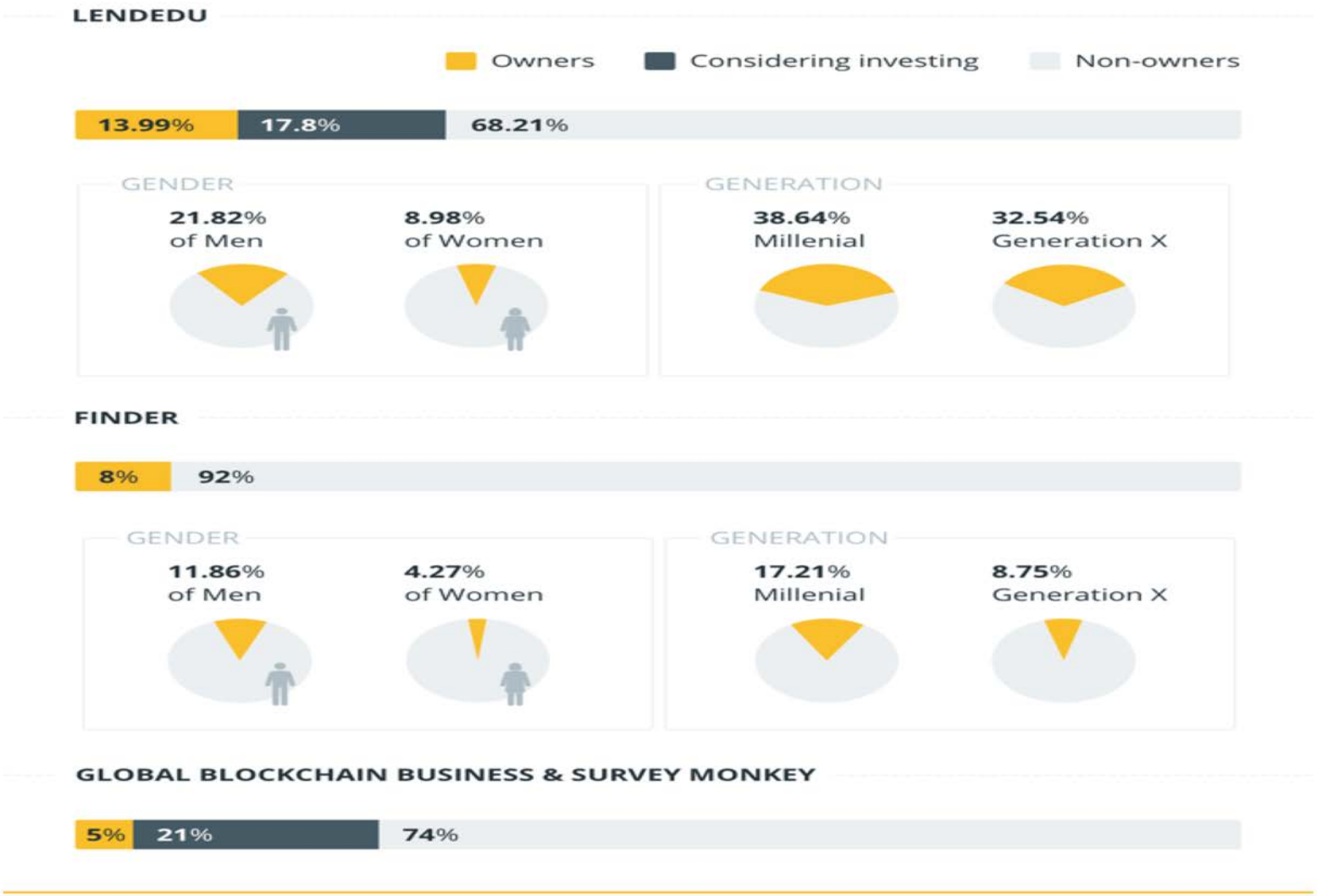
CRACKING THE CRYPTO CODE: BEYOND THE HYPE

Value vs. Price, Trade vs Invest

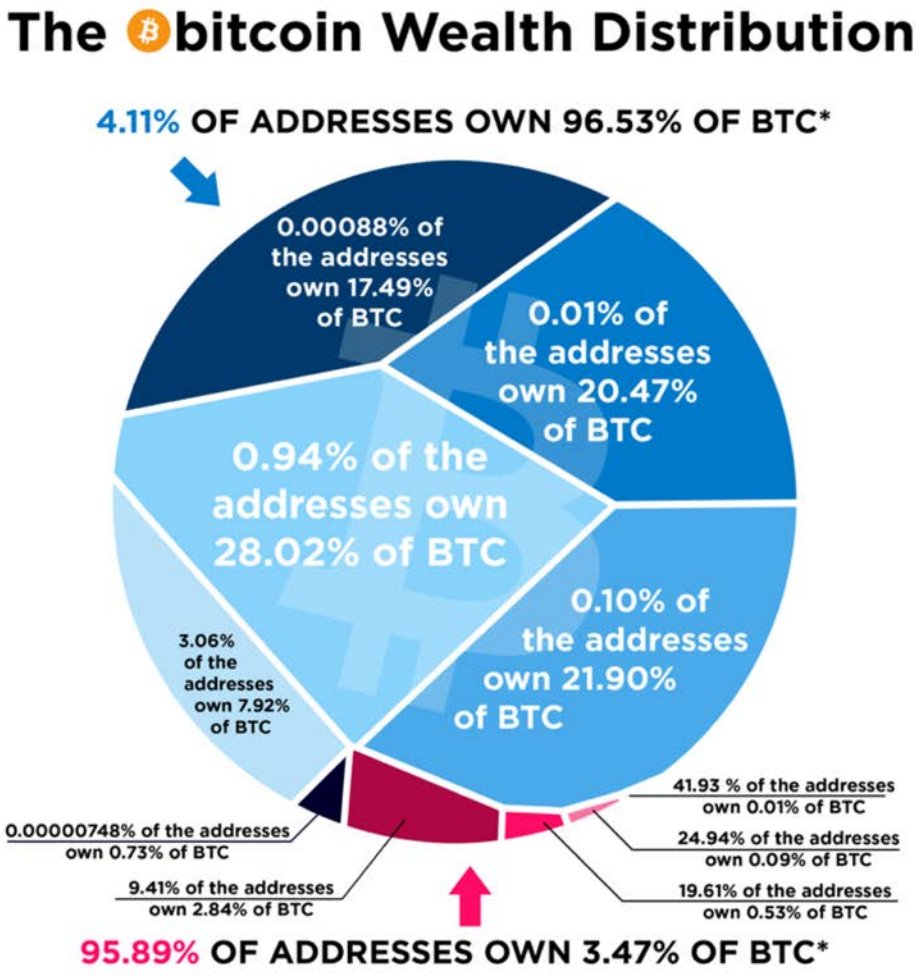
The Set up

- Crypto investments, especially Bitcoin, Ethereum and Ripple, have captured the imagination of both investors and onlookers:
  - Rising (and volatile) Prices: The big story is that the rising and volatile prices on these investments have made poor people rich, and rich people poor.
  - Futuristic: In addition, given the digitalization of pretty much everything else, a digital currency seems to be overdue.
- The rise has been dramatic enough that it has evoked the usual extremes:
  - The cynics view it as another size of irrational exuberance, a worthless asset hyped up and destined for the dust heap.
  - The optimists believe that this is the future of not just currency but all business, and that it will eventually displace the establishment (from fiat currencies to banks to stock exchanges to banks).

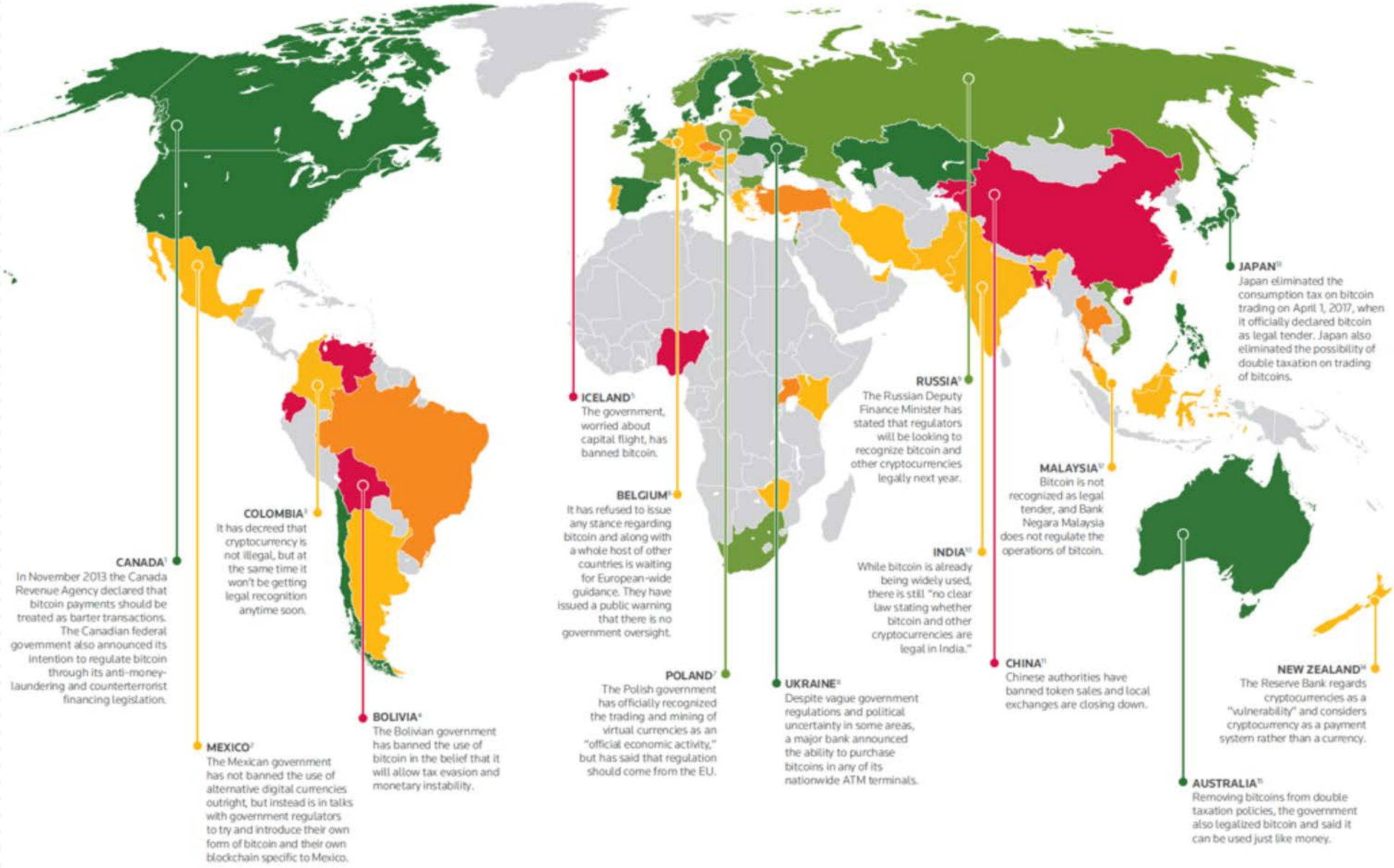
Some preliminary statistics on Crypto Currencies



