities of a standard measurement of value



# BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS

## 1-2-3. UNALTERABLE / NON-FORGEABLE / DIFFICULT TO SEIZE

- Created by the pseudonymous Satoshi Nakamoto in 2008
- Peer-to-peer protocol based on the Blockchain technology

### Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto  
satoshi@gmx.com  
www.bitcoin.org

**Abstract.** A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

#### 1. Introduction

Commerce on the Internet has come to rely almost exclusively on financial institutions serving trusted third parties to process electronic payments. While the system works well enough,

### The Security of the Blockchain technology

- Unalterable
- Non forgeable
- Difficult to seize



#### Why Bitcoin Matters for Freedom

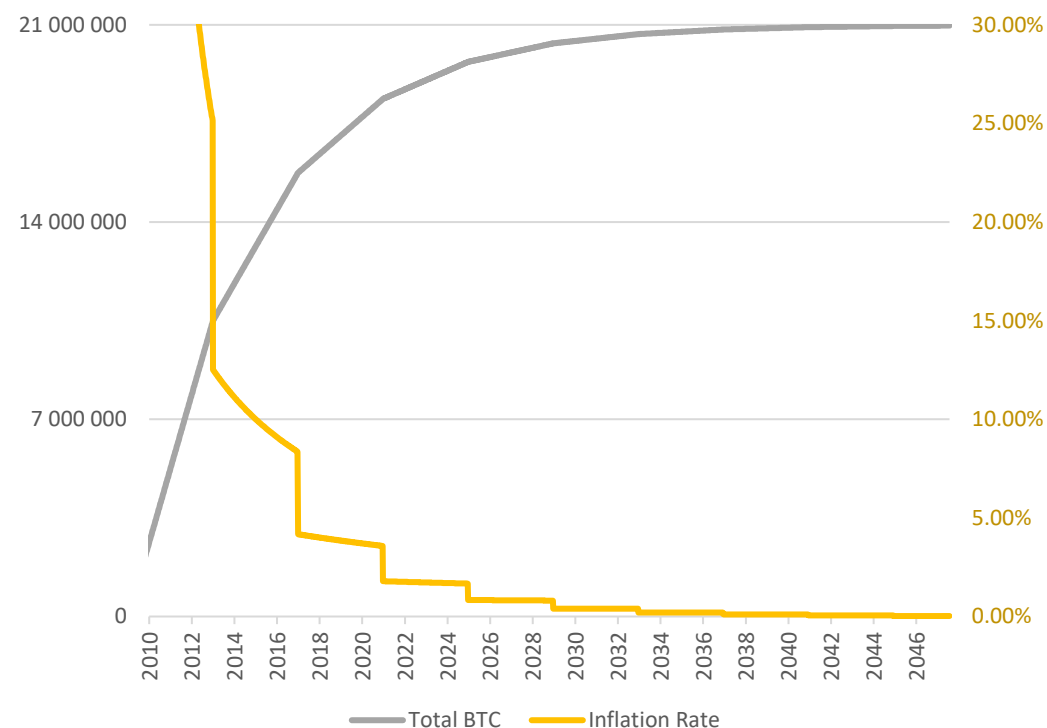
It could make a real difference for the 4 billion people who can't trust their leaders or access the banking system

time.com

# BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS

## 4-5. NOT MANIPULATED, NON-INFLATIONARY (1)

### • Bitcoin supply Growth



- Worldwide currencies are, in fact, issuable in unlimited quantities
- 1 BTC= 100 million Satoshis
- Block reward:
  - 6.25 BTC/block (every 9-10 min) since 2020
  - Halved every 210k blocks, i.e. approximately every 4 years
  - Next halving planned in April 24
- The amount of BTC to be issued is 21 million BTC, and its limit will be reached in 2140.

Source: TOBAM, as of 31/12/2024



# BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS

## 4-5. NOT MANIPULATED, NON-INFLATIONARY (2)

### HISTORY OF STANDARDS COMPARISONS

- US\$ => Inflationary

Annual money supply growth +5.6% on average before 2008 and 20% per year on avg since then

- Roman Denarius => Inflationary

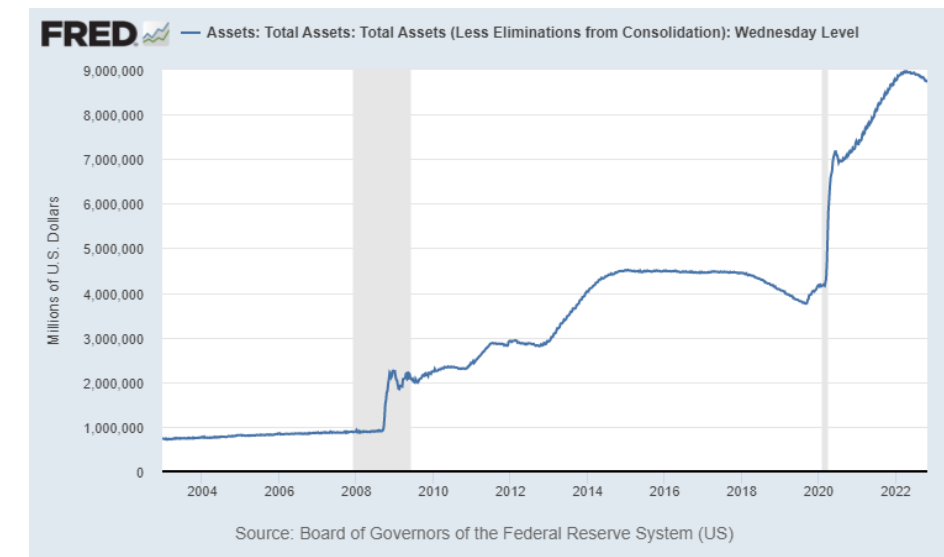
Debasement: % of silver in the Roman Denarius went from 4 g. of silver when it was first minted. By the time it was discontinued, it contained less than 0.1 gram. Number of coins multiplied (Bretton Woods 1.0?)

- Gold => Inflationary

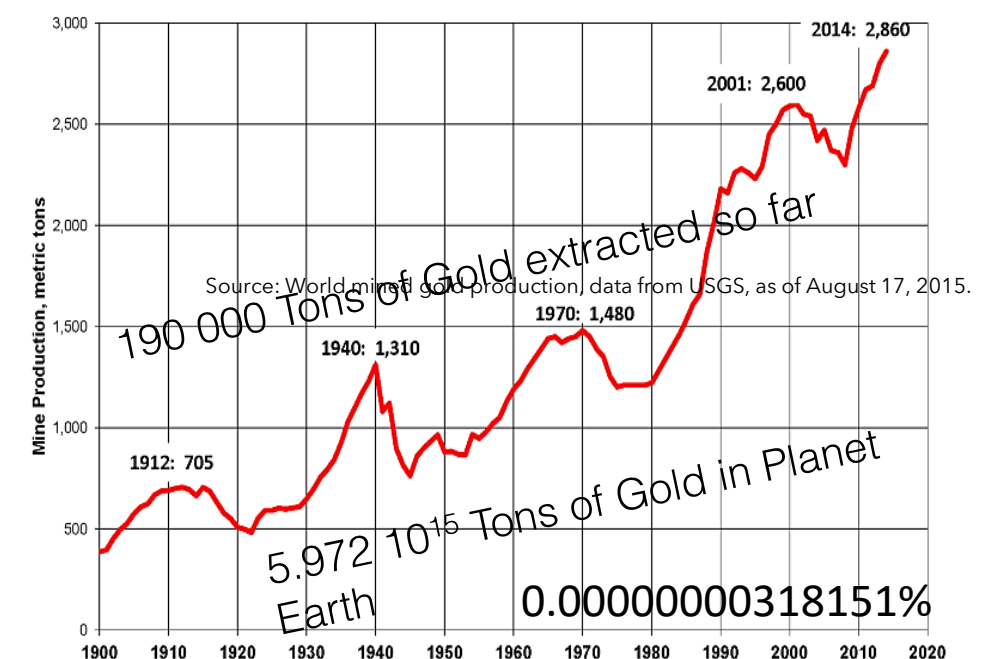
Money supply in Gold (btw 1.1% & 2.4% per year of added supply growth)

Bitcoin => Non-Inflationary

- Us Federal Reserve total assets



- Gold mine production, metric tons

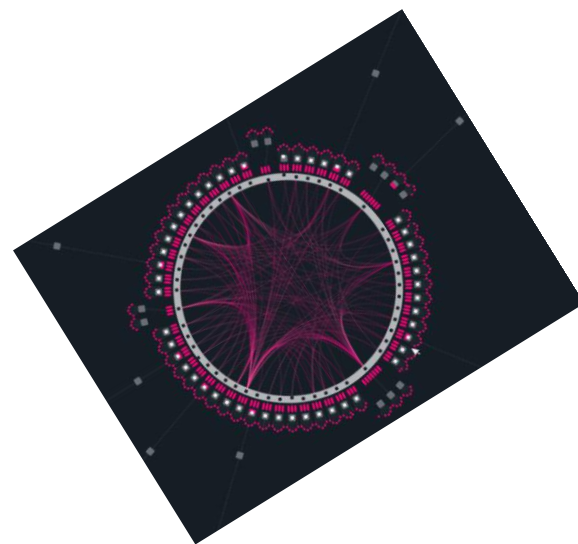


# BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS

## 6. EXCHANGEABLE



- Impossible to block a transaction
- Cheaper and more convenient than wired money transfers
- Irrevocable, undisputable transactions
- No risk of non-payment based on differences in legal enforcement system



## DISRUPTIVE INNOVATION SCHEME KÜBLER-ROSS CHANGE CURVE

- The Kübler-Ross Change Curve







Source: Kübler-Ross Change Curve also known as the stages of grief is a model consisting of the various levels or stages of emotions which are experienced by a person who is soon going to approach death or is a survivor of an intimate death. The Kubler-Ross Model also holds true when it comes to business, societies, work or employment in the way changes are integrated.

## BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS CONCLUSION (1)

Bitcoin is well debated and discussed.

We observe 4 types of criticisms:

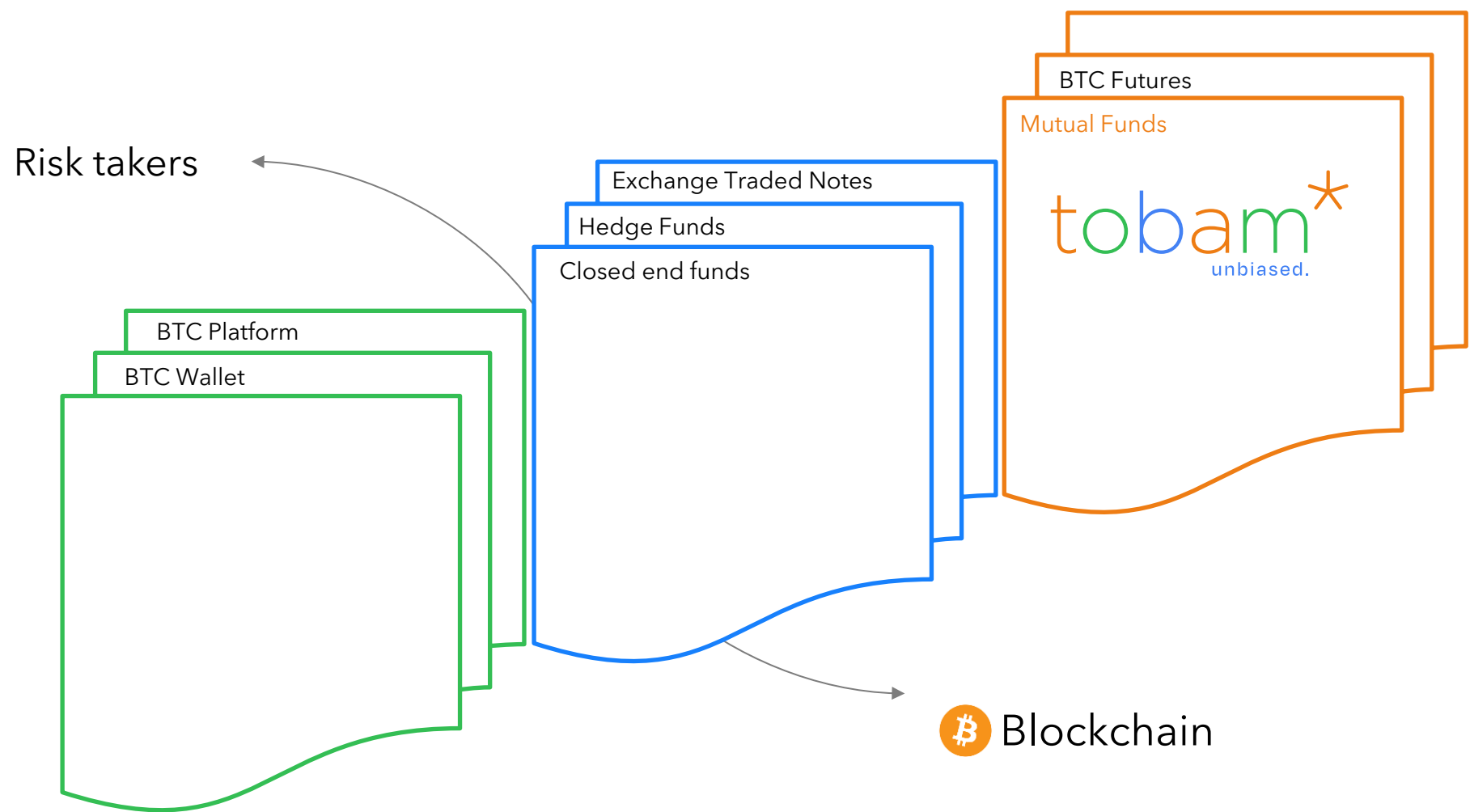
- Criticism driven by Passion or Ideology 
- Criticism driven by Conflicts of Interest 
- Criticism driven by Ignorance 
- Criticism driven by Reason 

TOBAM believes that most criticisms driven by reason will be addressed by the emergence of a financial system between risk takers and the blockchain.

