

Crypto Asset Lab

Presenting a New Research Initiative

Ferdinando Ametrano
Milan, June 5, 2019

Crypto-Assets are Hard to Understand

At the crossroads of:

1. Cryptography
2. Computer networking and distributed systems
3. Game theory
4. Monetary theory

With relevant legal, political, and cultural implications

*Mainly not a technology,
a cultural paradigm shift instead*

The Information Economy



1. Data is transferred with zero marginal cost
2. Why pay a fee to move bytes representing wealth?
3. Why only 9-5, Monday-Friday, two days settlement?
4. Who (and when) will gift humanity with a global instantaneous free p2p payment network?

Permissionless Innovation: Gentle, Fast, and Effective

Permissionless innovation: no centralized security mechanism, no barrier to enter, no editorial control

- Email has not been designed by a consortium of postal agencies
- Internet has not been developed by a consortium of telcos

Will a new money and its decentralized transactional network be designed by a consortium of banks?

Disruptive Innovation

1. Did not understand it:   
2. Have used it to build new business:     
3. The entertainment industry has wasted its resources fighting MP3 and illegal p2p sharing
4. We now buy music and movies from iTunes, Google Play, and Amazon... NOT from Sony Universal

The Crypto Asset Lab

A research initiative on crypto assets as

1. investment opportunity
2. fintech innovation
3. regulatory challenge

4. And their role in the history of money and finance

We also pay attention to the innovations in cryptography and blockchain technology, given their relevance for privacy, security, and other applications (e.g. timestamping, see OpenTimestamps).

Who are we

A meeting point between:

- Academia
- Industry
- Institutions
- Regulators

We encourage students, researchers, and practitioners to join us and help with research, development, training, teaching, and other experimental activities

Our Faculty



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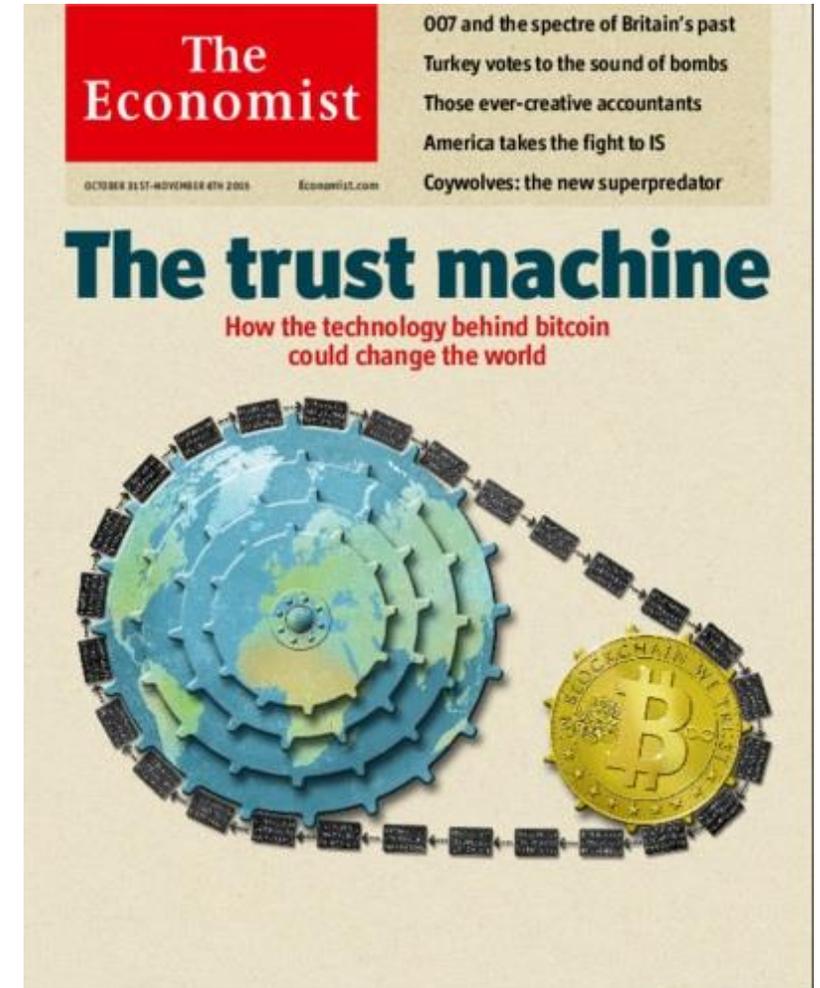
“Blockchain – not bitcoin – will prove revolutionary in banking”

*“When a wise man points at the moon
the fool examines the finger.”*

(Confucius)

*“When a wise man points **at the bitcoin** the fool examines **the blockchain.**”*

(Ametrano)



<http://www.economist.com/news/leaders/21677198-technology-behind-bitcoin-could-transform-how-economy-works-trust-machine>

"Bitcoin in 2014 Is Like Internet in 1994: Weird and Scary" (Marc Andreessen)

American entrepreneur, investor, and software engineer; coauthor of Mosaic, cofounder of Netscape



<https://twitter.com/pmarca/status/677658844504436737>

The Walled Garden Model

1. Controlled access to web contents and services
2. Offered in the late '90s and early '00s by CompuServe, AOL (and to some extent MSN)
3. Corporates wanted to go online, but not in the wild unregulated internet, populated by anonymous agents
4. They eventually realized that perceived risks, which are real, are outweighed by benefits

What is The Blockchain?