Highly Centralized..



A WORLD OF CRYPTOCURRENCIES



CANADA[1]
In November 2013 the Canada Revenue Agency declared that bitcoin payments should be treated as barter transactions. The Canadian federal government also announced its intention to regulate bitcoin through its anti-money-laundering and counterterrorist financing legislation.

MEXICO[2]
The Mexican government has not banned the use of alternative digital currencies outright, but instead is in talks with government regulators to try and introduce their own form of bitcoin and their own blockchain specific to Mexico.

COLOMBIA[3]
It has decreed that cryptocurrency is not illegal, but at the same time it won't be getting legal recognition anytime soon.

BOLIVIA[4]
The Bolivian government has banned the use of bitcoin in the belief that it will allow tax evasion and monetary instability.

ICELAND[5]
The government, worried about capital flight, has banned bitcoin.

BELGIUM[6]
It has refused to issue any stance regarding bitcoin and along with a whole host of other countries is waiting for European-wide guidance. They have issued a public warning that there is no government oversight.

POLAND[7]
The Polish government has officially recognized the trading and mining of virtual currencies as an "official economic activity," but has said that regulation should come from the EU.

UKRAINE[8]
Despite vague government regulations and political uncertainty in some areas, a major bank announced the ability to purchase bitcoins in any of its nationwide ATM terminals.

RUSSIA[9]
The Russian Deputy Finance Minister has stated that regulators will be looking to recognize bitcoin and other cryptocurrencies legally next year.

INDIA[10]
While bitcoin is already being widely used, there is still "no clear law stating whether bitcoin and other cryptocurrencies are legal in India."

CHINA[11]
Chinese authorities have banned token sales and local exchanges are closing down.

JAPAN[12]
Japan eliminated the consumption tax on bitcoin trading on April 1, 2017, when it officially declared bitcoin as legal tender. Japan also eliminated the possibility of double taxation on trading of bitcoins.

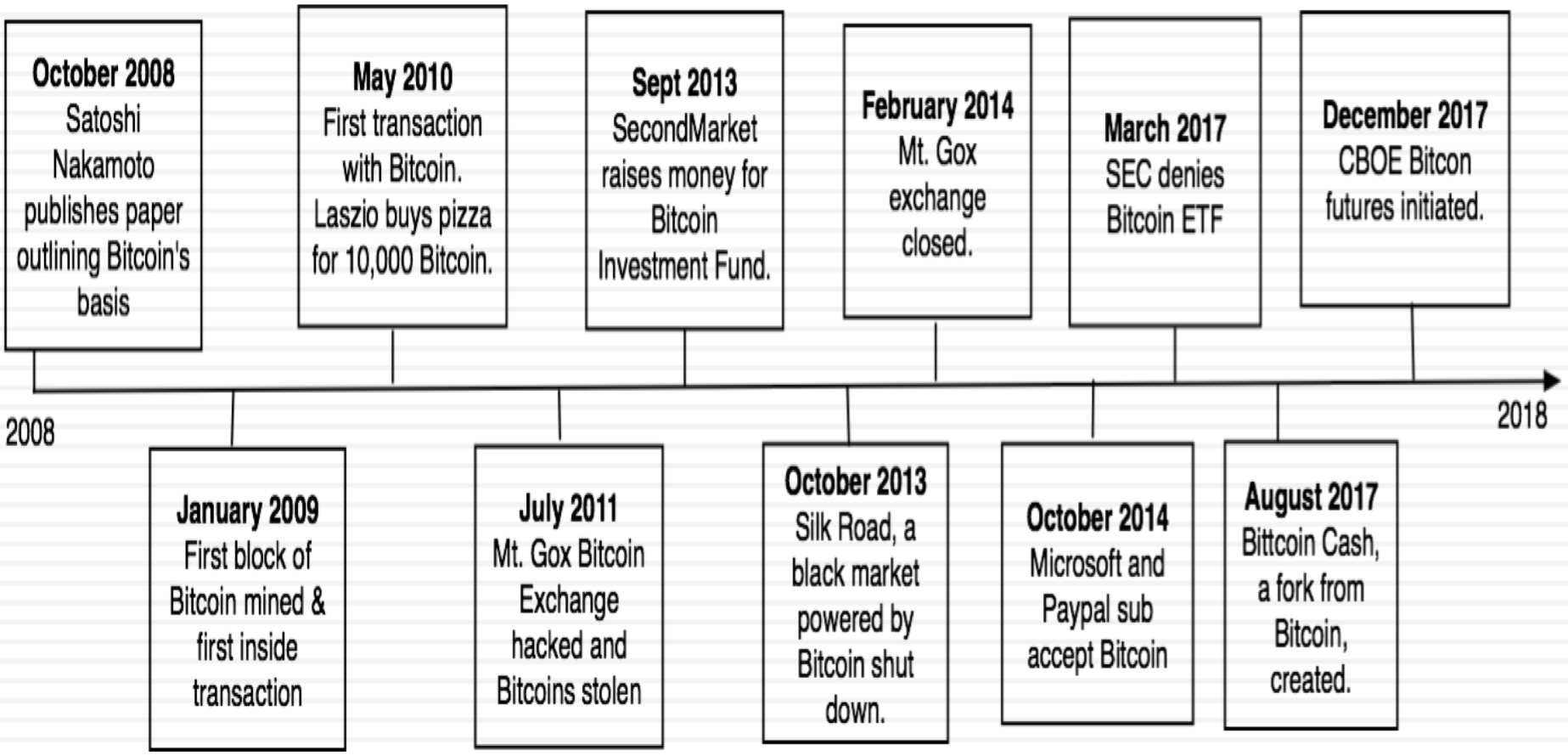
MALAYSIA[13]
Bitcoin is not recognized as legal tender, and Bank Negara Malaysia does not regulate the operations of bitcoin.

NEW ZEALAND[14]
The Reserve Bank regards cryptocurrencies as a "vulnerability" and considers cryptocurrency as a payment system rather than a currency.