# BITCOIN INVESTMENT CASE: FUNDAMENTAL CHARACTERISTICS

## CONCLUSION (2)

Rapid development of the financial system



# 1 • Intro to TOBAM & crypTOBAM

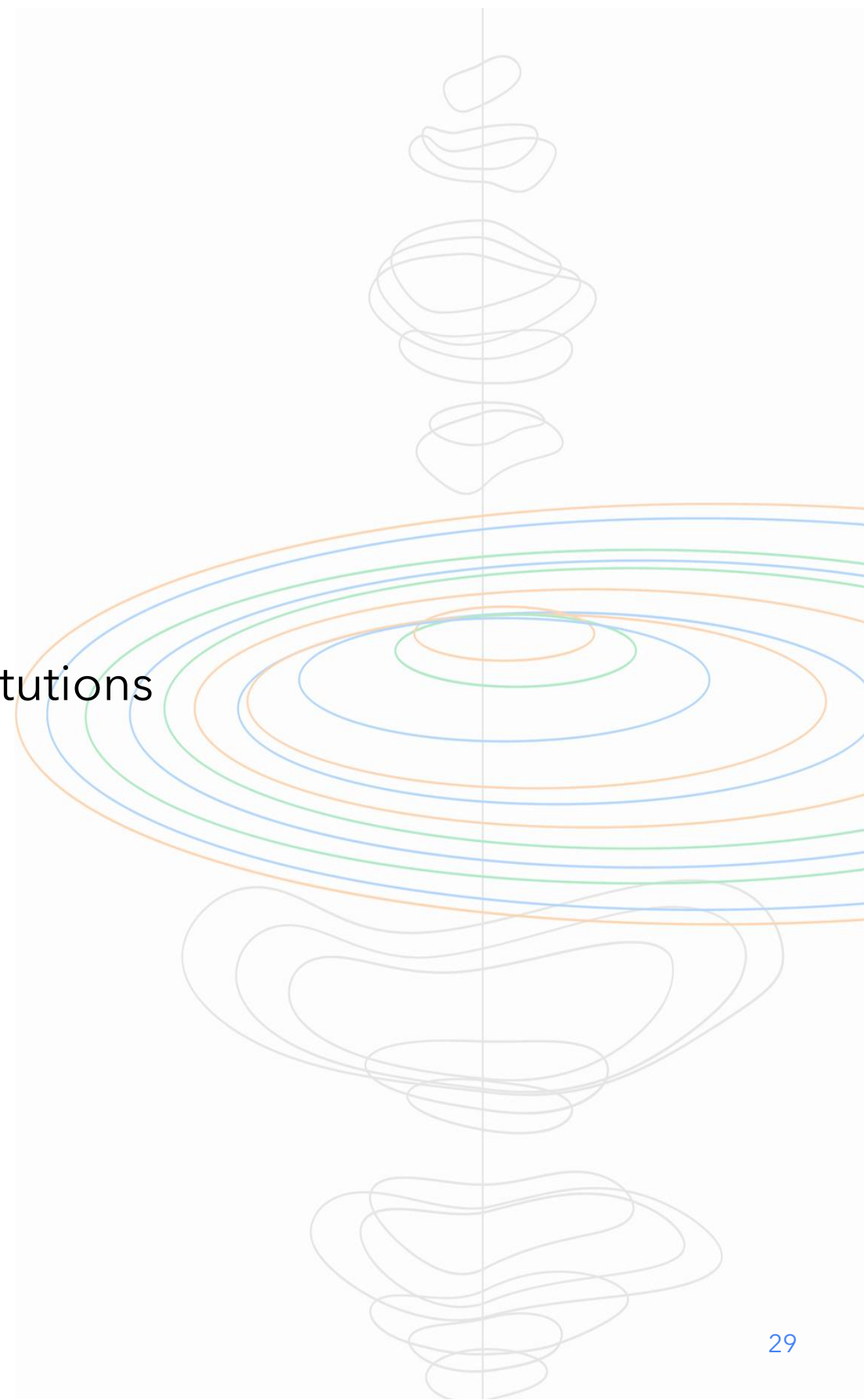
## 2 • Bitcoin investment case

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- **Empirical characteristics**

## 3 • Accessing the opportunity: alternatives for institutions

## 4 • TOBAM Bitcoin CO2 Offset Fund

## 5 • Conclusion & appendix



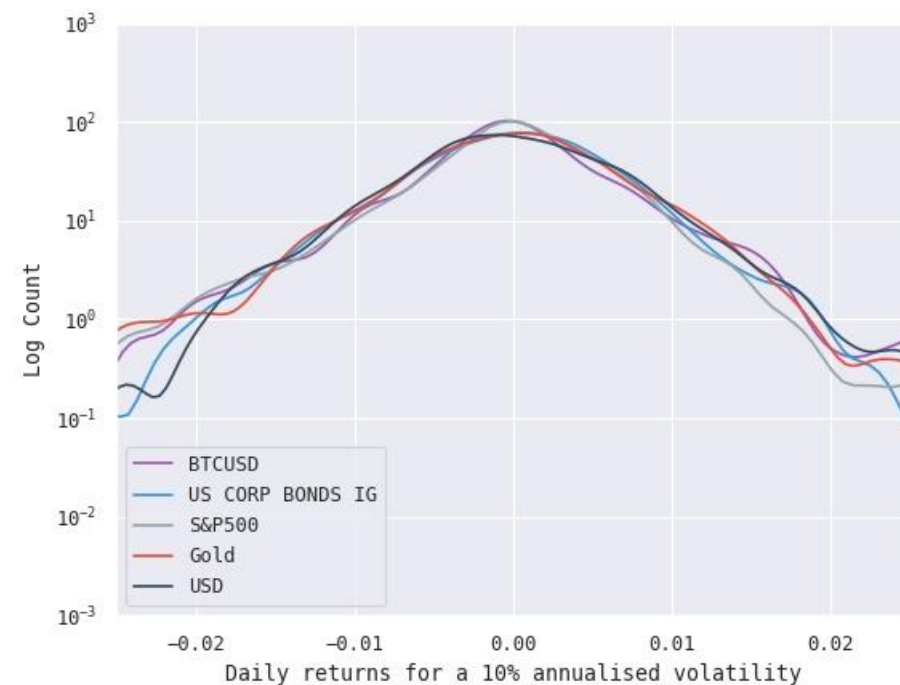
# BITCOIN INVESTMENT CASE: EMPIRICAL CHARACTERISTICS

## 1. BTC RISK NATURE IS CONVENTIONAL

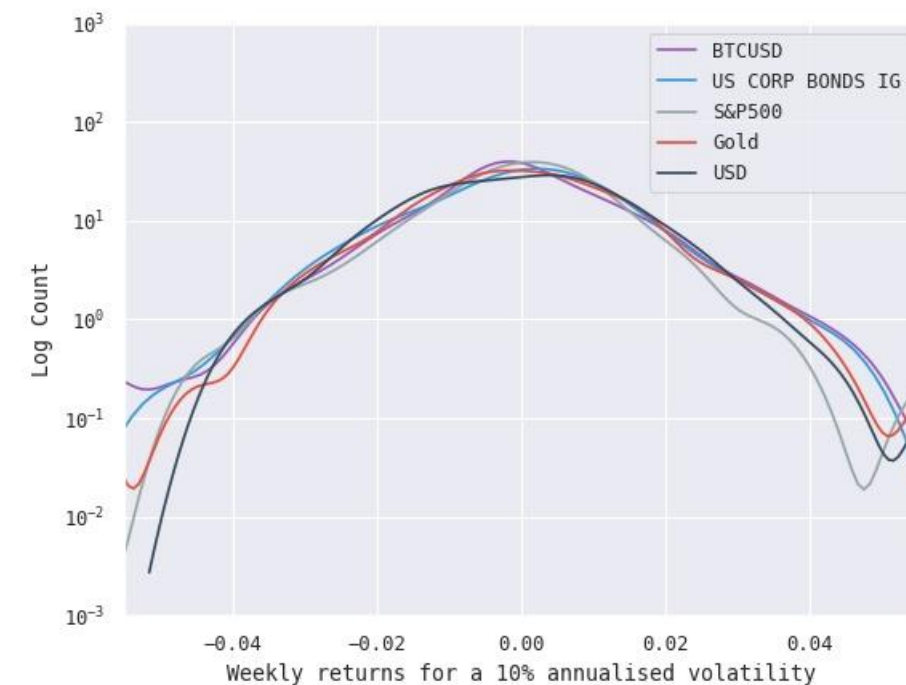
BTC, being much more volatile, must be scaled accordingly

In this example, we compare the distribution of daily returns of the equivalent of a 10% volatility position: i.e. 10% exposure in BTC, versus 237% exposure in US IG corporate bonds

- Distribution of daily returns of 10% volatility position in BTC, Gold, US\$, S&P500 and US Corporate bonds



- Distribution of weekly returns of 10% volatility position in BTC, Gold, US\$, S&P500 and US Corporate bonds



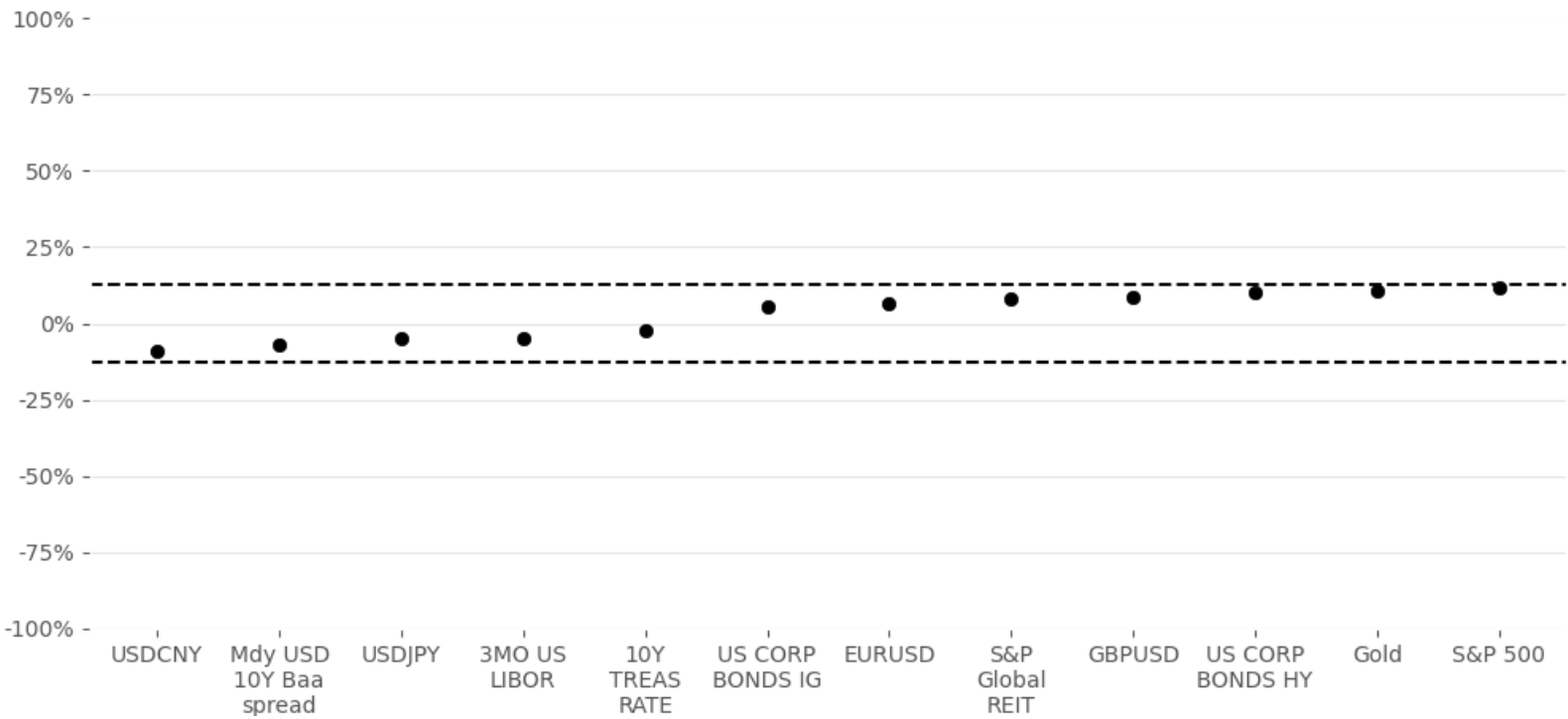
Source: TOBAM and Bloomberg. Hypothetical returns from 2011-01-11 to 2024-12-31 provided for illustrative purposes. Hypothetical results do not represent the results of actual trading using client assets. Hypothetical results are for information purposes only. They are intended to illustrate how the Strategy may have behaved. These hypothetical results are gross of tax and exclude costs of transaction and fee assumptions. Warning: Past performance is not an indicator or a guarantee of future performance. The value of your investment and income received from it can go down as well as up and you may not get back the full amount invested. Performance details provided are in USD and do not include reinvested dividends.