[A hash pointer linked list of blocks]

1. An append-only sequential data structure
2. New blocks can only be appended at the end of the chain
3. To change a block in the middle of the chain, all subsequent blocks need to be changed
4. Very inefficient compared to a relational database

Blockchain: A Distributed Transaction Ledger

1. Every block contains multiple transactions
2. Massively duplicated across network nodes
3. Shared with a P2P file transfer protocol
4. Updated by peculiar nodes, known as miners, appending new blocks of transactions

Blockchain Without Native Digital Asset

Blockchain without an *intrinsic native digital asset*

Does it make sense?

1. No bitcoin
2. No asset available to reward miners
3. Appointed validator officials required

Central governance is required!

*Why should validators use a blockchain,
i.e. a subpar data structure, instead of a database?*

Blockchain Needs A Native Digital Asset



 Tweet < 40

 Share < 24

 Share < 12

 Share < 3

Blockchain needs a native digital asset

01 June 2016 | 24242 views | 0

<https://www.finextra.com/videoarticle/1241/blockchain-needs-a-native-digital-asset>

Blockchain and Distributed Consensus

- Blockchain is just one of the components used to elegantly create the digital scarcity of an intrinsic native digital asset
- A native digital asset is crucial for reaching distributed consensus
- Blockchain is an idiosyncratic technology for distributed consensus, it does not have general purpose applicability, for centralized consensus it is better to use databases

What Makes Bitcoin Special?

1. Digital and scriptural: it only exists as validated transaction
2. Asset, not liability
3. Bearer instrument
4. It can be transferred but not duplicated (i.e. it can be spent, but not double-spent)
5. Scarce in digital realm, as nothing else before
6. It mimics gold monetary policy of decreasing incremental extraction

What Makes Bitcoin Special?

Bitcoin is digital gold

with a secure uncensorable embedded

settlement network

1. More a crypto-commodity than a crypto-currency
2. This is the groundbreaking achievement by Satoshi Nakamoto, not blockchain “technology”

Bitcoin Relevance

If one thinks about the role of physical gold in the history of civilization, money, and finance

the digital equivalent of gold could be disruptive

in the current digital civilization and the future of money and finance

Bitcoin can be the new global reserve asset

It is disconcerting that people are still, continuously, underestimating bitcoin

Bitcoin: Gold for the 21st Century

Ho provato a distillare in 18 minuti l'essenza di bitcoin (e cinque anni di studio). Credo possa essere una buona introduzione per neofiti, uno spunto di riflessione sulla storia della moneta per tutti

<https://www.youtube.com/watch?v=3XRF9erIMmU&list=PLrVvuryXHHTdKXzpIx7aYAzqAiRpaebWp&index=41>



Bitcoin Potential Upside

Asset Under Management worldwide:

\$100T



If 2% is invested in BTC,
price should be:

~ \$100,000/BTC

Gold capitalization:

\$8T



if BTC reaches a similar level,
its price should be:

~ \$400,000/BTC

Metcalfe's law:

"network value is proportional to the square of the number of users"



Estimated BTC investors:
50M

Forecast: 350M

Price might increase x49:

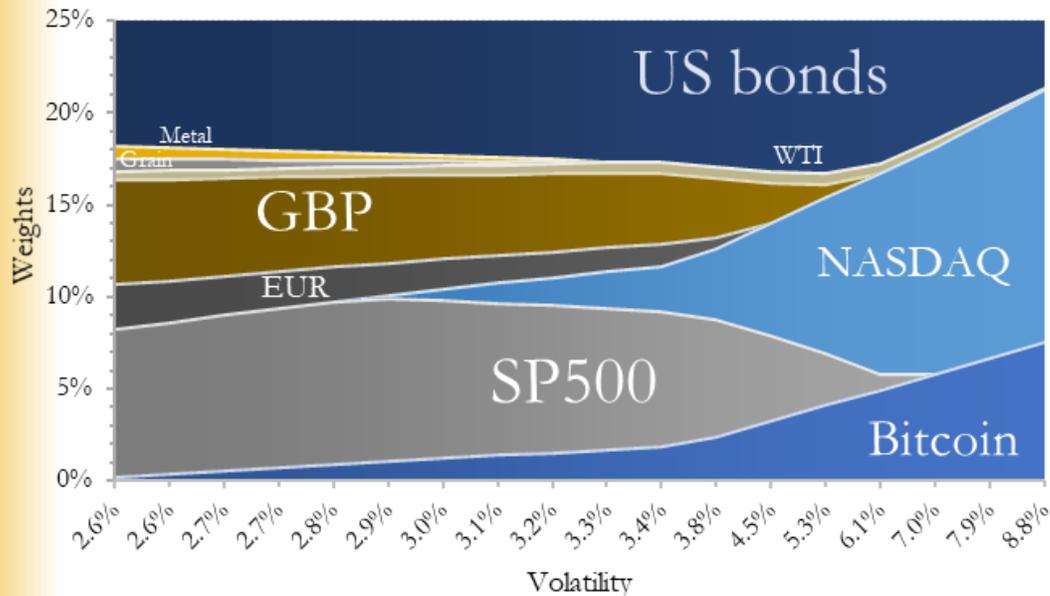
~ \$350,000/BTC

Bitcoin: CAPM Diversification

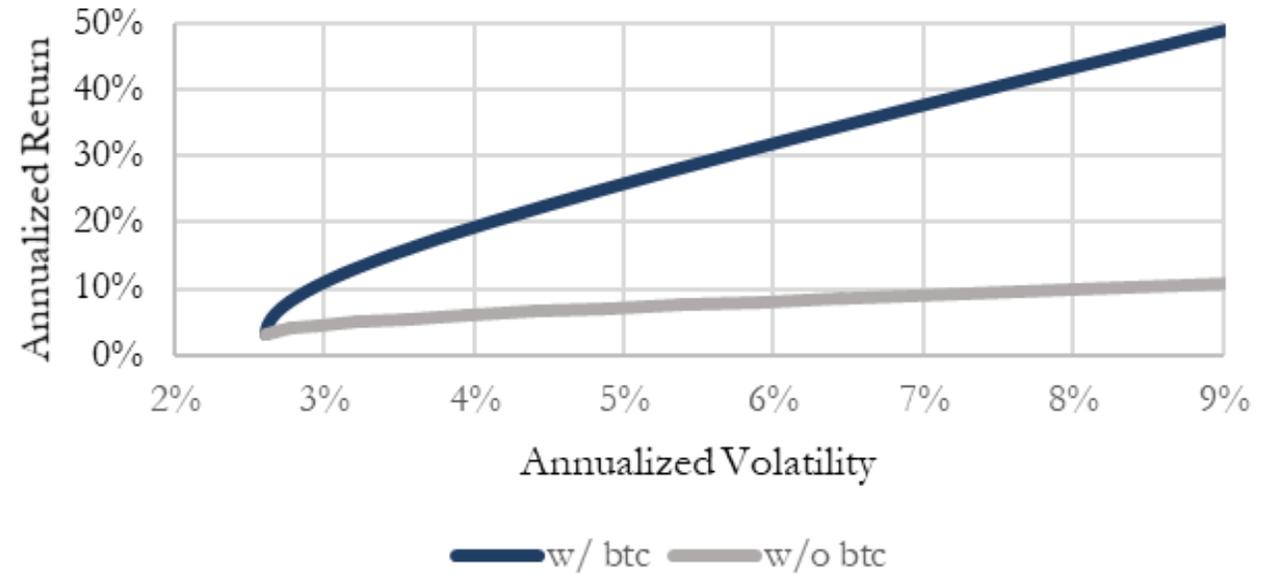
Bitcoin increases expected return for a given level of risk, e.g.

- at 4% volatility, return increases more than 140bps
- at 10% return, volatility decreases from 8.60% to 2.90%

Optimal Allocation Including Bitcoin



CAPM Efficient Frontier



For conservative risk levels, optimal CAPM diversification suggests to invest in Bitcoin up to 5% of the portfolio

A Crypto Asset Index

1. Is diversification possible among different cryptoasset?
2. How could institutional investors access this market?
3. Criteria for a crypto asset index

Token Economy

Our answer to Consob consultation:

- ICO are promising, but have been delusional so far
- A clear regulatory environment could be a real opportunity
- Dispel ambiguity between issuance/trading platforms and blockchains
- Hybrid token:
 - Issuer
 - Inflation
 - Project
 - Profit sharing
- Custody issuance on trading platforms

Timestamping: Digital Gold Jewelry

- Opentimestamps
- Certificates and degrees

*What jewelry is for gold,
timestamping could be for bitcoin:*

not essential

but effective at leveraging its beauty

Hayek Money: A New Generation of Cryptocurrencies

1. The cryptocurrency monetary standard of **elastic non-discretionary supply**
2. Price stability paradigm with respect to a given reference basket
3. Bitcoin can be used as reserve asset
4. Concurrent cryptocurrencies competing in monetary policy definition and reference basket choices
5. Private monies competing with legal tender monies: separation of Money and State?

Crypto Asset Lab

The logo for Crypto Asset Lab features the text 'Crypto Asset Lab' in a bold, black, sans-serif font. To the left of the text is a yellow, 3D wireframe cube. To the right of the text is a vertical stack of three yellow squares, each connected to the one below it by a thin vertical line.

 Digital
Gold
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UNIVERSITÀ DEGLI STUDI
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The logo for the University of Milan Bicocca, featuring a yellow square with a white geometric pattern inside, and the text 'UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA' around it.

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