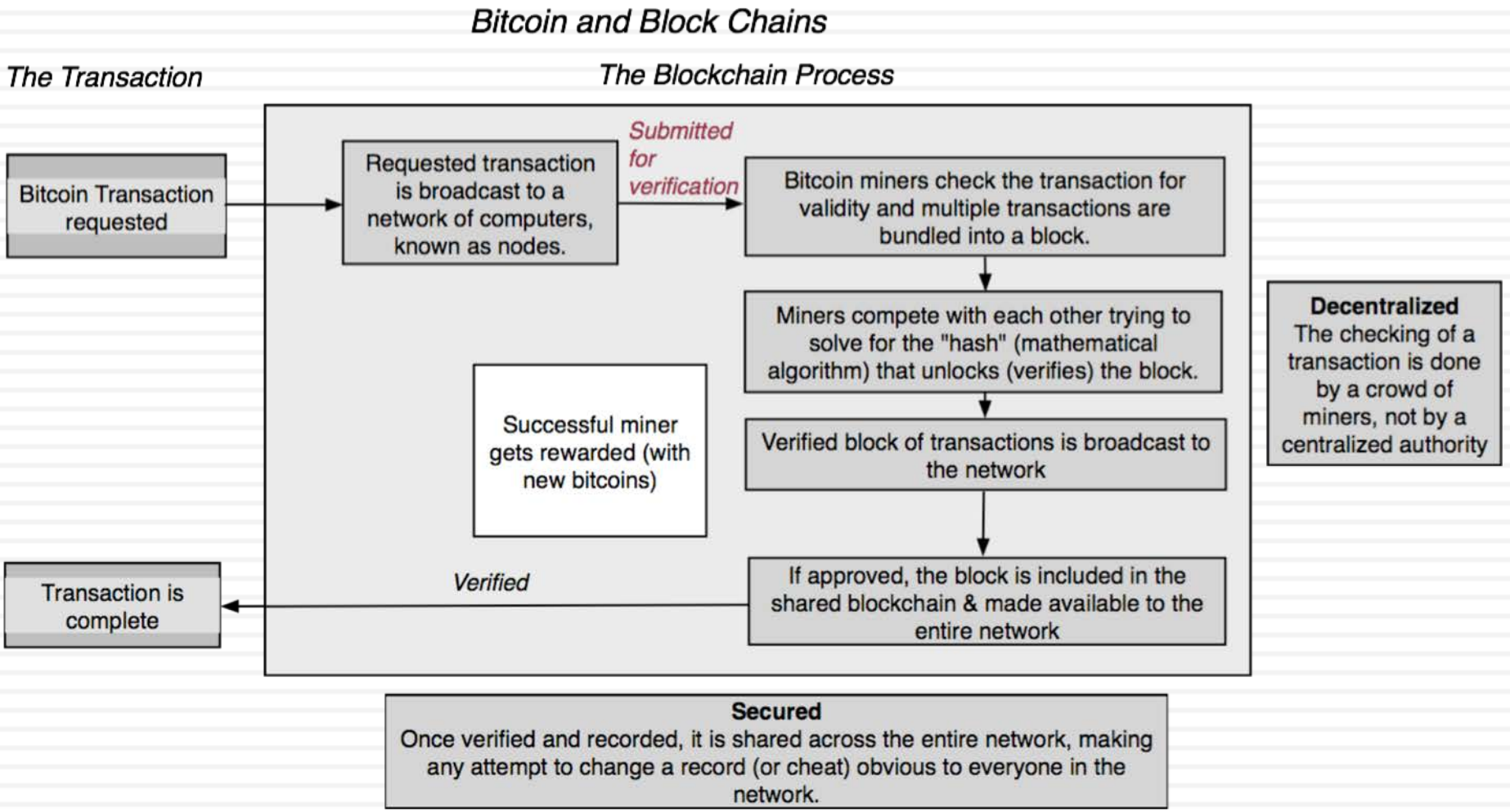
AUSTRALIA[15]
Removing bitcoins from double taxation policies, the government also legalized bitcoin and said it can be used just like money.

Bitcoin: A Quick History and Description

A Time Line for Bitcoin



Bitcoin's heart: The Block Chain



Bitcoin Specifics

- Brute Force (and power)
  - The mining of bitcoin requires that the hash be solved, mostly through brute computing force.
  - That requires running multiple computers and immense amounts of power. Bitcoin mining therefore happens in parts of the world where power is cheap.
- Absolute Limit
  - The original design limits the number of Bitcoin to 21 million.
  - That limit will be very hard to change, requiring buy in by existing bitcoin owners.
  - Each Bitcoin can be broken down into 100 million units.

Key Pluses

- Decentralized verification: The validation and verification of a transaction is sourced to members, called miners in the crypto currency world.
- Complete and open records: Every transaction, once validated and verified, is converted into a block of data that is recorded in the block chain ledger, which is accessible to everyone in the network.
- Incorruptible: A block chain, once recorded and shared, cannot be changed since those changes are visible to everyone in the network and are quickly tagged as fraudulent. Thus, the ledger, once created, becomes almost incorruptible.

Key Minuses: It is inefficient!

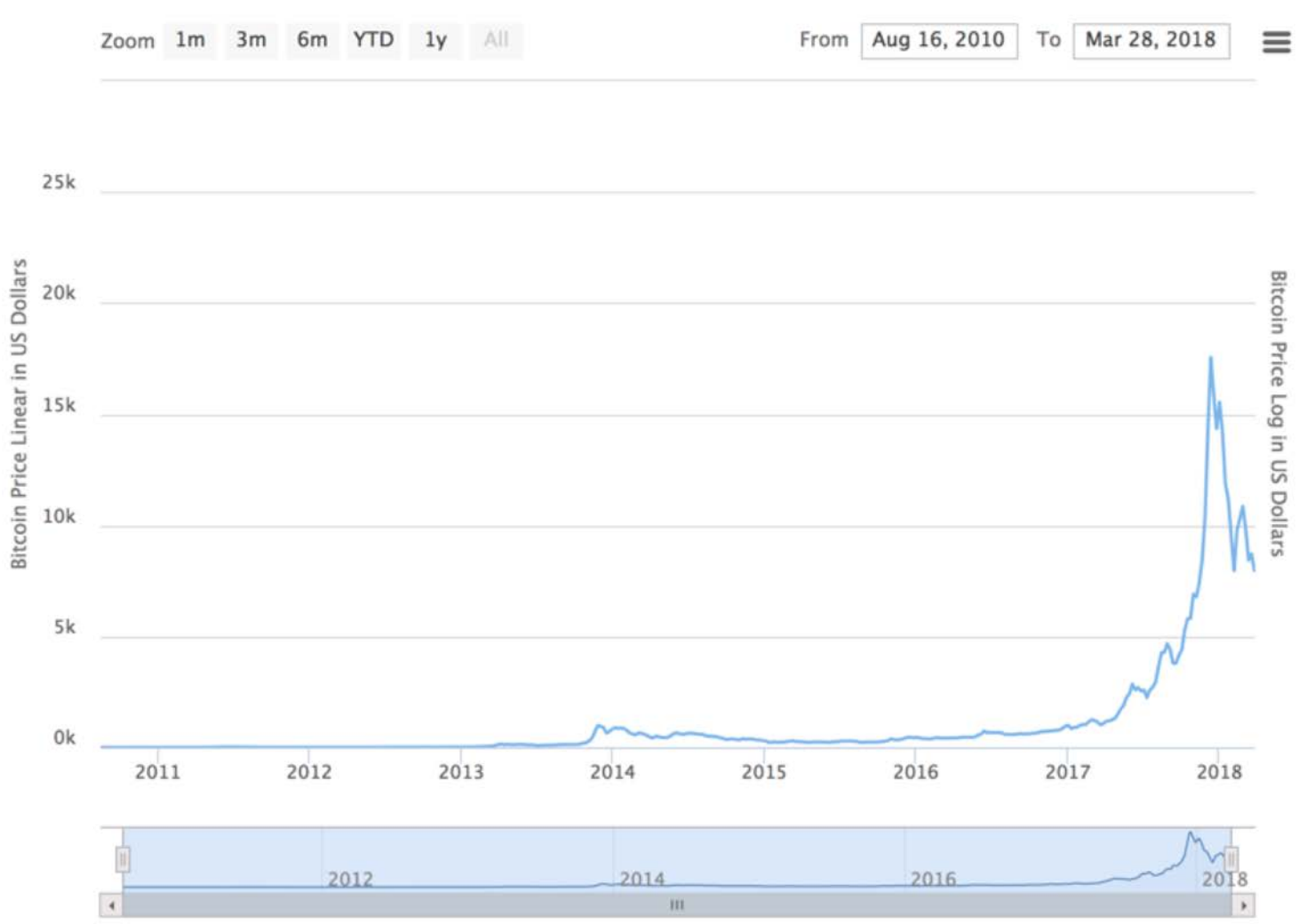
- Power hungry: The decentralized process requires multiple miners running even more computers to check transactions. Bitcoin guzzles about as much electricity annually as all of Nigeria.
- Person intensive: For every successful miner, there are many other miners who spend time and energy and have nothing to show for it.
- A thought experiment: If Bitcoin becomes a widely used currency, say as widely used as the Euro
  - How much energy would it use?
  - How would pay the miners for their time?

Potential Fixes: Technology and Trust!