# BITCOIN INVESTMENT CASE: EMPIRICAL CHARACTERISTICS

## 2. BTC IS A DIVERSIFYING ASSET (1)

- Correlation Spectrum: Bitcoin versus most asset classes



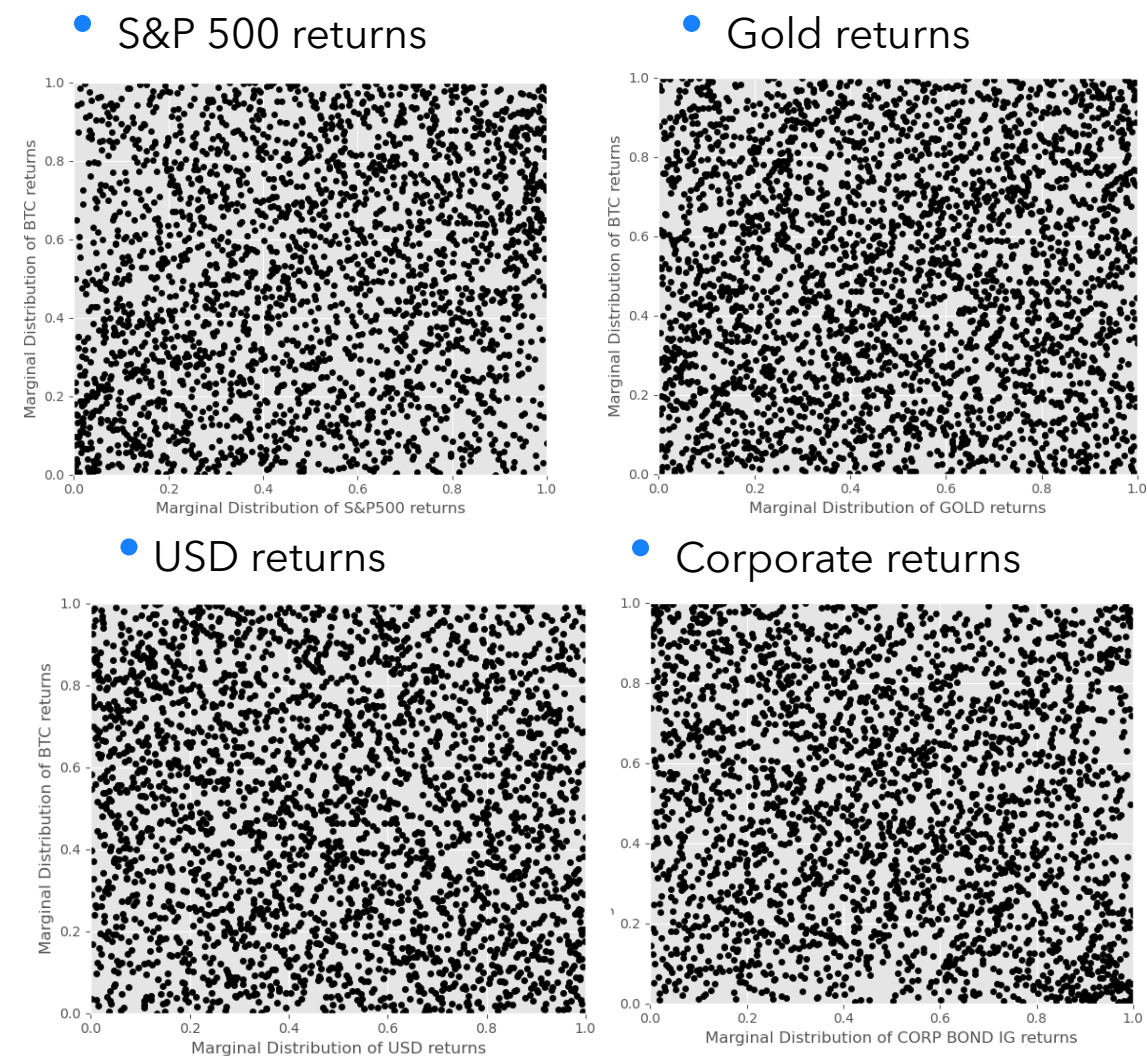
Insignificant or low correlation to any traditional assets

Source: TOBAM and Bloomberg.  
Weekly correlation with BTCUSD, 2-tailed deflated 95% confidence intervals around 0 (log normal assumption)  
Correlation calculations made from March 31, 2017 to Dec 31, 2024. Warning: Past performance is not an indicator or a guarantee of future performance. The value of your investment and income received from it can go down as well as up and you may not get back the full amount invested.

# BITCOIN INVESTMENT CASE: EMPIRICAL CHARACTERISTICS

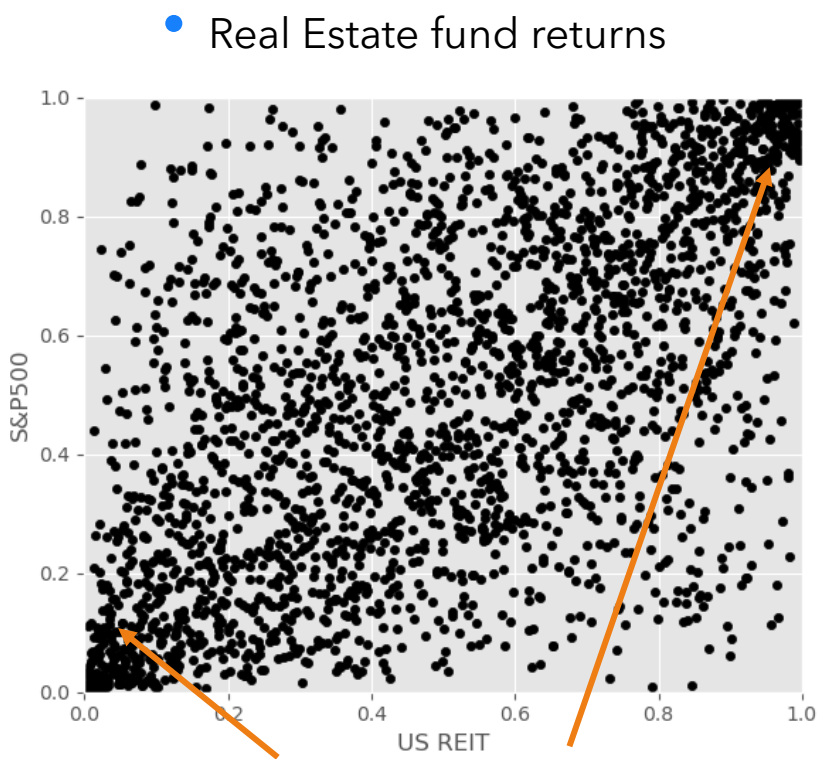
## 2. BTC IS A DIVERSIFYING ASSET (2)

Marginal Distribution of BTC returns versus S&P500, Gold, US\$ and US corporate bonds returns



Looking at the joint distribution of the BTC and the four assets, **no pattern emerges**

As a reference, a dependence pattern would look like this (stocks vs real estate):



Extreme returns notably are very much correlated: Stocks and Real Estate funds are moving together especially in extremes

Source: TOBAM, Bloomberg. Calculations made from 31/03/2012 to 31/12/2024.  
Past performance, risk and behavior are not indicative of future performance, risk and behavior.

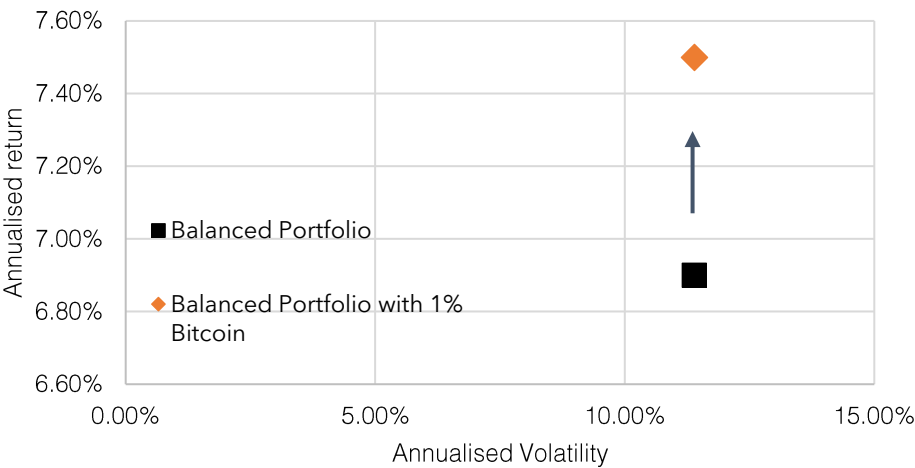
# BITCOIN INVESTMENT CASE: EMPIRICAL CHARACTERISTICS

## 3. BTC AS A DIVERSIFIER

TOBAM Research: Hypothetical 60/40 Balanced Portfolio<sup>1</sup>  
Period 2019-12-31 to 2024-12-31

- Diversification benefits of adding 1% of BTC

Summary Statistics	Balanced Portfolio	Balanced Portfolio with 1% Bitcoin	Difference
Annualized Return	6.9%	7.5%	0.6%
Annualized Volatility	11.4%	11.4%	0%
Sharpe Ratio	0.4	0.5	0.0
Max Drawdown	26.1%	26.2%	0.1%



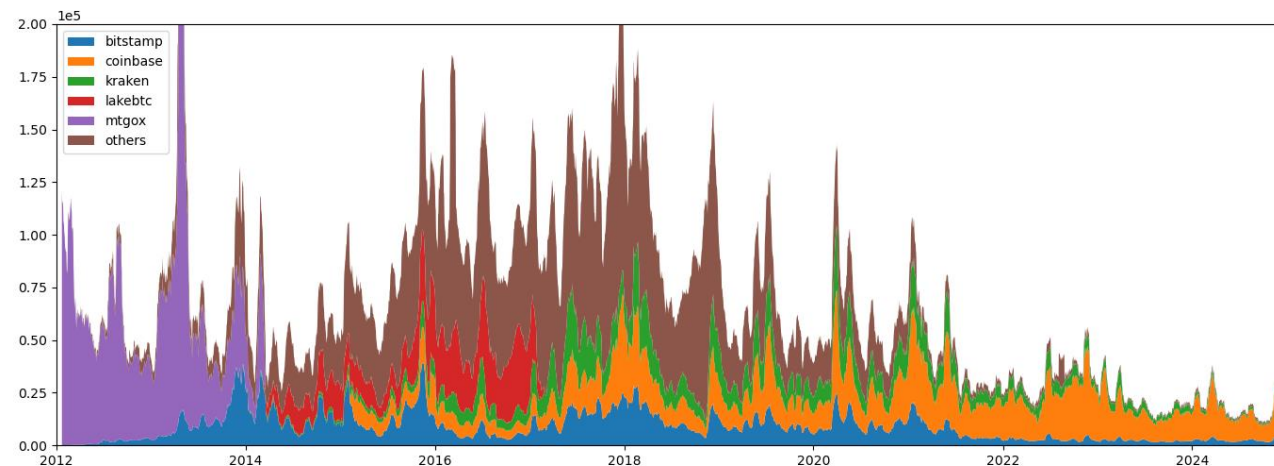
The addition of 1% of Bitcoin in a balanced portfolio may improve returns by 0.6% with no increase in max. drawdown over the period

<sup>1</sup> - 60% ACWI market cap index/ 34% ML US Corporate + 6% ML US HY Index  
Source: TOBAM, and FRED. Hypothetical returns from Dec 31, 2019 to Dec 31, 2024 provided for illustrative purposes. - daily rebalancing Hypothetical results are for information purposes only. These hypothetical results are gross of tax and exclude costs of transaction and fee assumptions. Warning: Past performance is not an indicator or a guarantee of future performance. The value of your investment and income received from it can go down as well as up and you may not get back the full amount invested. Performance details provided are in USD and do not include reinvested dividends. Performance returns and/or charts illustrating performance provided on this page are Gross of management fees, sales charges and other commissions, other taxes and relevant costs to be paid by an investor are not included in the calculations.

# BITCOIN INVESTMENT CASE: EMPIRICAL CHARACTERISTICS

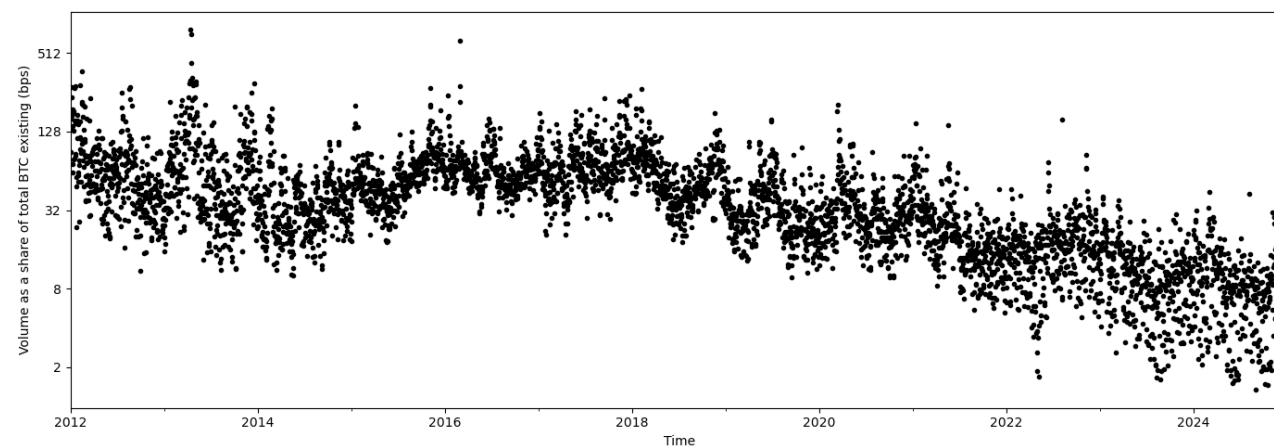
## 4. LIQUIDITY OF EXCHANGES (1)

### • Daily volume in BTC numbers since 2012



- While the BTC exchanges are always in flux, the trading volume on the liquid ones is steady - a median of about 5k exchanged in 2023 every day.

### • Daily volume as a share of the total BTC existing since 2012



- Daily trading on liquid exchanges represents about 0.5% of the total number of mined BTCs (half against USD), with spikes of up to 5%.
- Daily volume in 2023: around \$0.15bn per day

Source: TOBAM, [www.data.bitcoinity.org](http://www.data.bitcoinity.org). Data from 01/01/2012 to 31/12/2024.  
Past performance, risk and behavior are not indicative of future performance, risk and behavior.

Note: These are conservative estimates, filtering out less reliable exchanges (BTC China, Bitfinex...).

# BITCOIN INVESTMENT CASE: EMPIRICAL CHARACTERISTICS

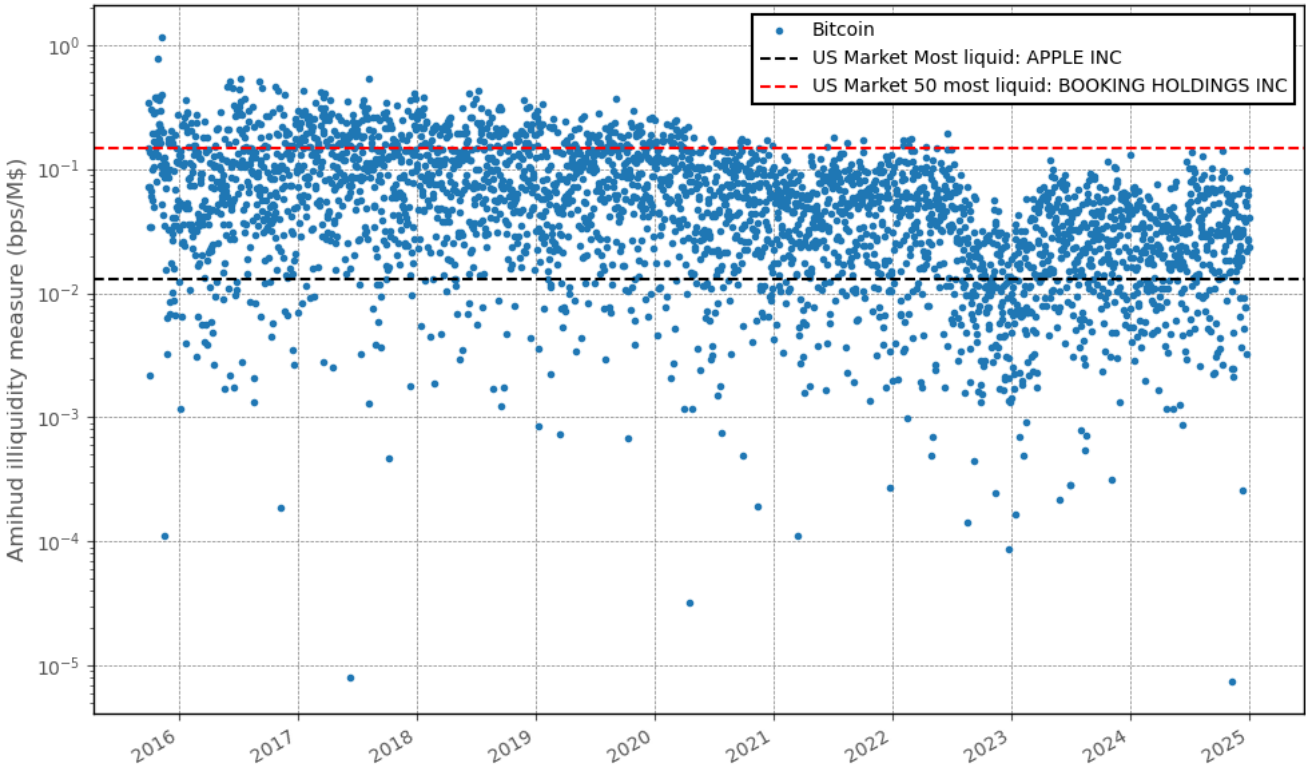
## 4. VOLUME AND VOLATILITY ON EXCHANGES (2)

Despite the OTC trades, exchange volumes represent the overall activity fairly.

We highlight a significant increase in liquidity since 2012: trading \$1mn in 2013 moved the price by around 100 bps vs 1 bp only in 2022.

Amihud's illiquidity measure:  $\frac{abs(return)}{dvolume}$  (dvolume = dollar volume)

● Amihud's Illiquidity measure since 2012



Source: MSCI, TOBAM. [www.data.bitcoinity.org](http://www.data.bitcoinity.org). Calculations from 31/12/2012 to 31/12/2024. Ranking of MSCI USA stock liquidity done since 2017. Past performance, risk and behavior are not indicative of future performance, risk and behavior.



# 1. Intro to TOBAM & crypTOBAM

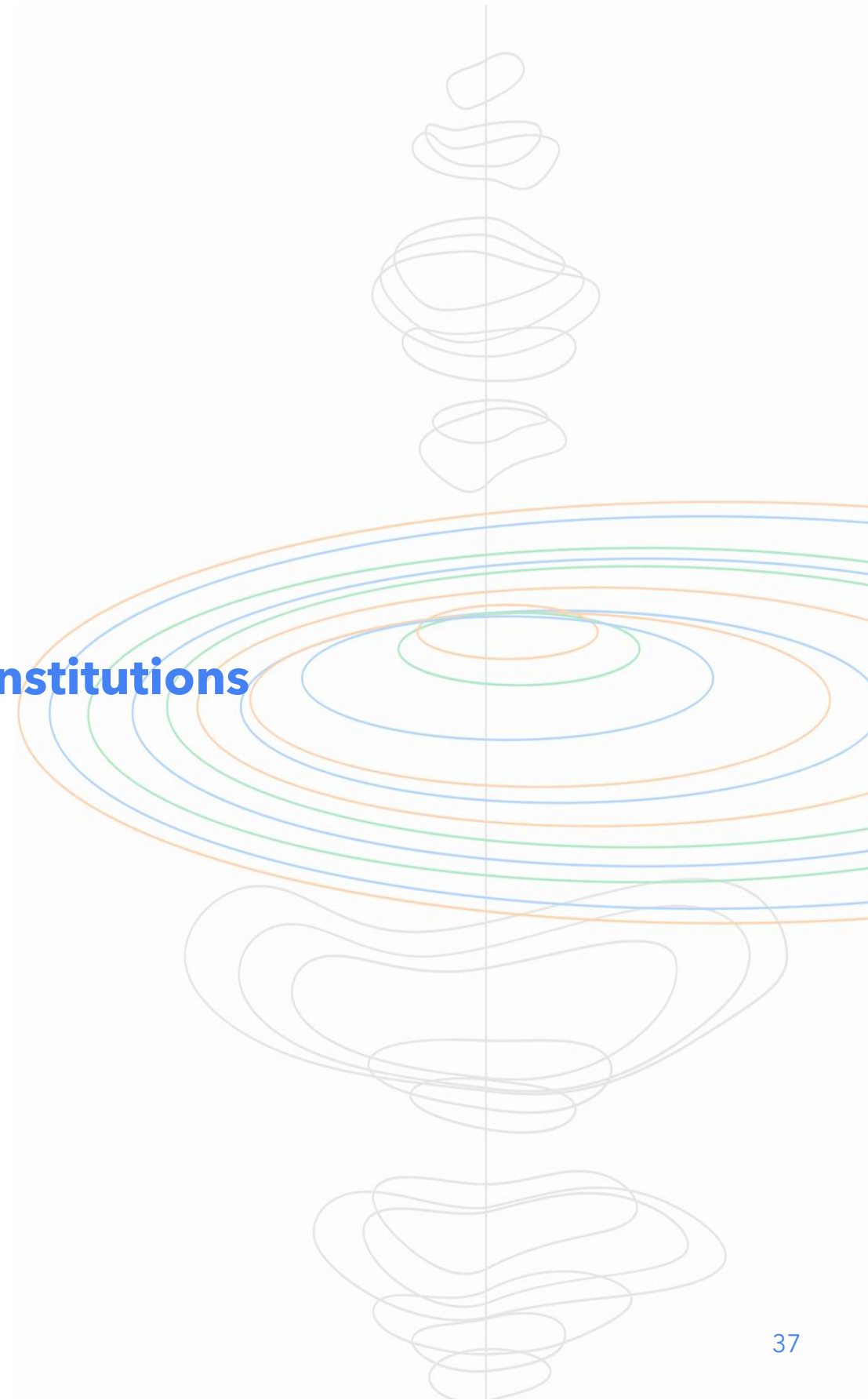
## 2. Bitcoin investment case

- Warning
- Fundamental characteristics
- Empirical characteristics

## 3. **Accessing the opportunity: alternatives for institutions**

## 4. TOBAM Bitcoin CO2 Offset Fund

## 5. Conclusion & appendix



## MANY INVESTMENT OPTIONS AVAILABLE, FEW INSTITUTIONAL VEHICLES

Institutions demand convenience, security, efficiency and more and more climate awareness

Key considerations:

- Price correlation to crypto-currencies
- Liquidity
- Fork accruals
- Operational and counterparty risk
- Tax treatment
- Carbon footprint



CRYPTO-ASSET INVESTMENT VEHICLES

Vehicle	Convenience	Accurate price tracking of crypto-assets?	Fork accrual?	Credit, counterparty and custody risks	Tax treatment
Direct Ownership (Self-Custody, incl. 'Hard Wallets')	Low  Platform choice, manual trading and key management	Yes	Yes  (manual management)	Self-custody risks	Low tax clarity
Exchanges	Medium  Platform choice, manual trading	Yes	Usually not	Platform counterparty risks	Low tax clarity
<b>TOBAM</b> Open ended Investment Fund	High  ISIN code	Yes NAV reflects the valuation of the underlying crypto-assets	Yes	Highly Mitigated	Greater tax clarity
Closed-end Investment Trust	High  ISIN code	Usually sells at a discount or a premium	Yes  (if well structured)	Highly Mitigated  (if well structured)	Greater tax clarity
Exchange traded Notes (or Certificates)	High  ISIN code	Usually sells at a discount or a premium. Depends on the prospectus' exact formula	Usually not	Issuer counterparty risks	Greater tax clarity
Futures	Low  Futures must be rolled over. Difficult to access	Usually sells at a discount or a premium.  Roll over costs	Usually not	Low  Clearinghouse guarantee	Greater tax clarity

DIRECT OWNERSHIP

• Convenience	➡	✗	Very low convenience, very difficult for qualified investors
• Accuracy of BTC Tracking	➡	✓	Perfect
• Fork Management	➡	✓	Manual Management
• Credit / Counterpart & Custody Risks	➡	✓	Self-custody risks
• Tax Treatment	➡		Possible poor tax-clarity

PLATFORMS / EXCHANGES

• Convenience	➔		Medium: Platform choice, manual trading
• Accuracy of BTC Tracking	➔	✓	Perfect
• Fork Management	➔	✗	Usually not
• Credit / Counterpart & Custody Risks	➔	✗	Platform counterparty risks
• Tax Treatment	➔		Possible poor tax-clarity

CLOSED-END INVESTMENT TRUST

• Convenience	➔	✓	High: ISIN Code
• Accuracy of BTC Tracking	➔	✗	Usually sells at a discount or a premium.
• Fork Management	➔	✓	Yes if well structured
• Credit / Counterpart & Custody Risks	➔		Highly mitigated (if well structured)
• Tax Treatment	➔	✓	Greater tax-clarity

EXCHANGE TRADED NOTES (ETN)

• Convenience	➡	✓	High: ISIN Code
• Accuracy of BTC Tracking	➡		Usually sells at a discount or a premium. Depends on the prospectus exact formula
• Fork Management	➡	✗	Usually not
• Credit / Counterpart & Custody Risks	➡		Issuer counterparty risks
• Tax Treatment	➡	✓	Greater tax-clarity

FUTURES

<ul style="list-style-type: none"><li>Convenience</li></ul>	➡	✗	Low: Futures must be rolled over. Difficult to access
<ul style="list-style-type: none"><li>Accuracy of BTC Tracking</li></ul>	➡	✗	Usually sells at a discount or a premium. Roll over costs.
<ul style="list-style-type: none"><li>Fork Management</li></ul>	➡	✗	Usually not
<ul style="list-style-type: none"><li>Credit / Counterpart &amp; Custody Risks</li></ul>	➡	✓	Low: clearinghouse guarantee
<ul style="list-style-type: none"><li>Tax Treatment</li></ul>	➡	✓	Greater tax-clarity

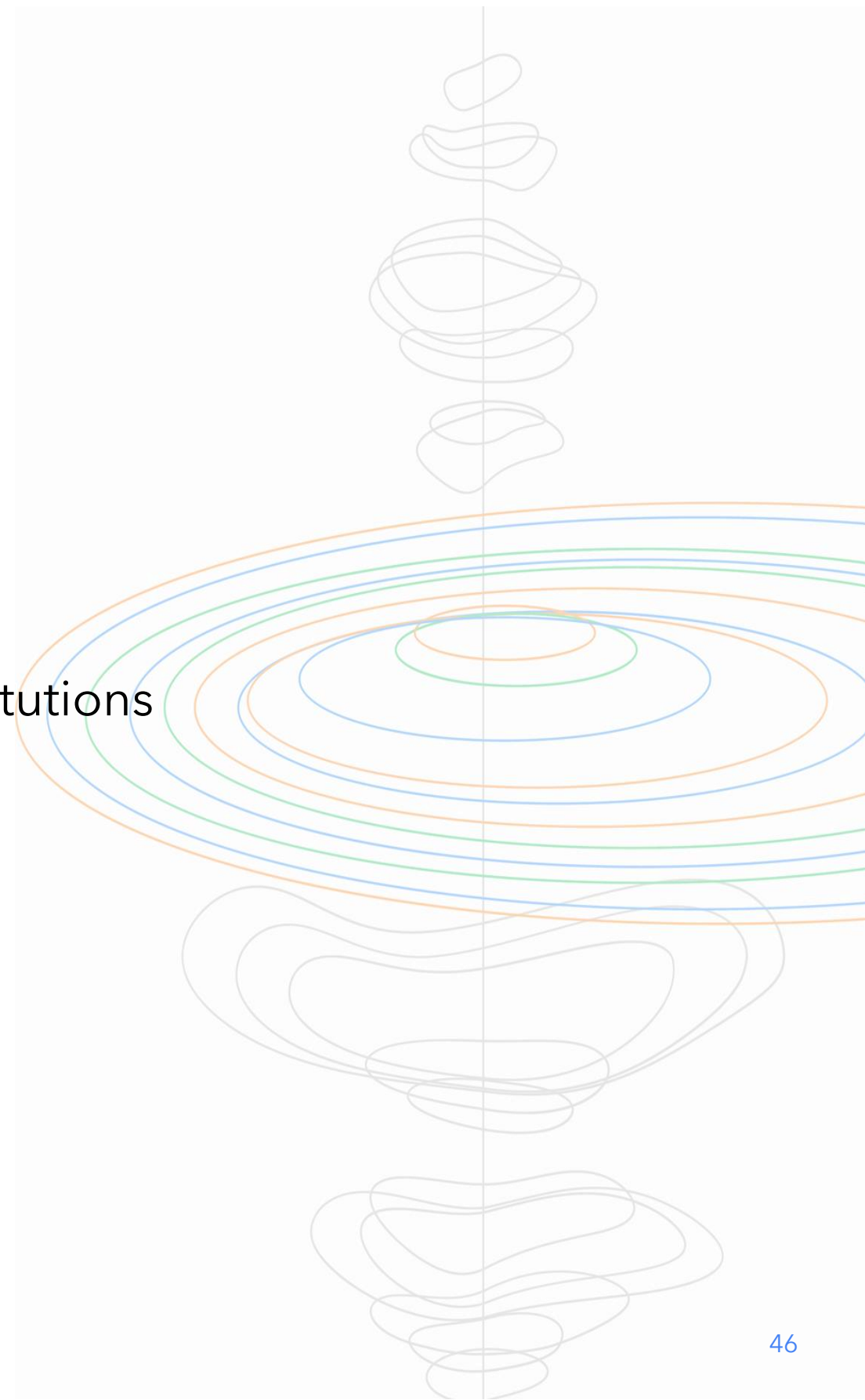


OPEN ENDED INVESTMENT FUND

• Convenience	➡	✓	High: ISIN Code
• Accuracy of BTC Tracking	➡	✓	Very Good: NAV reflects the valuation of the underlying crypto asset
• Fork Management	➡	✓	Yes
• Credit / Counterpart & Custody Risks	➡	✓	Highly mitigated
• Tax Treatment	➡	✓	Greater tax-clarity