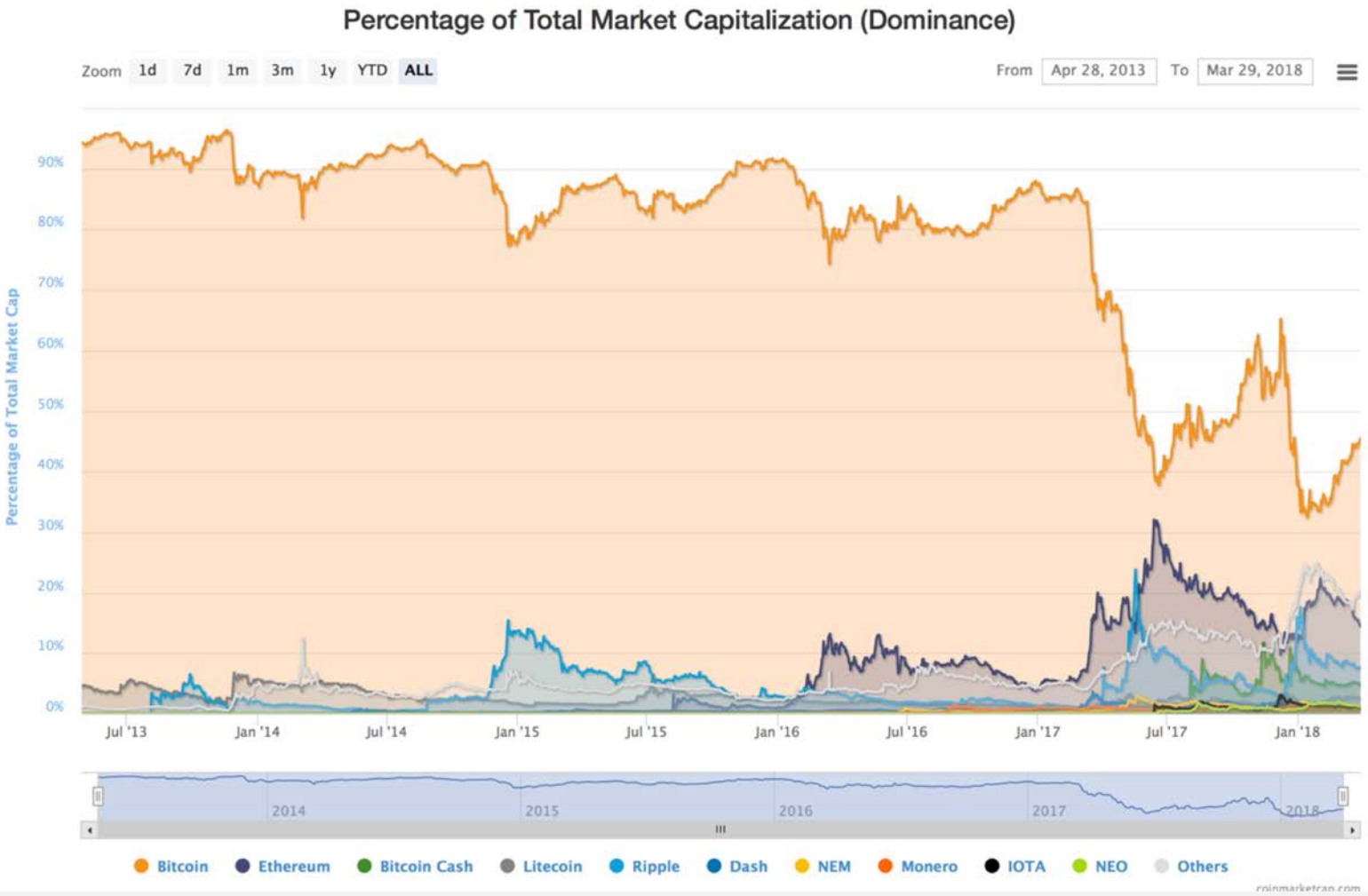
- Improved technology: Bitcoin, in particular, is technologically inefficient, partly it is because the oldest crypto. It is one reason that you have seen forks in the currency and Bitcash.
- More trust: One reason that Bitcoin is so inefficient is because it is built on the presumption that no one can be trusted and that everyone should have an equal chance to confirm a transaction. Ironically, one way to make the blockchain more efficient is to trust more and be less democratic.

The Crypto Boom!

To Infinity and Beyond: Bitcoin's Price Boom



Has led to a broader crypto boom



And an explosion in public attention..

- The surge in crypto currency prices and the millionaires it has created has also led to an explosion of websites dedicated to crypto currencies.
- In concurrence, the traditional financial news sites (from the Wall Street Journal to CNBC) have dedicated more of their pages to crypto currency news than they have on many other markets.

Which seems disproportionate to the value..

Peak Market Capitalization = $750 billion

The Extremes Beckon!

The Naysayers..

- Warren Buffett on Bitcoin (January 2018): “In terms of cryptocurrencies, generally, I can say with almost certainty that they will come to a bad ending.”
- Charlie Munger on Bitcoin (February 2018): "Bitcoin is noxious poison,” and the bitcoin craze is "totally asinine.”
- Nouriel Roubini on Bitcoin (February 2018): Bitcoin is “the "biggest bubble in human history” and it’s price is going to zero.
- Goldman Sachs (February 2018): Today’s cryptocurrencies will go to zero, but stronger digital currencies may still emerge.

Be careful about what you say… Jamie Dimon's evolution on Bitcoin..

The Proponents

- Analysts: Saxo Bank analyst Kay Van-Petersen told CNBC in January 2018 that she "wouldn't be surprised" if Bitcoin peaked between $50,000 and $100,000 this year, based upon chart patterns.
- Hedge funds: Mark Yusko announced his firm, Morgan Creek, is seeking to raise up to $500 million to start a new crypto hedge fund saying that he believes "blockchain to be one of the most powerful and valuable technologies to have been developed in the digital age".
- Silicon Valley: There are venture capitalists, Marc Andreesen most prominent among them, who believe that the future belongs to crypto currencies and have invested in companies and funds to back that view.

And central bankers (and regulators) cannot make up their mind..

- Mark Carney, Bank of England (February 2018): "It has pretty much failed thus far on ... the traditional aspects of money. It is not a store of value because it is all over the map. Nobody uses it as a medium of exchange."
- Korean Central Bank: Regulation (of virtual currencies) is appropriate because it is regarded as a commodity. It [cannot be] regulated at the level of a currency.
- Israeli Central Bank: "The Bank of Israel's position is that Bitcoin should be viewed as a financial asset".

Laying the Groundwork

Classifying Investments

1. Cash flow generating assets: Generate cash flows now or are expected to do so in the future. Can be a fixed cash flow claim, a residual claim or a contingent claim.
2. Commodities: Used as raw material to meet another need (energy, food etc.).
3. Currencies: Measure of cash flows, medium of exchange or store of value.
4. Collectibles: May have aesthetic or emotional value but derives its pricing from its scarcity (supply) and the perception of others that it is wanted.

Value versus Price

	To value	To price
Assets	Can be valued based upon expected cashflows, with higher cashflows & lower risk = higher value.	Can be priced against similar assets, after controlling for cash flows and risk.
Commodity	Can be valued, based upon utilitarian demand and supply, but with long lags in both.	Can be priced against its own history (normalized price over time)
Currency	Cannot be valued	Can be priced against other currencies, with greater acceptance & more stable purchasing power = higher price.
Collectible	Cannot be valued	Can be priced based upon scarcity and desirability.

Trading versus Investing

- There are two ways of playing markets.
  - Investor: You buy (sell) investments that you believe are under valued (over valued) and bet that the market will correct its mistakes over time.
  - Trader: You buy (sell) an investment because you expect will go up (down) in price, for whatever reason.
- With assets (like stocks, bonds or businesses), you can be either an investor or a trader.
- With currencies, commodities and collectibles, you cannot be an investor, only a trader.

Trading versus Investing

	The Pricing Game	The Value Game
Underlying philosophy	The price is the only real number that you can act on. No one knows what the value of an asset is and estimating it is of little use.	Every asset has a fair or true value. You can estimate that value, albeit with error, and price has to converge on value (eventually).
To play the game	You try to guess which direction the price will move in the next period(s) and trade ahead of the movement. To win the game, you have to be right more often than wrong about direction and to exit before the winds shift.	You try to estimate the value of an asset, and if it is under(over) value, you buy (sell) the asset. To win the game, you have to be right about value (for the most part) and the market price has to move to that value
Key drivers	Price is determined by demand & supply, which in turn are affected by mood and momentum.	Value is determined by cash flows, growth and risk.
Information effect	Incremental information (news, stories, rumors) that shifts the mood will move the price, even if it has no real consequences for long term value.	Only information that alter cash flows, growth and risk in a material way can affect value.
Tools of the game	(1) Technical indicators, (2) Price Charts (3) Investor Psychology	(1) Ratio analysis, (2) DCF Valuation (3) Accounting Research
Time horizon	Can be very short term (minutes) to mildly short term (weeks, months).	Long term
Key skill	Be able to gauge market mood/momentum shifts earlier than the rest of the market.	Be able to “value” assets, given uncertainty.
Key personality traits	(1) Market amnesia (2) Quick Actiing (3) Gambling Instincts	(1) Faith in “value” (2) Faith in markets (3) Patience (4) Immunity from peer pressure
Biggest Danger(s)	Momentum shifts can occur quickly, wiping out months of profits in a few hours.	The price may not converge on value, even if your value is “right”.
Added bonus	Capacity to move prices (with lots of money and lots of followers).	Can provide the catalyst that can move price to value.
Most Delusional Player	A trader who thinks he is trading based on value.	A value investor who thinks he can reason with markets.

The Crypto Bottom Line: Valuing or Pricing? Investing or Trading?

- Using the delineation that I used to classify investments into assets (generates cash flows), commodities (raw material to meet other needs), currencies and collectibles, what is bitcoin?
  a. Asset
  b. Currency
  c. Commodity
  d. Collectible
- What about gold?
- Other crypto investments?

What is Bitcoin?

- Bitcoin is not an asset, since it does not generate cash flows standing alone for those who hold it (until you sell it) and it is not a commodity, because it is not raw material that can be used in the production of something useful.
- The choice then becomes whether it is a currency or a collectible.
  - Bitcoin can be a currency, but it is not a good one yet, insofar as it has only limited acceptance as a medium of exchange and it is too volatile to be a store of value.
  - Bitcoin can be a collectible, like gold, that people will flee to, when they stop trusting central banks and fiat currencies.

Bitcoin: As Currency

Why Bitcoin is not an asset: Debunking the arguments

1. **You can lend Bitcoin out and earn interest**
   - Since the interest income is then a cash flow, the argument is that Bitcoin is an asset.
   - The counter is that you can lend any currency out and earn interest. If you do, it is the loan that you make that is the asset, not the currency itself.
2. **The Bitcoin network has value**
   - Extrapolating from the tech space, where companies like large network companies like Facebook have value, Bitcoin has value because of the networking benefit.
   - The counter is that an investor in Facebook is not valuing it highly because it has a big network, but because he or she makes money from making money off that network (by selling advertising).