Check the fees, they are transparent....usually

1. Intro to TOBAM & crypTOBAM
2. Bitcoin investment case
  - Warning
  - Fundamental characteristics
  - Empirical characteristics
3. Accessing the opportunity: alternatives for institutions
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5. Conclusion & appendix



## WHY INVEST IN TOBAM BITCOIN CO2 OFFSET FUND ?

### 1. CONVENIENT






The convenience of daily dealing with ISIN codes and all-in fee share classes available in several currencies

- Inception Date: November 20, 2017
- Vehicle type: AIF Unregulated ("SPF")
- Domicile: France
- Liquidity: Daily
- Available Currency: USD, EUR, GBP, CHF
- On-going Charge: 2.5% or 1.25%, To be negotiated over 5m€

# WHY TOBAM BITCOIN CO2 OFFSET FUND ?

## 2. SECURE

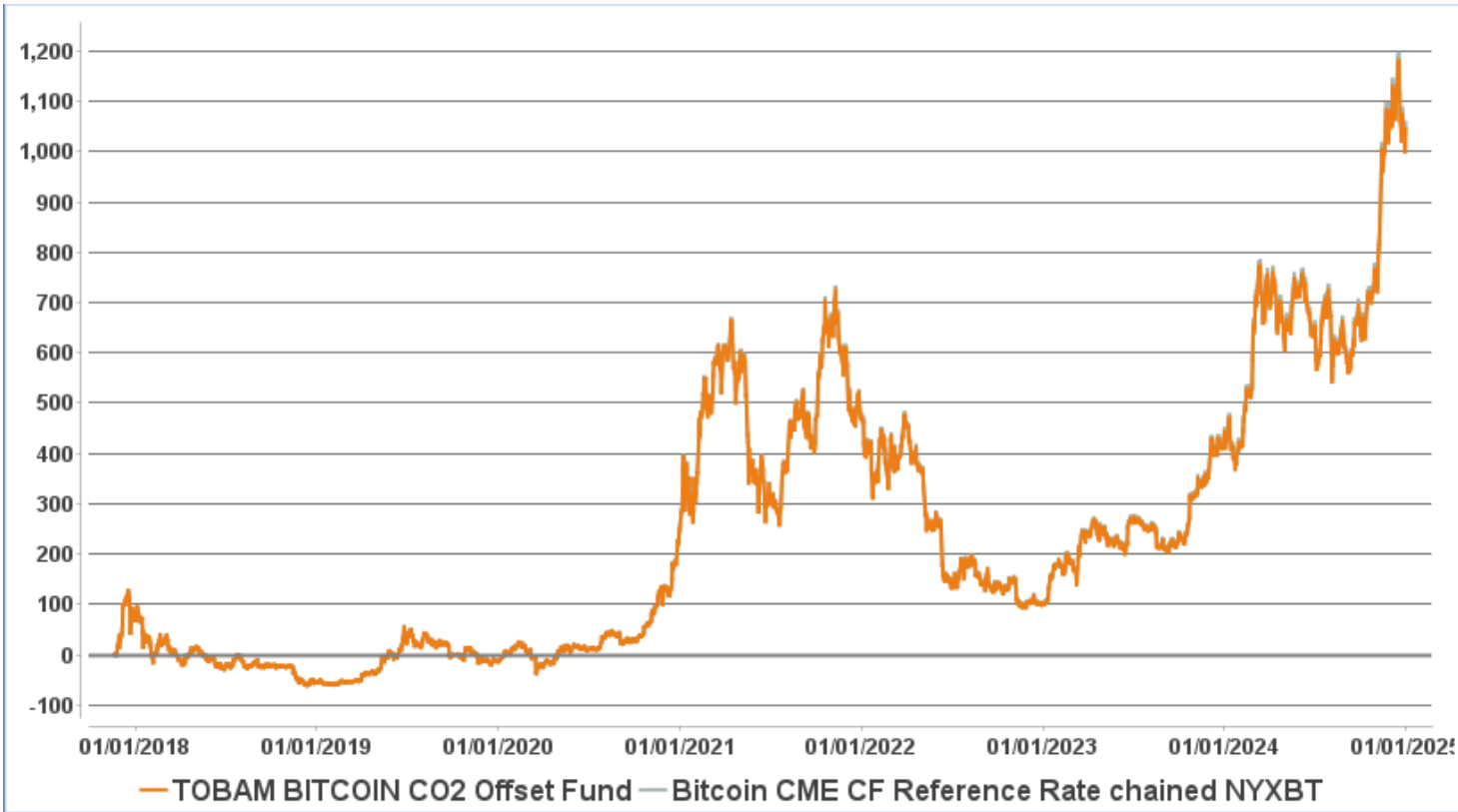
- Mutual Fund Structure with segregation of duties

Administrator	Fund Custodian	Crypto Custodian	Auditor	Asset Manager
				
<p>Calculates daily NAV by accessing:</p> <ul style="list-style-type: none"><li>• Cash account</li><li>• Public keys of the portfolio in the blockchain</li></ul>	<ul style="list-style-type: none"><li>• Centralizes subscription &amp; redemption</li><li>• Audit of the holdings of the portfolio</li><li>• Holds the financial assets of the funds</li></ul>	<ul style="list-style-type: none"><li>• Secures the Fund bitcoins on a segregated address directly in the blockchain</li><li>• Applies security protocol at each bitcoin withdrawal</li></ul>	<ul style="list-style-type: none"><li>• Certifies accounts produced by custodian</li><li>• Audit by PwC General Risk Management of TOBAM's set up and procedures</li></ul>	<ul style="list-style-type: none"><li>• Fundamental &amp; empirical research</li><li>• Fork management</li><li>• Notified by CACEIS of any subs/ redemption</li><li>• Management of the fund, BTC trading, choice of the platforms</li><li>• In charge of cybersecurity procedure, and secured investment process</li></ul>

# WHY TOBAM BITCOIN CO2 OFFSET FUND?

## 3. EFFICIENT: 100% CORRELATION TO BITCOIN, 0.46% TRACKING ERROR

- Gross Performance in USD and Tracking Error since inception (20/11/2017 - 31/12/2024)



TOBAM BITCOIN CO2 Offset Fund		
Return:	1,044.68%	
Annualized return:	40.88%	
Hist vol:	71.32%	
Sharpe ratio:	0.54	
Sortino ratio:	0.91	
Downside volatility:	42.43%	
Bitcoin CME CF Reference Rate chained NYXBT		
Return:	1,057.54%	
Annualized return:	41.10%	
Hist vol:	71.33%	
Sharpe ratio:	0.54	
Sortino ratio:	0.91	
Downside volatility:	42.42%	
Tracking error:	0.46%	
Beta:	1.00	r <sup>2</sup> 100
Correlation:	100.00%	

12/30/2022 - 12/30/2024		Daily	Calculation		Correlation	USD	
<Filter>		Correlation Matrix (5 Rows x 5 Columns)					
Security	21SHARES BITCOIN SINGLE	CME CF Bitcoin Ref. Rate	TOBAM BITCOIN-A2	GRAYSCALE BITCOIN TRUST BTC	BITCOIN TRACKER ONE EUR		
11) 21SHARES BI...	1.000	0.941	0.945		0.638	0.971	
12) CME CF Bitcoi...	0.941	1.000	0.999		0.577	0.934	
13) TOBAM BITCO...	0.945	0.999	1.000		0.604	0.939	
14) GRAYSCALE B...	0.638	0.577	0.604		1.000	0.655	
15) BITCOIN TRA...	0.971	0.934	0.939		0.655	1.000	

Sources: TOBAM, Bloomberg. Returns reflect live data from November 20, 2017 to Dec 31, 2024.

Warning: Past performance is not an indicator or a guarantee of future performance. The value of your investment and income received from it can go down as well as up and you may not get back the full amount invested. Performance details provided are in USD. Performance returns and/or charts illustrating performance provided on this page are gross of management fees, sales charges and other commissions, other taxes and relevant costs to be paid by an investor are not included in the calculations. The risk free rate of return is calculated using the one month USD LIBOR rate. TOBAM Bitcoin Fund gross annualized performance between November 20, 2017 to Dec 31, 2024 is 40.9%, while the performance net of fees and transaction costs is +37.4%.

## WHY TOBAM BITCOIN CO2 OFFSET FUND ?

### 4. CARBON OFFSET



#### Goal:

Compute and offset the carbon footprint of TOBAM Bitcoin Fund since its inception.

#### Assumed bias:

When computing the carbon quantity to offset, we prefer to very strongly overestimate by a wide margin rather than underestimate.

#### Parameter choices:

- The fossil-fuel heavy (app. 90%) current US energy mix is used to estimate Bitcoin's energy supply footprint  
In practice, it is estimated that as much as 75% of the energy used in mining could stem from renewable (Coinshare 2019 Mining Report)
- TOBAM Bitcoin Fund carbon offset is computed pro-rata its Bitcoin holding percentage in the Bitcoin system  
In practice, TOBAM Fund's share of the blockchain transactions is lower than its Bitcoin holding percentage.



## WHY TOBAM BITCOIN CO2 OFFSET FUND ?

### 4. CARBON OFFSET - METHODOLOGY

The carbon offset is accrued daily. On each day  $t$ , observe:

- $N(t)$ : The number of bitcoins stored by the Fund
- $\text{Supply}(t)$ : The number of mined bitcoins until date  $t$
- $E(t)$ : the energy spent mining on date  $t$
- $C(t)$ : The CO2 offset per unit of spent energy

Then the Fund Carbon offset **F** increases at  $t$  by:

$$F(t) = F(t-1) + (N(t)/\text{Supply}(t) \times E(t) \times C(t))$$

All data is publicly accessible and easily auditable:

- $\text{Supply}(t)$ : Bitcoin Blockchain  
<https://www.blockchain.com/charts/total-bitcoins>
- $E(t)$ : Cambridge Bitcoin Electricity Consumption Index  
<https://cbeci.org/>
- $C(t)$ : Based on US Energy Information Administration  
<https://www.eia.gov/tools/faqs/faq.php?id=74&t=11>

## WHY TOBAM BITCOIN CO2 OFFSET FUND ?

### 4. CARBON OFFSET - IMPLEMENTATION

- TOBAM has a long experience of carbon footprint compensation through the decarbonization of its own corporate carbon footprint.
- The implementation of the Fund's carbon offset is done via a combination of projects managed by third parties, through the use of Verified Emission Reductions certificates.
- The carbon offset of the fund is computed on a bi-annual basis.
- The cost of the carbon offset is borne by TOBAM.



#### Madre de Dios Amazon Forest Conservation Project

Peru

This verified carbon offsetting project reduces deforestation and helps to establish sustainable forest management practices.

#### Vietnam Biogas Project

Vietnam

This carbon offsetting project enables families across Vietnam to use animal and human waste to generate a clean and sustainable source of energy with positive impacts for health and well-being.

## WHY TOBAM BITCOIN CO2 OFFSET FUND ?

### 5. AML/CFT DIMENSIONS

#### Goal :

Implement the highest standards in terms of AML/CFT

#### Implementation:

- Subscriptions/Redemptions
  - CACEIS acts as the transfer agent for the Fund
  - AML/CFT is similar to any « traditional » fund
- Within the fund
  - The Fund is only authorized to trade with regulated counterparties that must abide to the E.U. or US AML/CFT regulations

Name	Role	Country	Regulator(s)
BitGo	Platform	Etats-Unis	NYDFS (New York State Department of Financial Services)
BitGo	Crypto custodian	Etats-Unis	NYDFS (New York State Department of Financial Services)
Coinbase	Platform	Etats-Unis	NYDFS (New York State Department of Financial Services) FinCEN (Financial Crimes Enforcement Network)
Bitstamp	Platform	Luxembourg	CSSF (Commission de Surveillance du Secteur Financier)

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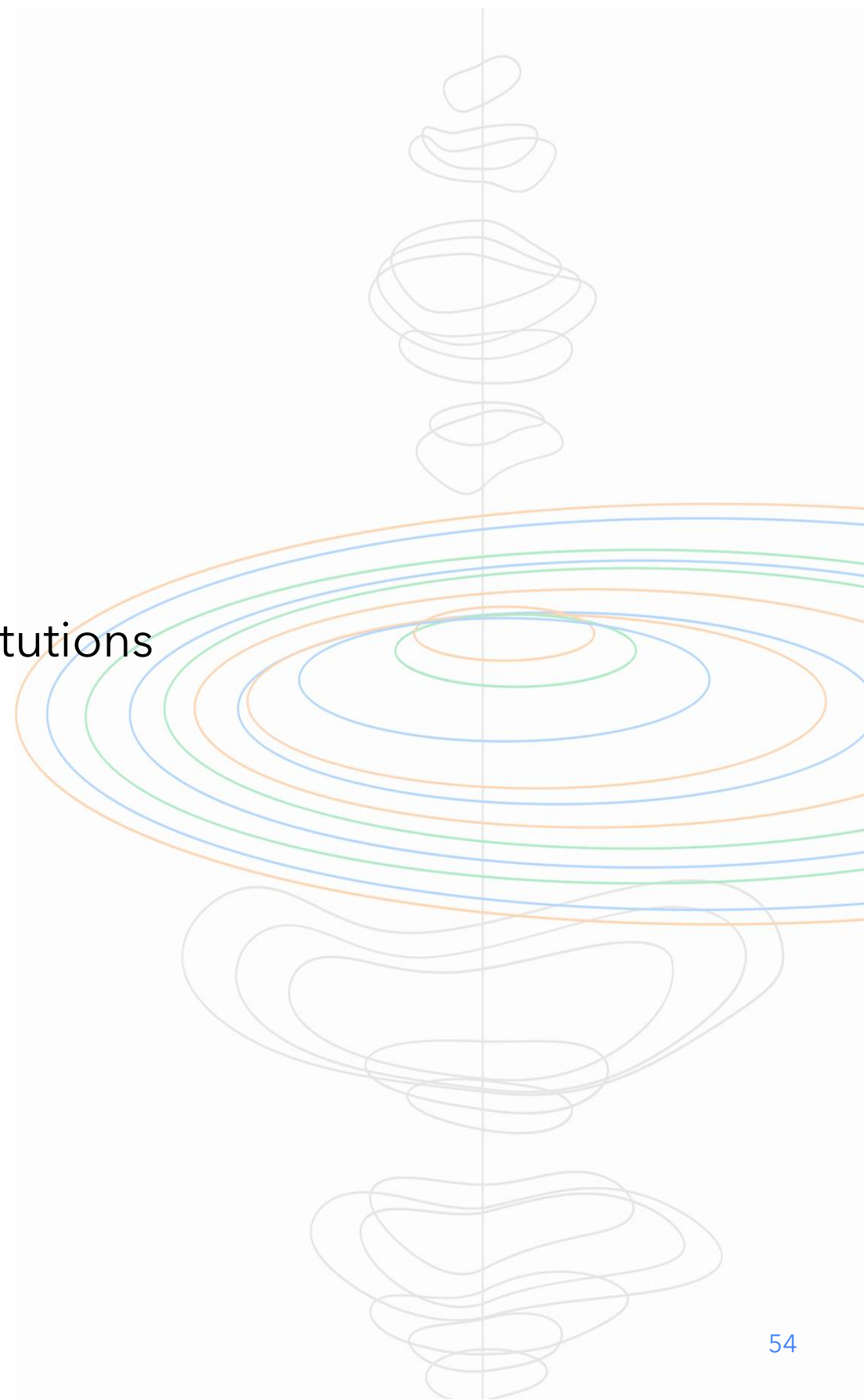
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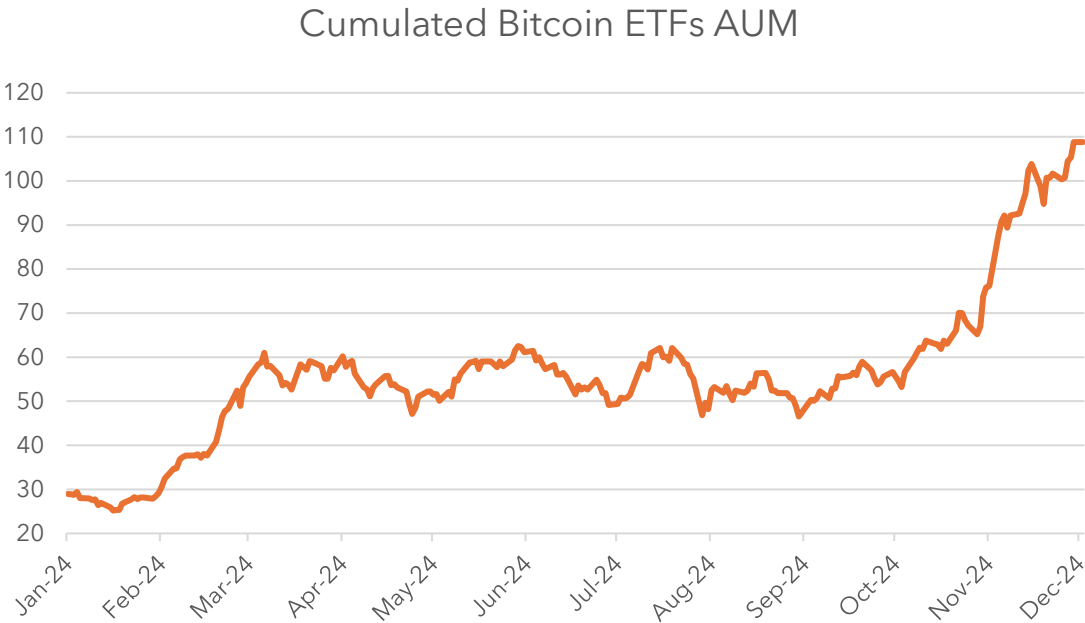
## 5. Conclusion & appendix



# CONCLUSION AND PERSPECTIVES ON BITCOIN

BITCOIN HAS CHANGED A LOT IN 2024. 2025 LOOKS VERY PROMISING

## Bitcoin ETFs top \$100bn in assets ...in less than 12 months



- In less than a year, Bitcoin ETFs assets are overtaking 20 year old Gold ETPs!

## Minds are changing considering Bitcoin

A Trump U.S. Strategic Bitcoin Reserve 'Game-Changer' Is Suddenly Hurling Toward The Bitcoin Price



- USA and Brazil considering strategic bitcoin reserve
- Swiss canton of Bern passed legislation to study Bitcoin mining as a tool for tapping excess electric energy.

TOBAM has been **active on Bitcoin since 2013**, we launched the **first open ended fund** invested in BTC in 2017

## PAST STANDARDS OF VALUE HAVE ALWAYS HAD A REAL-ASSET UNDERLYING UNTIL ...

- **Bartering & Commodity money**

Commodities Money (bags of salt, tea, tobacco, coconuts, shells..)

- **Coins & Paper Money**

Metals objects introduced as money around 5000 B.C.  
First metal coins introduced by the Lydians by 700 B.C.  
Paper Money introduced in ancient China around A.D. 960

- **Representative Money - Introduction of the precious metal Standard (Silver & Gold)**

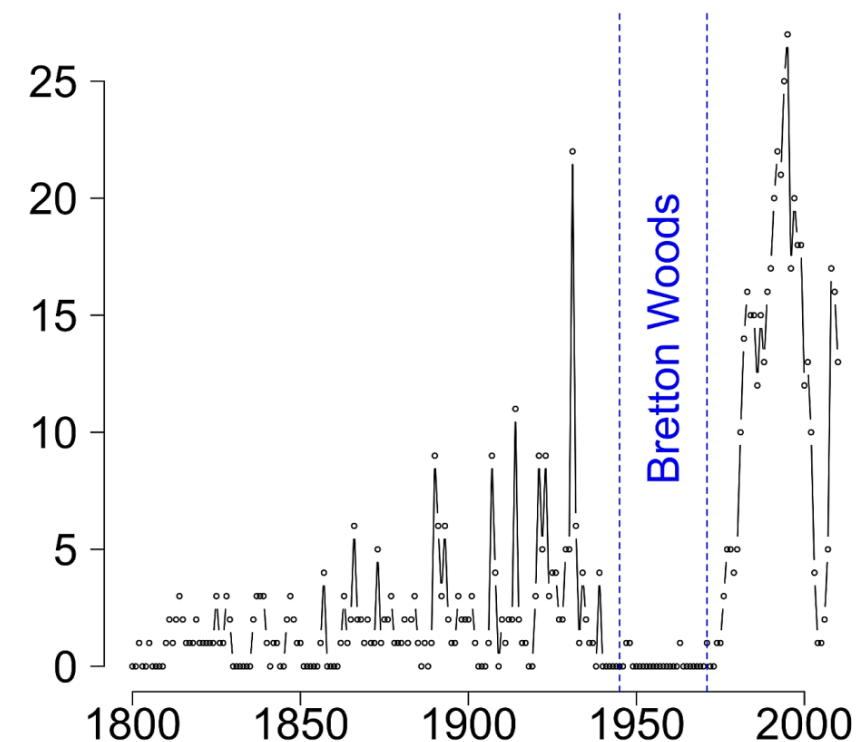
With the introduction of paper currency and non-precious coinage, commodity money evolved into representative money. This meant that what money itself was made of no longer had to be very valuable.

Representative money was backed by a government or bank's promise to exchange it for a certain amount of silver or gold.

- **Fiat Money ("Let it be done" money, 1971)**

Representative money has now been replaced by fiat money. Money is now given value by a government fiat or decree.

- Numbers of countries having a banking crisis in each year since 1800 (70 countries)



...the end of convertibility of the US\$ to Gold (very recent: 1971!)

Bitcoin has fundamental characteristics that position it as a good candidate to become a new international standard

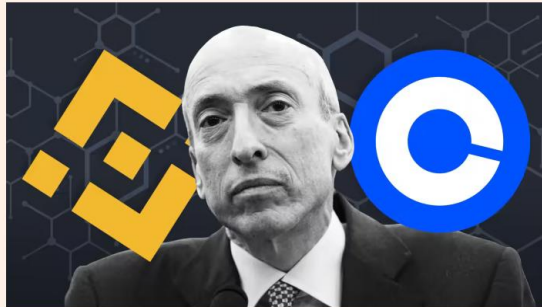


# BITCOIN NEWS: US REGULATOR

June 6, 2023

## SEC lawsuits escalate Gary Gensler's assault on crypto markets

US regulator fires broadside against digital assets market with Binance and Coinbase legal actions



Gary Gensler, chair of the Securities and Exchange Commission, said existing rules are clear: 'I think there's been clarity for years' © FT montage/Bloomberg

Nikou Asgari in London and Stefania Palma in Washington JUNE 6 2023



The US securities regulator's lawsuits against crypto exchanges Binance and Coinbase this week marks its most aggressive legal assault on the digital asset market.

June 16, 2023

## BlackRock delves deeper into crypto with push for bitcoin ETF

Asset manager's product would be first publicly traded spot bitcoin exchange traded fund in US if approved by SEC



Larry Fink was once sceptical of cryptocurrencies, but has since vowed to 'explore the digital assets ecosystem' © Bloomberg

Brooke Masters in New York 9 HOURS AGO



BlackRock pushed further into cryptocurrencies on Thursday by filing an application with the US Securities and Exchange Commission to offer a spot bitcoin exchange traded fund.

August 29, 2023

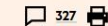
## Grayscale scores big court win against SEC over bitcoin ETF

Price of crypto token shoots higher after regulator's decision to reject application found to be 'arbitrary'



Despite the SEC's tough stance on the industry, demand for a spot bitcoin ETF has grown © Reuters

Scott Chipolina in London and Brooke Masters in New York AUGUST 29 2023



October 24, 2023

## Bitcoin rises to 17-month high as ETF optimism soars

Digital currency recoups all of losses sustained after collapse of Terra stablecoin



The price of bitcoin leapt more than 10% to \$35,000 a token as traders grew increasingly confident the Securities and Exchange Commission would approve an exchange-traded fund in coming months © REUTERS

Scott Chipolina in London OCTOBER 24 2023



January 17, 2024

## US bitcoin ETFs pull in \$871mn in first three days of trading

Grayscale has outflows of more than \$1.1bn as investors turn to BlackRock and Fidelity for new crypto products



Grayscale helped open the door to regulatory approval for bitcoin ETFs after winning a court victory against the SEC last year © Bloomberg

Scott Chipolina in London and Will Schmitt in New York JANUARY 17 2024



February 12, 2024

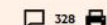
## Bitcoin price tops \$50,000 after spot ETF launches spur demand

Flagship cryptocurrency rallies to 2021 levels on optimism about mainstream investor appetite

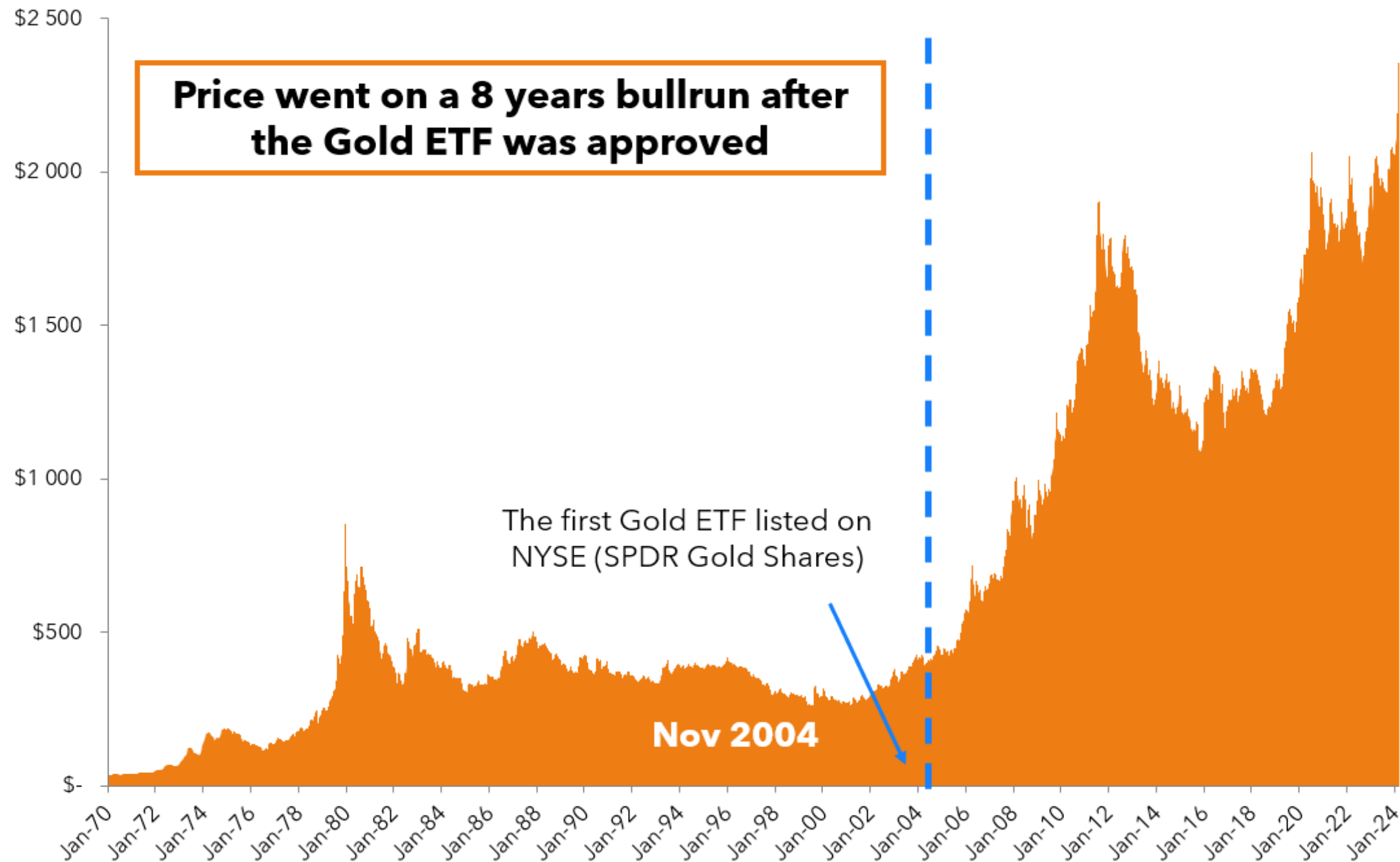


Bitcoin has gained almost 15% since the start of the year, largely driven by the SEC reversing a decade-old policy to approve several spot bitcoin ETFs © Reuters