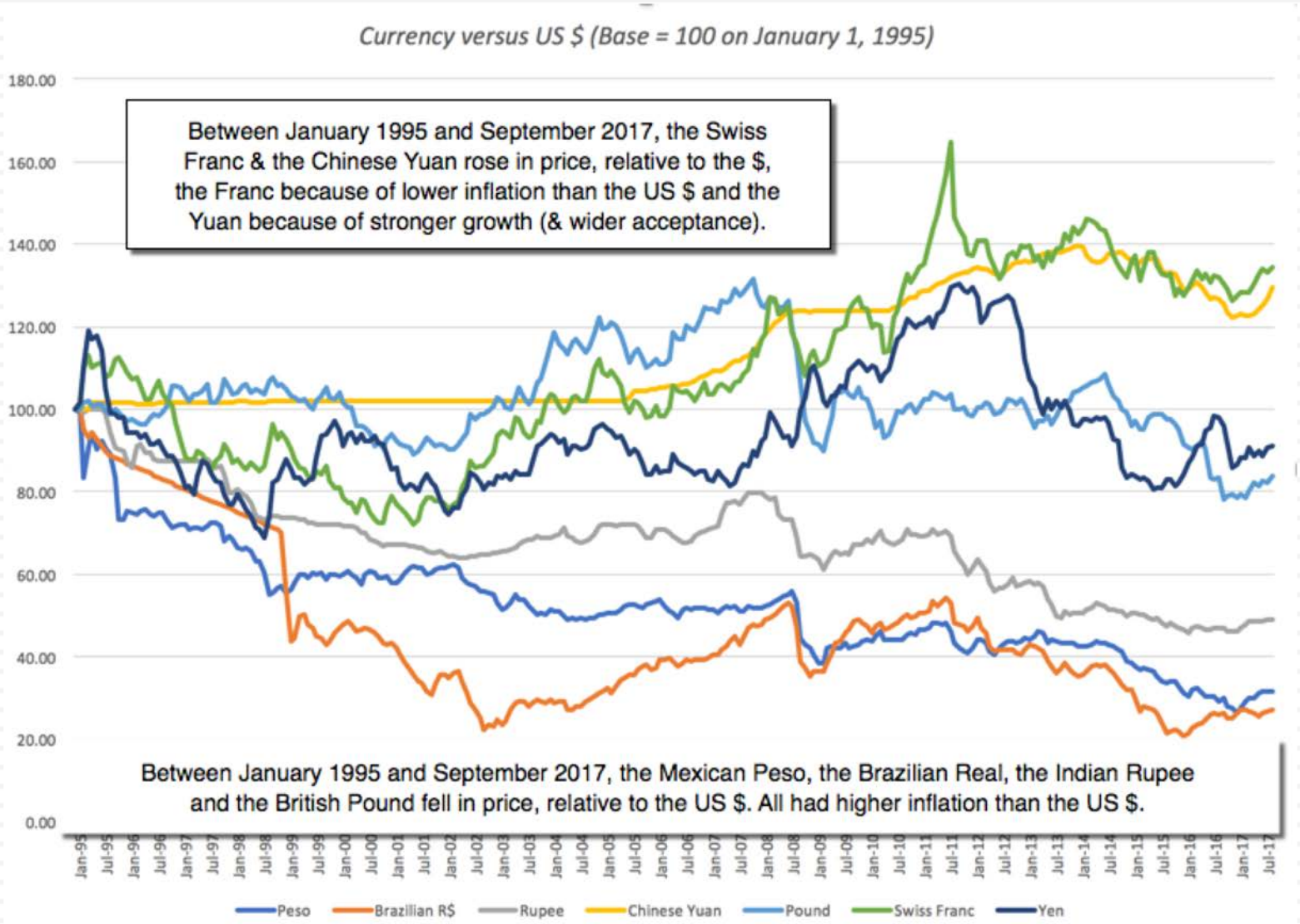
Three Pathways for Bitcoin

- The Global Digital Currency: Bitcoin gains wide acceptance in transactions across the world, becoming a widely used global digital currency. If that happens, it could compete with fiat currencies and given the algorithm set limits on its creation, its high price could be justified.
- Gold for Millennials: Bitcoin becomes a haven for those who do not trust central banks, governments and fiat currencies. In short, it takes on the role that gold has, historically, for those who have lost trust in or fear centralized authority. If this scenario unfolds, and Bitcoin shows the same staying power as gold, it will behave like gold does, rising during crises and dropping in more sanguine time periods.
- The 21st Century Tulip Bulb: In this, the worst case scenario, Bitcoin is like a shooting star, attracting more money as it soars, from those who see it as a source of easy profits, but just as quickly flares out as these traders move on to something new and different. If this happens, Bitcoin could very well become the equivalent of Tulip Bulbs, a speculative asset that saw its prices soar in the sixteen hundreds in Holland, before collapsing in the aftermath.

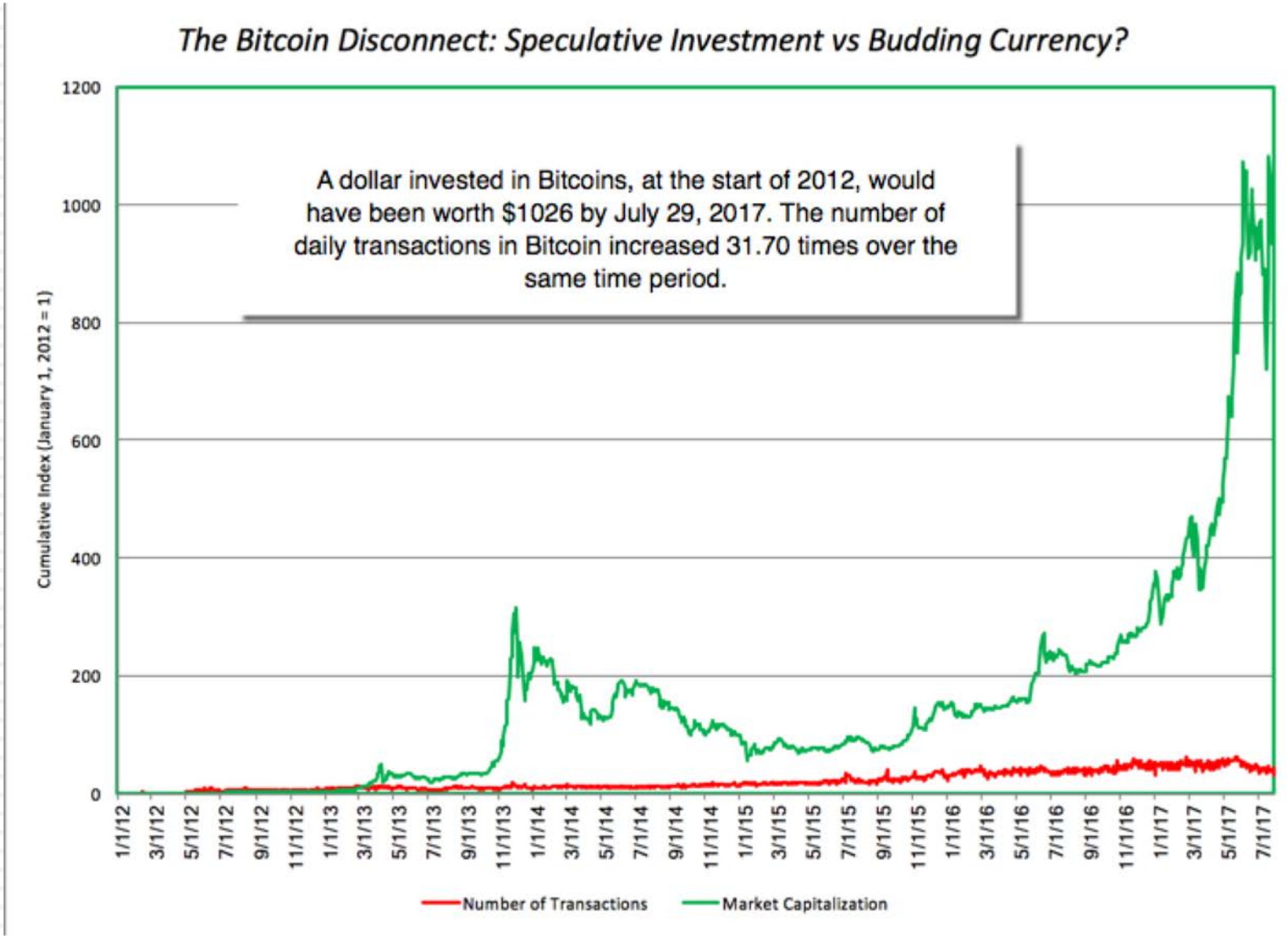
If Bitcoin is a currency, its pricing over time will depend upon how good it is a currency

- The goodness of a currency is measured on three dimensions:
  - Medium of exchange: A currency has to be accepted as payment for goods and services, with more acceptance going with better currencies.
  - Store of value: The quality of a currency will be proportional to its capacity to hold its purchasing power. Inflation in a currency makes it a less attractive choice.
- Over time, you should expect to see currencies that are are more widely accepted as mediums of exchange and have lower inflation appreciate against currencies that don't measure up well on either dimension.

Some evidence (albeit debatable)



Bitcoin is not yet a good medium of exchange…



Nor a good store of value..

- It is true that people who put their money in Bitcoin early in the game have made huge amounts of money, but that is a characteristic for a good speculative investment, not a currency.
- Put differently, an investor who put bitcoin in his pocket in January 2018 and forgot about it for two months would have found that it lost more than half of it's purchasing power in those two months.

A Currency Comparison

Currency	*Issuing Entity*	*Transaction Capability*	*Security, Storage & Convertibility*
US Dollar (Euro)	Issuing Entity: The Federal Reserve (ECB) Trust: Has ebbed & flowed over time, depending upon how independent the Fed (ECB) is perceived to be and how focused it is on protecting the dollar's (Euro's) buying power. It is possible that the shift to protecting the US (EU) economy (with quantitative easing) over the last few years has reduced this trust.	Almost universal acceptance, reflecting the size of the US (EU) economy & the depth of financial markets in the US (Euro Region).	Can be saved relatively securely (in insured bank accounts & treasuries), while earning market-set interest rates.
Chinese Yuan	Issuing Entity: The People's Bank of China Trust: While the Chinese Central Bank gets in the news with its currency interventions, the perception (fair or unfair) is that it is a creature of the Chinese Government and will do its bidding.	Acceptance within Chinese borders but only limited acceptance outside China.	Can be saved in Chinese banks or government securities, but at rates influenced or set by the government.
Argentine Peso	Issuing Entity: Central Bank of Argentina Trust: Controlled by the Argentine government. Any attempt at independence is quickly countered.	Accepted in Argentina, but even Argentines may prefer to be paid in other currencies.	Can be saved, but security can be undercut by government decree.
Gold	Issuing Entity: Nature Trust: Absolute, unless the alchemists finally succeed	Almost universal for big transactions, but	Compact & portable. Can be stored but with a cost to the saver, not a return.
Bitcoin	Issuing Entity: Computer Algorithm Trust: Perhaps higher among tech true believers than the rest of us, but depends ultimately on how impervious the algorithm is to internal manipulation or external assault.	Limited to a small subset of transactions among the technologically adept.	Stored on compute servers, with no return to savers. Unregulated nature of business exposes users to risk.

Why is Bitcoin not working as a currency?

- Price volatility: The same volatility that draws investors into playing the Bitcoin pricing game works against it as a currency. Currencies should be boring, not exciting.
- Design flaws: The process by which Bitcoin transactions are checked, with miners competing to solve algorithms, and being rewarded with Bitcoin is not compatible with low enough transactions costs in the long term to be competitive with good currencies.
- Absolute limit: A currency that has an absolute limit on its quantity will result in deflation over time. Even Milton Friedman, who mistrusted central banks, allowed money supply to grow with the real economy.

Fixing these problems will get push back

- From Bitcoin traders: Any attempt to dampen volatility will make Bitcoin speculators furious, since they make money on volatility, not on Bitcoin's utility as a currency.
- From Bitcoin True Believers: The concept of decentralization and crowd-checking transactions is a central feature of Bitcoin, and abandoning it would be abandoning the heart of the currency.
- From Bitcoin holders: Any attempt to relax the absolute limit on Bitcoin will get push back from existing Bitcoin holders.

The Bottom Line on Bitcoin

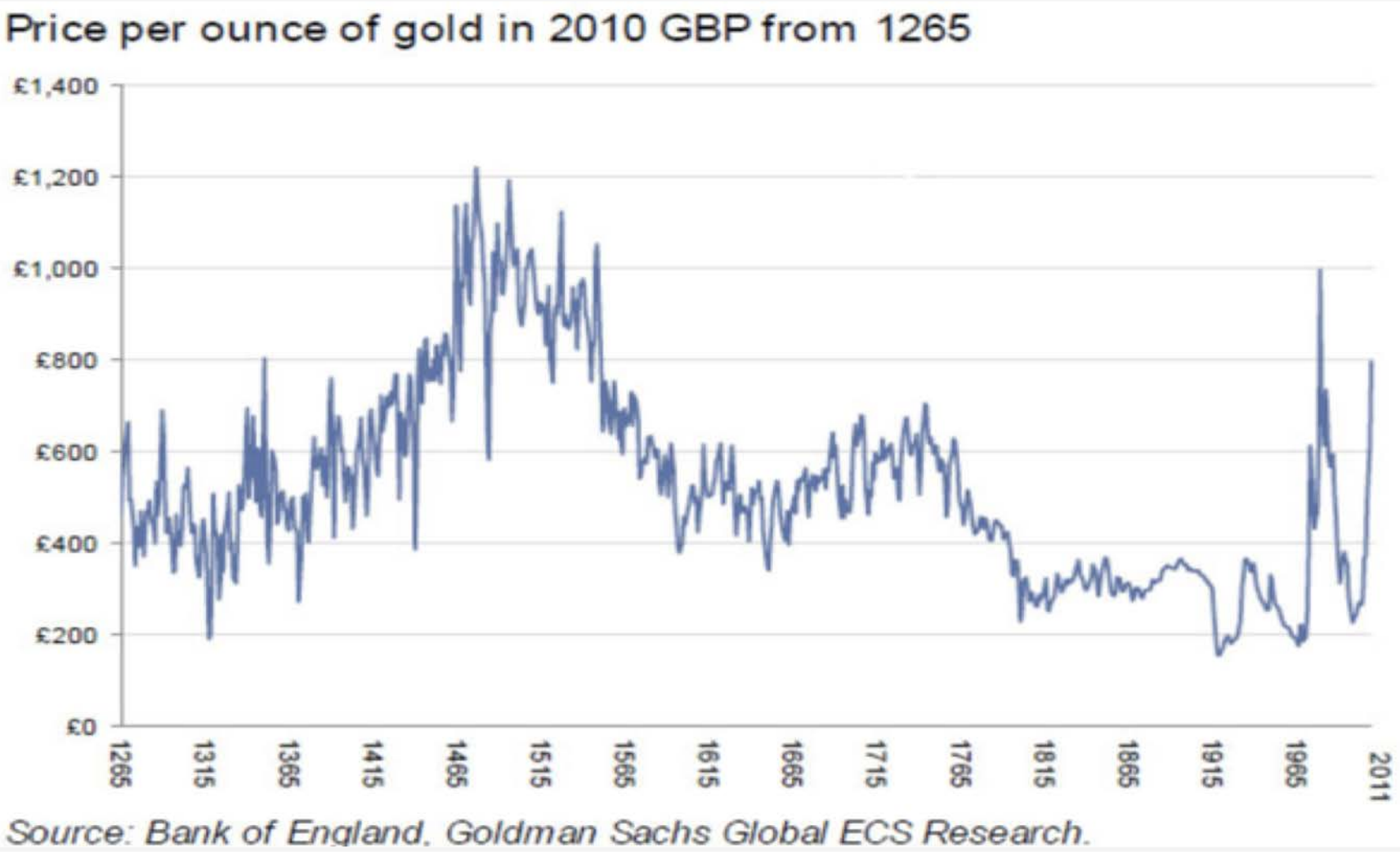
- Bitcoin is not an asset class: To those who are carving out a portion of their portfolios for Bitcoin, be clear about why you are doing it. It is not because you want to a diversified portfolio and hold all asset classes, it is because you want to use your trading skills on Bitcoin to supercharge your portfolio returns.
- You cannot value or invest in Bitcoin, you can only price and trade it: Any one who claims to value Bitcoin either has a very different definition of value than I do or is just making up stuff as he or she goes along.
- It will be judged as a currency: In the long term, the price that you attach to Bitcoin will depend on how well it will performs as a currency. If it is accepted widely as a medium of exchange and is stable enough to be a store of value, it should command a high price.

What next?

- Would I buy Bitcoin at $X?
  - No, but not because I believe that it is over valued, since I cannot make that judgment without valuing it and as I noted before, it cannot be valued.
  - It is because I am not and never have been a good trader and, as a consequence, my pricing judgments are suspect.
- If you have good trading instincts, you can play the pricing game, as long as you recognize that it is a game, where you can win millions or lose millions, based upon your calls on momentum.
  - If you win millions, I wish you the best!
  - If you lose millions, please don't let paranoia lead you to blame the establishment, banks and governments for why you lost.