Scott Chipolina in London and Will Schmitt in Miami FEBRUARY 12 2024

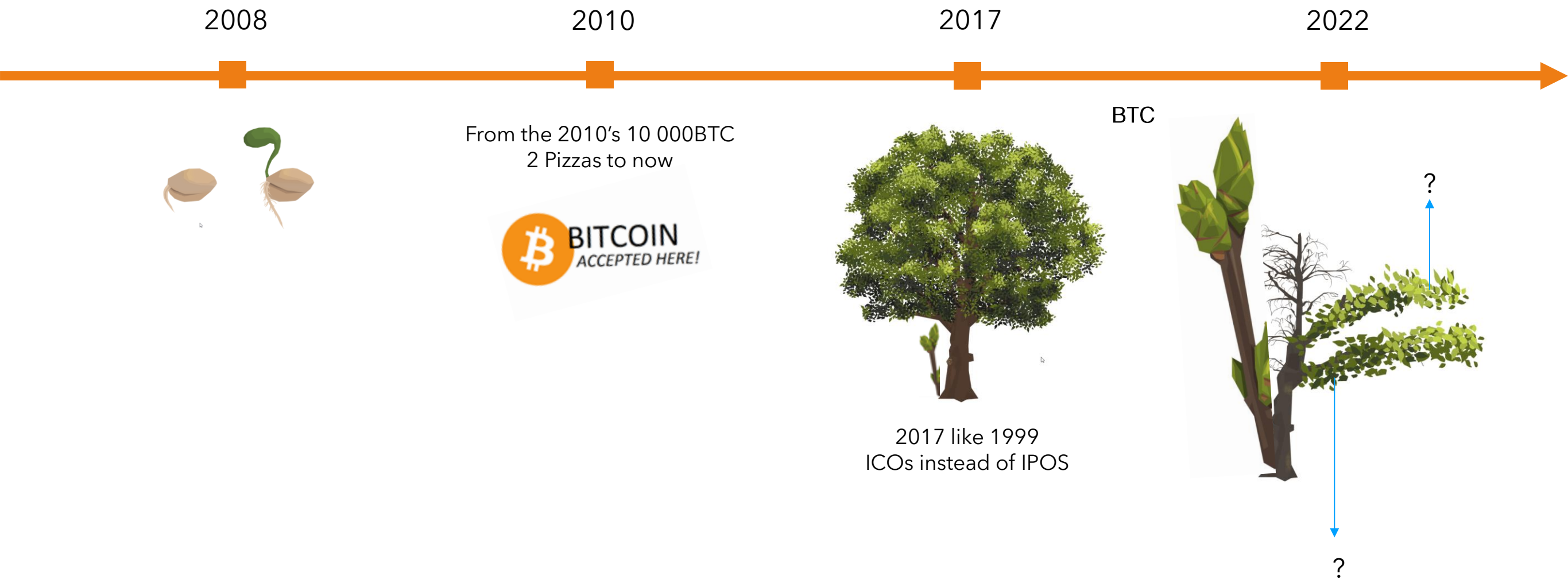


## BITCOIN NEWS: THE IMPACT OF ETFs?



Source: Bloomberg. As of 03/31/2024.

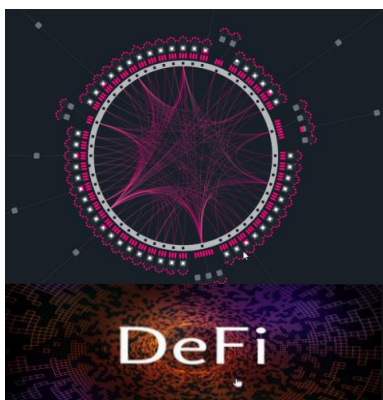
OUR VISION OF THE FUTURE OF CRYPTO:



- Amazon price divided by 10!

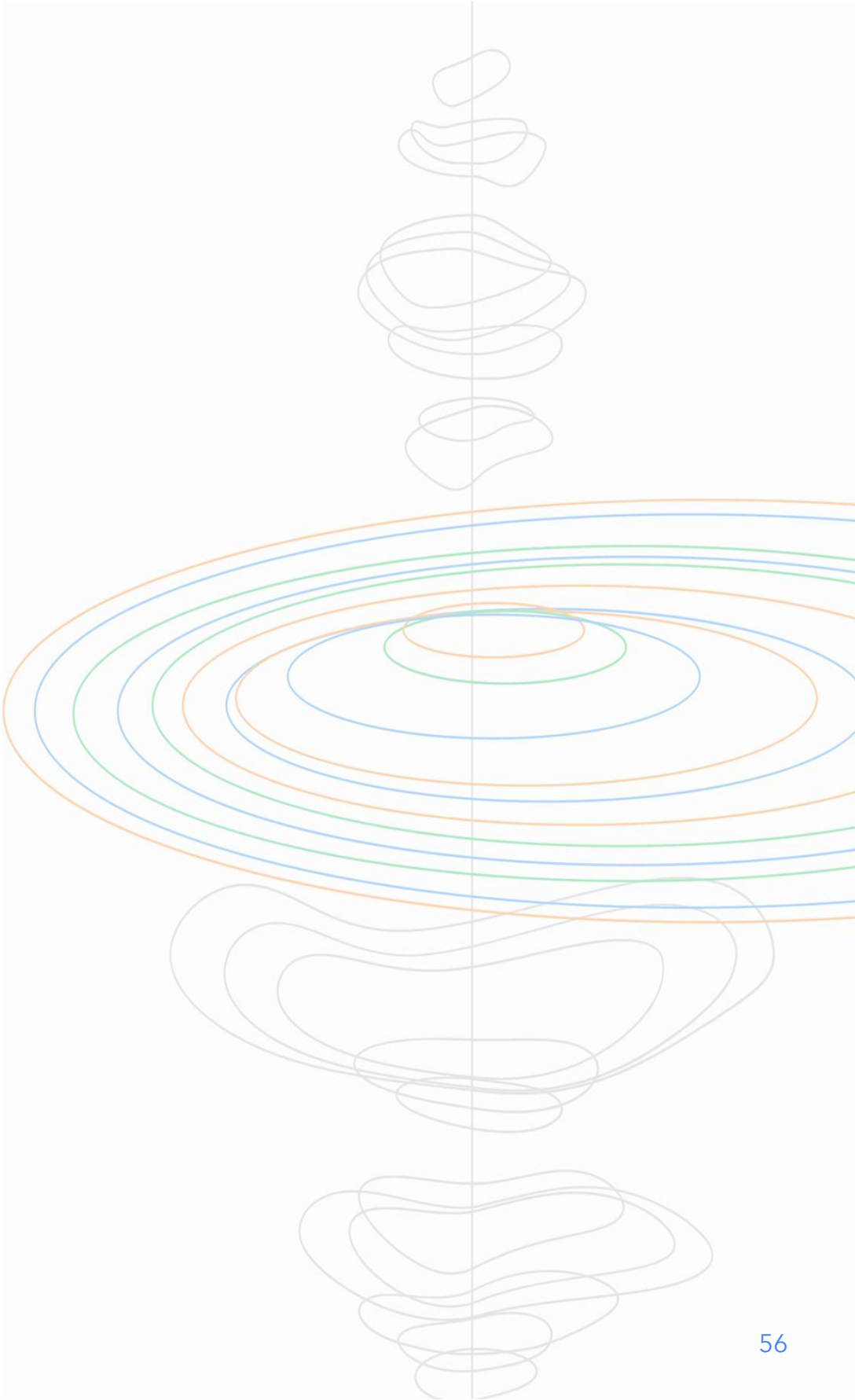


- BTC price divided by 10!





APPENDIX



BITCOIN VS. GRAYSCALE  
18/05/2015 TO 31/12/2024



Bitcoin CME CF Reference Rate chained NYXBT

Return:	40,130.55%	
Annualized return:	86.50%	
Hist vol:	68.67%	
Sharpe ratio:	1.23	
GRAYSCALE BITCOIN TRUST BTC		
Return:	31,702.48%	
Annualized return:	82.00%	
Hist vol:	85.77%	
Sharpe ratio:	0.93	
Excess return:	8,428.07%	
Vol reduction:	-19.94%	
Excess annual. return:	4.50%	
Tracking error:	71.49%	
Info ratio:	0.06	
Beta:	0.47	r <sup>2</sup> 34.93%
Correlation:	59.10%	
Jensen's alpha:	25,119.77%	
Treynor ratio:	1.79	

Sources: TOBAM, Bloomberg.

PEER COMPARISON – CORRELATION TO BITCOIN  
FROM 9TH MARCH 2019 TILL 9TH MARCH 2021

03/09/2019 - 03/09/2021		Weekly		Calculation		Correla	
<Filter>		Correlation Matrix (5 Rows x 5 Columns)					
Security		21SHARES BITCOIN SINGLE	NYXBT Index	TOBAM BITCOIN-A2	GBTC US Equity	VONTOB 0 PERP Corp	
11) 21SHARES BI...		1.000	0.846	0.848	0.964	0.854	
12) NYXBT Index		0.846	1.000	0.992	0.874	0.864	
13) TOBAM BITCO...		0.848	0.992	1.000	0.869	0.861	
14) GBTC US Equi...		0.964	0.874	0.869	1.000	0.909	
15) VONTOB 0 PE...		0.854	0.864	0.861	0.909	1.000	

Sources: TOBAM, Bloomberg. The 2-year timeframe corresponds to a period of live data common to all products above. Vontobel Tracker Certificate on Bitcoin was terminated, effective March 12th, 2021. Following the termination, Vontobel issued two new Tracker Certificates.



## WHY TOBAM BITCOIN CO2 OFFSET FUND? COMPLEXITY AND PITFALLS OF DIRECT INVESTMENT

### Platform selection:

- Very difficult to perform accurate due diligence
- Low transparency, often combined with « exotic » regulation territories
- Unclear legal relationship status
- Risk of seeing the platform hacked or withdrawals frozen

### Password creation, management and safeguarding

- Platform: Main password + soft token (2FA)
- And if On-chain custody: wallet password and seed

### Trading

- Passing of limit orders and market impact minimisation

### Custody:

- Platform: Counterparty and hacking risk, no direct claim on bitcoins and forks
- In the Blockchain: I.T. expertise required, bitcoins are lost if the seed is compromised or lost. Security measures include encryption, using off-network computers, multisignature, running a dedicated Bitcoin node, backups, succession plans.... Transactions are irreversible, very high operational risk

### Administration:

- Management of authorised signatories, inheritance...
- May lead to tax complications

# WHY TOBAM BITCOIN CO2 OFFSET FUND?

## 1. CONVENIENT: A PLAIN VANILLA PROCESS

Available currencies: EUR,USD,GBP,CHF			Cash Settlement	NAV
SUBSCRIPTION	D before 1.00 pm CET	→	D + 1	D
REDEMPTION	D before 1.00 pm CET	→	D + 1	D
NAV CALCULATIONS	Using the BRR index (CME CF Bitcoin Reference Rate).			


Note: all times are quoted as Central European Time (CET)

## WHY TOBAM BITCOIN CO2 OFFSET FUND?

### 2. SECURE: OPERATIONAL SET UP

Bitcoins are withdrawn from platforms and other counterparties to minimise counterparty, fraud and hacking risks

#### Custody

- BitGo Trust is a custodian regulated by the South Dakota division of Banking 
- \$15 billion in transactions monthly – 20% of all on-chain transactions
- \$100 million Lloyd's insurance policy covering digital assets in BitGo's Cold Wallet custody
- All funds are held on segregated "cold storage" wallets. A rigorous withdrawal process ensures that Bitcoin can only be withdrawn:
  - after appropriate authorisation, and
  - toward TOBAM trading counterparties only

Institutional standard AML, confidentiality, auditing, reporting, storage and financial strength

## WHY TOBAM BITCOIN CO2 OFFSET FUND?

### 3. EFFICIENT: FORK MANAGEMENT

- A contentious “fork” is a breach of consensus (schism) among users of a cryptocurrency resulting in a blockchain split and the creation of a new cryptocurrency. It can be compared to a corporate spin-off.
- Whereas certificates, futures and platforms do not consider forks accrued to investors, TOBAM Fund claims on forks are directly registered in the blockchain
- Forks are operationally challenging: reaching out to platforms, splitting the wallet coins, keeping the newly created or reinvesting in BTC....