Crypto Collectibles

The Original Collectible



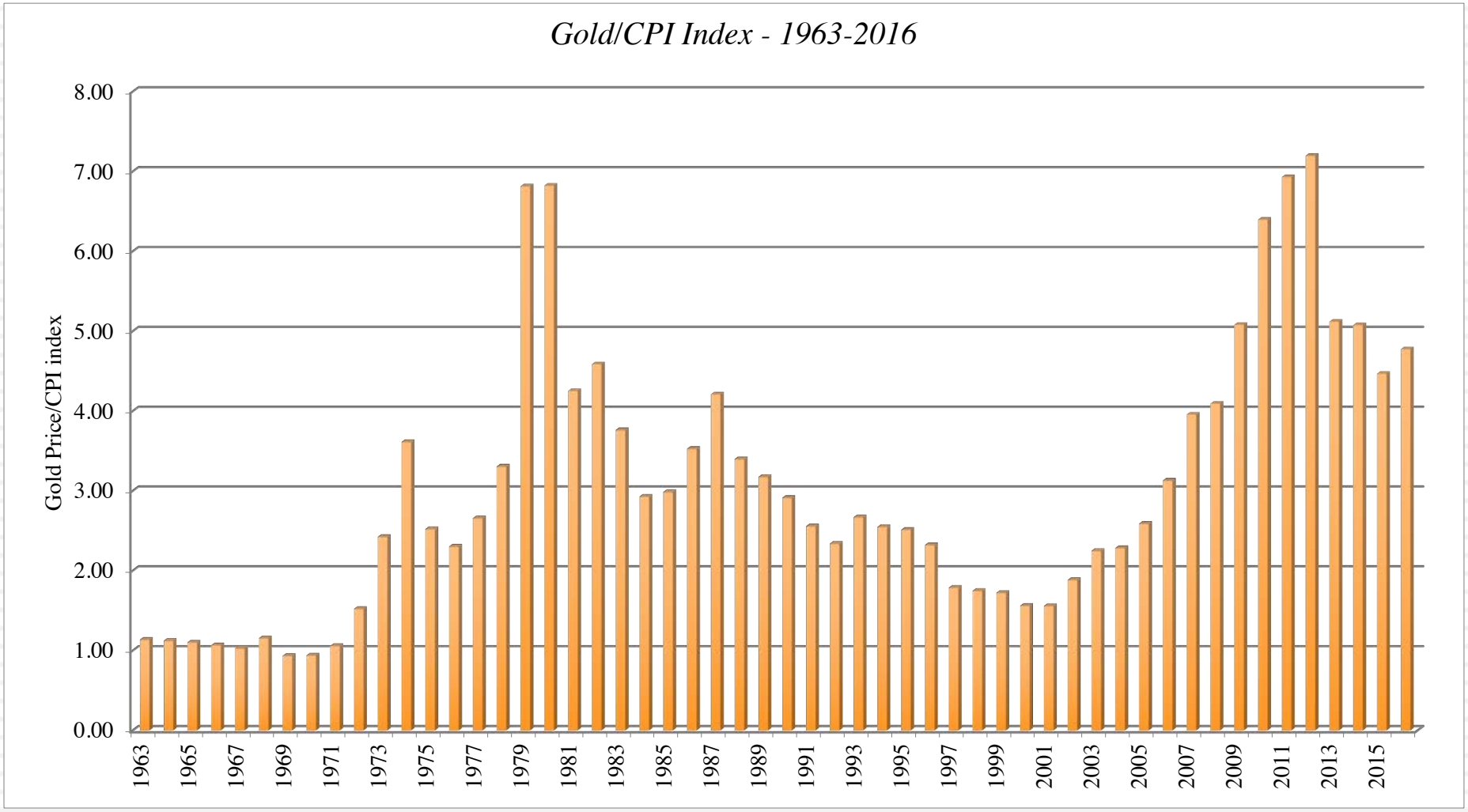
Why Gold?

- Rarity: It is not the rarest element (there are seven that are rarer including platinum and palladium), but it is rare enough that it holds its value.
- Physically: It is the most malleable and ductile of all the **elements** and a single gram can be beaten into a one square meter sheet of **gold** leaf. **Gold** has a very high density.
- Aesthetically: Because it is the most malleable and ductile element, it can be refashioned into aesthetically pleasing forms.

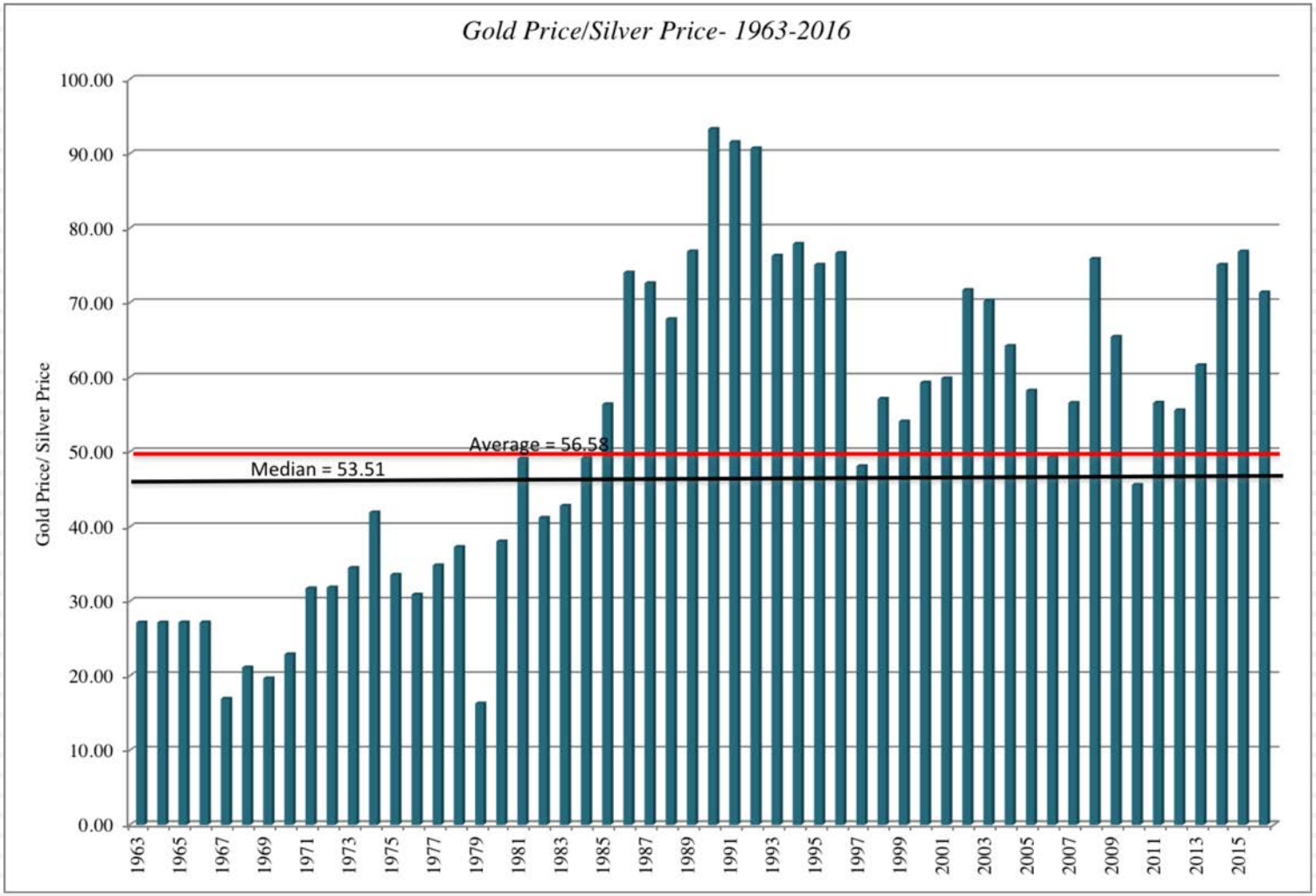
Valuing and Pricing Gold

- While there are some who claim to have models to value gold, it is not a cash flow generating asset and cannot be valued.
- Gold can be priced in one of two ways:
  - Relative to other fiat currencies
  - Relative to other precious metals (especially silver)

Gold and Fiat Currencies



Gold and Silver



Bitcoin: Millennial Gold?

- Is it rare?
  - The absolute limit that Bitcoin operates under does give it a measure of rarity.
  - That said, if you view Bitcoin as a crypto collectible, there is nothing to stop other crypto collectibles from being issued and flooding the market.
- Does it have aesthetic value?
  - Don’t know, since I have never seen it.
- Will it hold its value?
  - Your guess is as good as mine.

Crypto Commodities

Currency versus Commodity

- The essence of a currency is that its primary uses are as a medium of exchange or as a store of value. The key to a commodity is that it is an input into a process that has a utilitarian function.
- Oil and coal are clearly commodities, since they derive their value from the fact that they can be used to produce energy.
- It is true, as with currencies, that you can create an asset based upon a commodity. A share of an oil well is an asset not because you like or even need oil, it is because you hope to sell the oil to generate cash flows.

Bitcoin as Commodity: Why the arguments don't work…

1. Bitcoin is scarce
   - Argument: The algorithm imposed limits on Bitcoin effectively mean that it will be scarce and if it is scarce, it will have value.
   - Counter: There are lots of scarce items but if there is no utilitarian or aesthetic benefit, they will not be commodities.
2. Time and energy was spent "mining" Bitcoin
   - Since resources were expended in the production of Bitcoin, it must have value as a commodity.
   - Not really. Not unless you can point to it becoming useful as an input into producing something that we value.

A Commodity Argument for Crypto Currencies

1. Block Chains and Smart Contracts will create large disruptions in businesses: Block chains and the smart contracts that emerge from them will replace conventional contracts in many businesses, and that will generate cash flows to the contract providers.
2. Crypto Currencies are the lubricants for smart contracting: Crypto currencies are a necessary ingredient to make smart contracts work efficiently, and that the demand for them will then rise as smart contracting expands.
3. "Your" crypto currency will be one of the winners: Your crypto currency of choice (Bitcoin, Ethereum etc.) will become the winner or at least one of the winners, perhaps because it has the "best technology" for smart contracting or has the most buy in by the institutional players in the game.

The Crypto Commodity Bottom line

- While Bitcoin has more of the makings of a currency, some of its crypto competitors like Ethereum and Ripple have fewer pretentions about being universal currencies and are more tailored to making block chain transactions more efficient.
- If that is the selling point, you could consider valuing them as commodities, based upon demand for the crypto in question for smart contracting the supply of that crypto.
- To win at this game, you have to
  - Be technically savvy enough to identify what makes one digital currency better than another at smart contracting.
  - Think about whether there will be networking benefits that allow one digital currency to win this game.