- ⇒ TOBAM Bitcoin Fund handles the management of the Forks by:
- Dealing with the operational challenges of the fork
  - Taking all necessary steps to maintain the exposure to BTC

## WHY TOBAM BITCOIN CO2 OFFSET FUND?

### 3. EFFICIENT: TRANSACTION COSTS

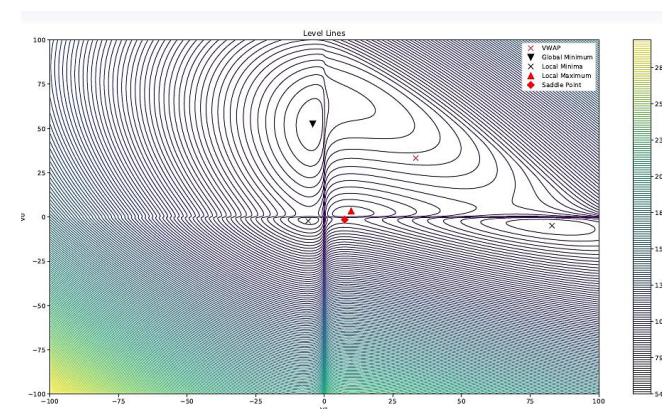
#### Futures/Closed ended Investment Trusts/Certificates:

- May trade at a discount or a premium (100% premiums have been witnessed)
- May have to be rolled
- Bid/Ask spread

#### TOBAM Bitcoin Fund:

- NAV reflects the valuation of the underlying BTC assets (without a premium)
- Relationships with crypto-currency liquidity providers
- Minimisation of Market Impact on crypto-currency markets

$$\begin{aligned}
 -\tilde{U}_\lambda = & \sum_{n=0}^{N-1} v_n \left( \sum_{i=0}^{n-1} \alpha^{n-i} \kappa \sigma_i \left( \frac{|v_i|}{V_i} \right)^\gamma \times \text{sgn}(v_i) + \frac{\kappa}{\gamma+1} \sigma_n \left( \frac{|v_n|}{V_n} \right)^\gamma \times \text{sgn}(v_n) \right) \\
 & + \left( \nu - \sum_{i=0}^{N-1} v_i \right) \left( \sum_{i=0}^{N-1} \alpha^{N-i} \kappa \sigma_i \left( \frac{|v_i|}{V_i} \right)^\gamma \times \text{sgn}(v_i) \right. \\
 & \quad \left. + \frac{\kappa}{\gamma+1} \sigma_N \left( \frac{|\nu - \sum_{i=0}^{N-1} v_i|}{V_N} \right)^\gamma \times \text{sgn} \left( \nu - \sum_{i=0}^{N-1} v_i \right) \right) \\
 & + \lambda \left( \sum_{n=0}^{T-1} \left( \sum_{i=0}^n v_i \right)^2 \sigma_{n+1}^2 + \sum_{n=T+1}^N \left( \nu - \sum_{i=0}^{n-1} v_i \right)^2 \sigma_n^2 \right)
 \end{aligned}$$



Formula and chart provided for illustrative purpose only

## WHY TOBAM BITCOIN CO2 OFFSET FUND?

### 4. CARBON OFFSET: EXAMPLE OF COMPUTATION FOR 2023

As of 30/12/2023:

1.  $N = 347$  BTC in the Fund
2. Supply = 19 584 283 BTC in total
3.  $E = 16.9$  TWH/day spent on mining
4.  $C = 371\,000$  Tons CO2 per TWH

Cumulative CO2 offset as of 30/12/2023: 3298 tons of CO2

Cumulative CO2 offset as of 30/12/2022: 2364 tons of CO2

Cumulative CO2 offset as of 31/12/2021: 1 475 tons of CO2

Cumulative CO2 offset as of 31/12/2020: 899 tons of CO2

Based on this methodology, TOBAM Bitcoin Fund CO2 offset is estimated at 934 tons of CO2 over 2023.

# WHY TOBAM?

- Task force on cryptocurrencies:
  - Head of Project
  - École Polytechnique Researcher
  - Computer scientists with years of experience
  - Legal/Risk
  - Qualified Traders
- Team has conducted research with dedicated researchers on cryptocurrencies since 4/2017.
- Cryptocurrency new activity approved by the French regulator (AMF), TOBAM is the only\* asset manager approved by the AMF for that activity
- Quantitative asset management firm with top-of-the-league IT systems and technological processes
- World class cybersecurity systems with over 10 years of security
- Regular external audit

## Bitcoin stylized facts

TOBAM

July 6, 2017

Abstract

We examine the statistical properties of the bitcoin price process. The timeseries of bitcoin daily log returns appears to be trend stationary but unconditionally heteroscedastic, being characterised by a decreasing volatility and a lightening of its tails since creation; under the GEV model, the timeseries presents undefined kurtosis and skew (i.e.,  $-\infty$  respectively). We use an exponential power distribution to compare VaR and CVaR risk metrics and compare its results with those obtained through use of the GEV model. We then study the correlation of bitcoin with other financial assets and show it can hardly be used to lower a portfolio volatility although it appears to be totally uncorrelated to other financial assets. However, a frequently rebalanced marginal bitcoin allocation may prove beneficial for returns while coming at a very low volatility cost. We then study the bitcoin price process at higher frequencies using orderbook data of online exchanges and first highlight the presence of significant market-micro structure noise before computing the aggregated Gaussianity of bitcoin. We assess that under present conditions, market-making isn't profitable for the general public, study general dynamics of bitcoin exchange orderbooks and finally consider the optimization of price slippage when buying a significant number of bitcoins among several exchanges.

### I. INTRODUCTION

Bitcoin, a Peer-to-Peer Electronic Cash System, is the flagship of a new generation of digital assets and networks based on cryptographic principles and used to guarantee an exchange of value or the execution of algorithmic contracts.

The whole market of so-called *crypto-currencies* was virtually non-existent prior to 2010 and now weighs more than \$100 billions, having nearly sextupled in the last six months (January to June 2017). The topical crypto-currency fad constitute for many a pure speculative frenzy, whereas others claim that the advent of this new asset class has only begun.

As institutional investors and HNWI get more and more interested by investing in crypto-currencies, we feel that there is a growing need for quantitative studies mapping this currently uncharted territory.

Bitcoin currently accounts for more than 46% of the crypto-currencies market total capitalization and is also the sole significant digital token which has been traded for more than a year. This is why we elected to focus this study on the first and still most important of its kind.

### ACKNOWLEDGEMENTS

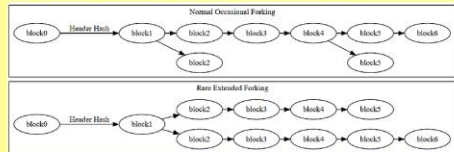
I owe a debt of gratitude to TRISTAN FROIDURE, KHALID JALALZAI and THIERRY MICHEL for their patient guidance and helpful critiques.

\*Please see footnote for acknowledgment of other markets

Definition: A fork is a change of rules in the blockchain, there exists two kinds of forks:

- A **Softfork** is a change to the bitcoin protocol wherein only previously valid blocks or transactions are made invalid. Since old nodes will recognise the new blocks as valid, a softfork is backward-compatible. This kind of fork requires only a majority of the miners upgrading to enforce the new rules.
- A **Hardfork** is a change to the bitcoin protocol that makes previously invalid blocks or transactions valid, and therefore requires all users to upgrade. When such a fork occurs, the community is usually divided between those who support the fork and those who are opposed to it; each side then only consider its own version of the blockchain to be valid.

Here follows two examples of Blockchain forks from Bitcoin's developer guide:



A byproduct of distributed consensus, forks happen anytime two miners find a block at nearly the same time. The ambiguity is resolved when subsequent blocks are added to one, making it the longest chain, while the other block gets "orphaned" (or abandoned) by the network.

The topical controversy concerns the maximal size of each Blockchain Block, which now stands at 1 MB and thus allows only about 300'000 transactions to take place daily. This limit is already being challenged, causing transaction delays. This is why a number of well-known entities, such as major miners, support a hardfork in order to increase this limit.

Such an event would likely divide the Bitcoin community, hence causing great volatility and effectively splitting the Bitcoin capitalization among the two sides of this fork.

The Bitcoin System being theoretically reliable, we will now describe how bitcoins are effectively bought and managed.

\* As of March 31, 2020



APPENDIX: PRI ASSESSMENT REPORT

VERSUS PRI MEDIAN

POLICY GOVERNANCE & STRATEGY



DIRECT LISTED EQUITY –  
ACTIVE QUANTITATIVE



DIRECT FIXED INCOME –  
CORPORATE



CONFIDENCE BUILDING MEASURES



## RISKS

- Risk of capital loss: the fund does not benefit from any guarantee or capital protection. There is a risk that investors will not get back the full amount of the capital originally invested.
- Liquidity Risk: the investment strategy may involve investing in assets (i.e. Bitcoin) whose liquidity may decline sharply. In these conditions, volatility may widen significantly.
- Volatility Risk: the fund invests essentially in Bitcoin, which can prove to be highly volatile. There is a risk that the fund will demonstrate high levels of volatility.
- Risks linked to investment in Bitcoins: the fund invests in a highly volatile and lowly regulated asset, and due to particular factors such as platforms disruptions or regulations, the fund presents a greater degree of risk than that generally associated with investments on the major financial markets or assets.
- Cybersecurity Risk: cryptocurrencies and platforms can be subject to cyber attacks and risks of hacking. The fund by investing essentially in bitcoin might also be subject to such attacks.

## ABOUT TOBAM

TOBAM is an asset management company offering innovative capabilities designed to maximize the benefits of scientific research to build efficient investment exposures. TOBAM's expertise relies on 3 core pillars:

- TOBAM's Maximum Diversification<sup>®</sup> approach, supported by original, patented research and a mathematical definition of diversification, provides clients with diversified core exposure, in equity and fixed income markets.
- A research driven, *Solutions* division (TOBAMSolutions<sup>®</sup>), dedicated to build customized solutions and services to sophisticated institutional investors,
- A *LBRTY*<sup>®</sup> strategy range, which aims to help investors substantially mitigate their exposure to autocratic regimes in their portfolio.

In line with its mission statement and commitment to diversification, TOBAM also launched a satellite activity (CRYPTOBAM<sup>®</sup>) on cryptocurrencies in 2016.

TOBAM Maximum Diversification<sup>®</sup>, TOBAMSolutions<sup>®</sup>, TOBAM LBRTY<sup>®</sup> and CRYPTOBAM<sup>®</sup> illustrate TOBAM's systematic "out of box" dedication to demanding investors.

TOBAM manages north of USD 2 billion (as of 31 December 2024). Its team includes 31 finance professionals based in Paris, New York and Dublin.

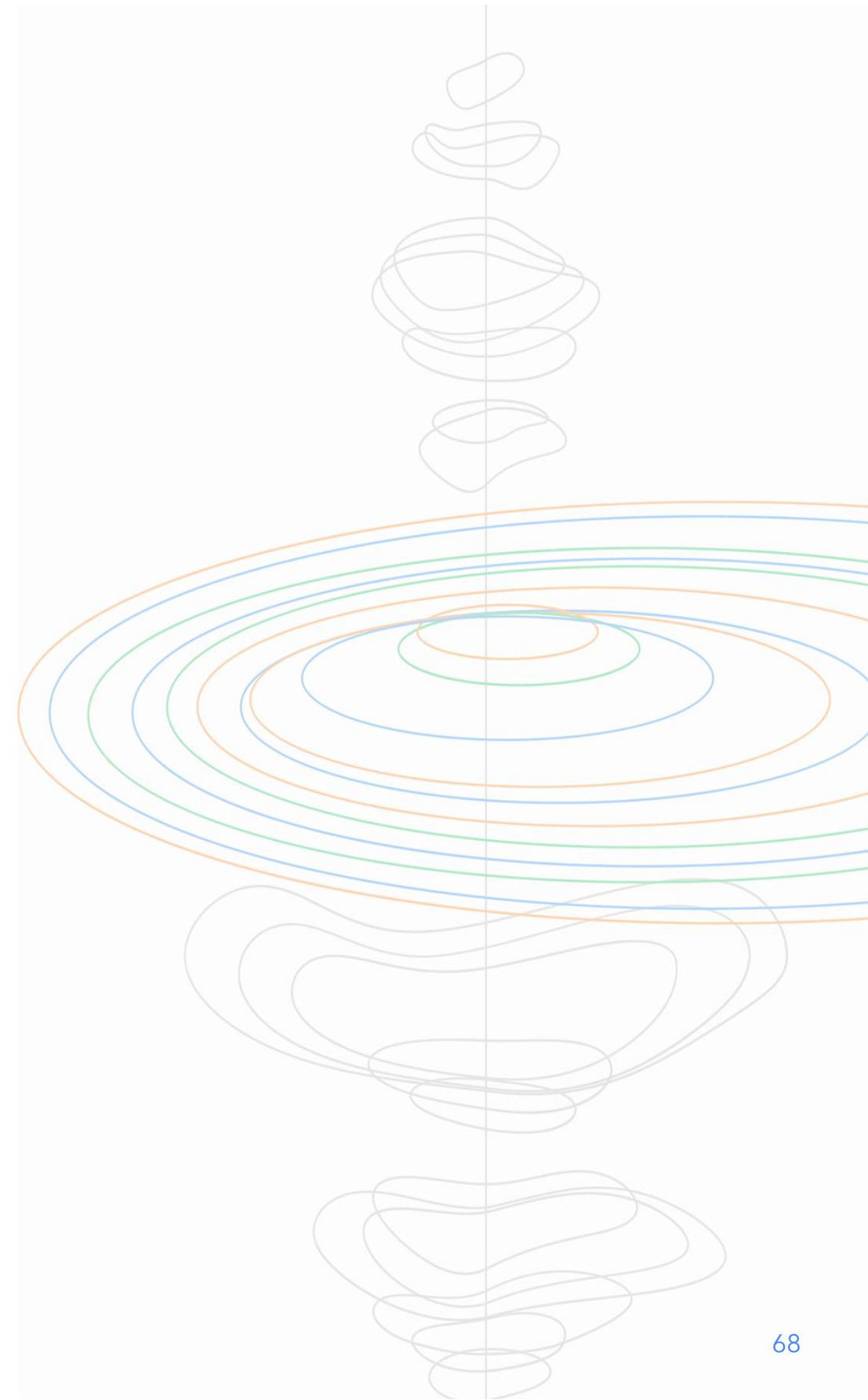
For more information, please visit [www.tobam.fr](http://www.tobam.fr) or [tobamdirect.com](http://tobamdirect.com)

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