Crypto Assets

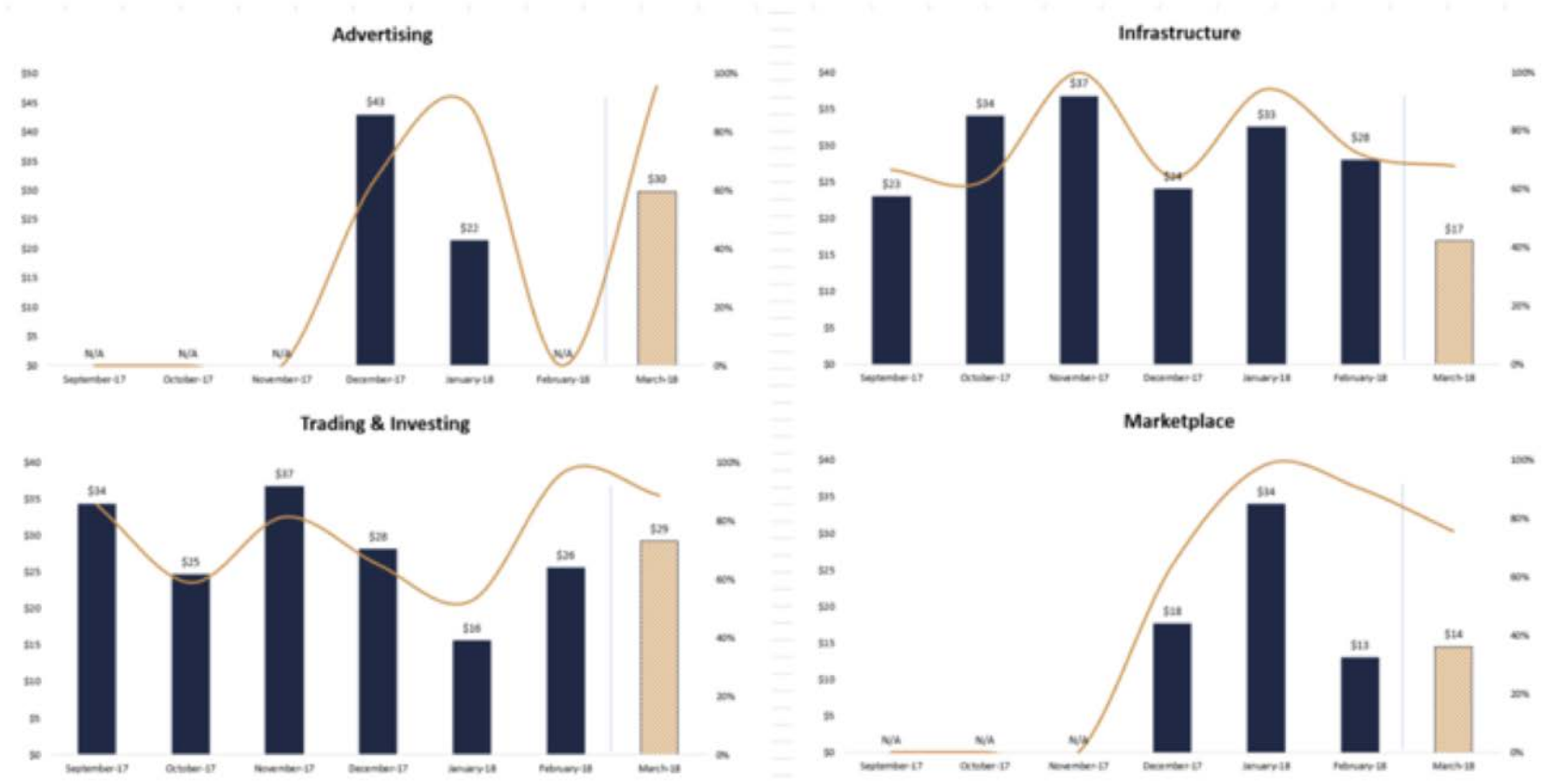
ICOs: The Magic of Tokens

1. Equity Tokens: You get a share in a company by buying equity tokens in the company.
2. Securities Tokens: These are a broader class of tokens, that can be redeemed for everything from precious metals to real estate.
3. Utility Tokens: A holder of this token can redeem it for products or services offered by the issuer.

It’s growing but still a very small market

Source: Satis Data

In a few businesses…



Source: Satis Data

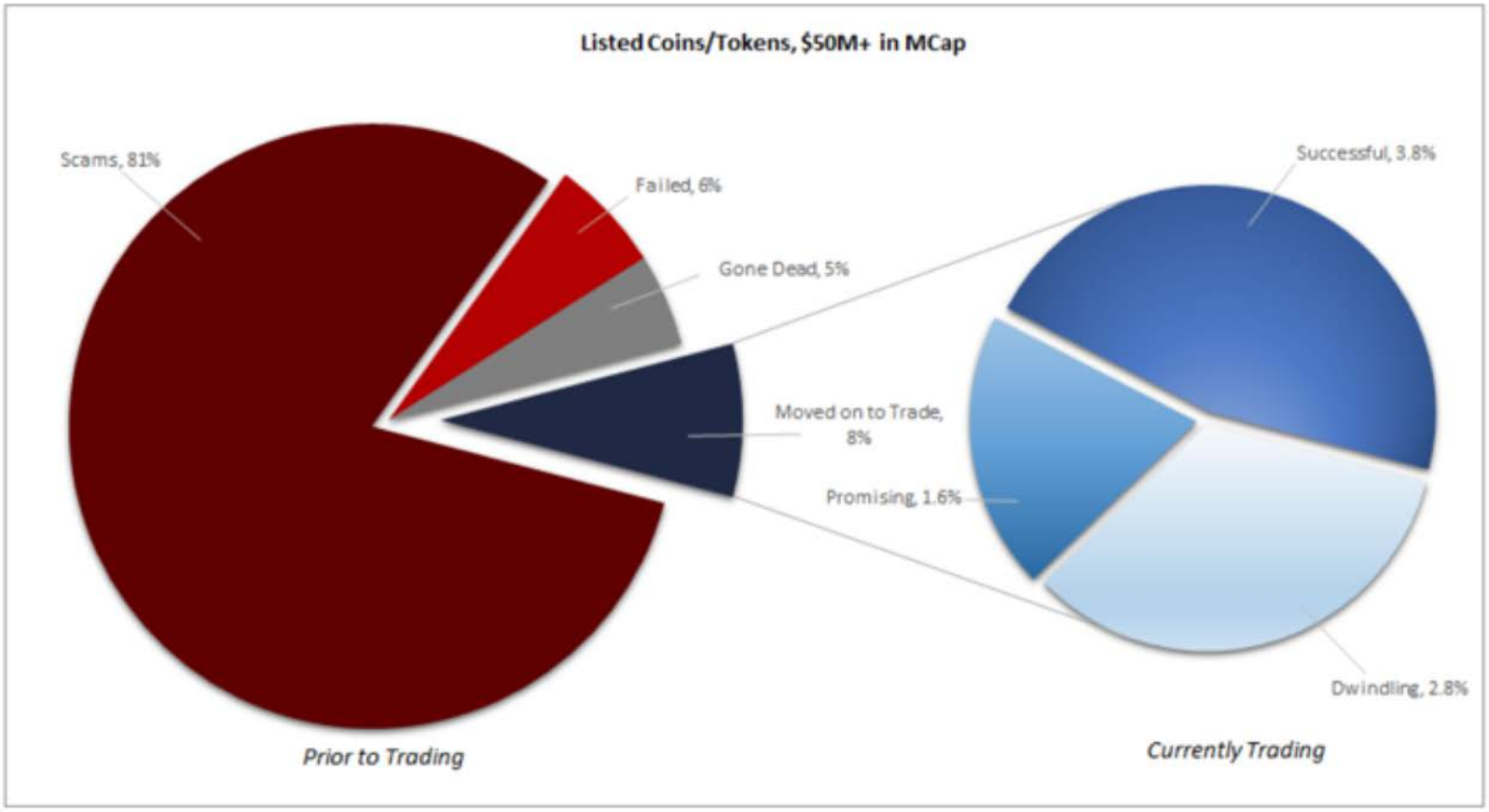
Equity Tokens

- If equity tokens mean what they say, i.e., they give you a share of a company's profits, they are assets and can be valued like any other assets, based upon expected cash flows, growth and risk.
- There are two problems:
  - Information Disclosure: Unlike a regular stock offering, where companies are required to file a prospectus and provide details, there is little or no disclosure in most parts of the world.
  - Corporate Governance: Unlike a conventional share of equity, where investors (at least in theory) get a say in who runs the company, ownership rights are diffuse in many digital issuances.

Leading to fiascos like this one..

- In July 2017, Tezos, a start up, raised $230 million to develop its own decentralized blockchain.
- Arthur and Kathleen Breitman, the couple who founded the company, and Johann Gevers, president of the foundation created to conduct the ICO and hold the investor funds had a falling out over what the Breitman viewed the funds to be.
- Kathleen Breitman told Reuters: "[P]articipating in the Tezos fundraiser was like contributing to a public television station and receiving a 'tote bag' in return. That's the same kind of thing here."

And lots of scams…



Sources: icorating, coinschedule, tokendata, icodata, coinscamlist, deadcoins, Satis Data

The Future?

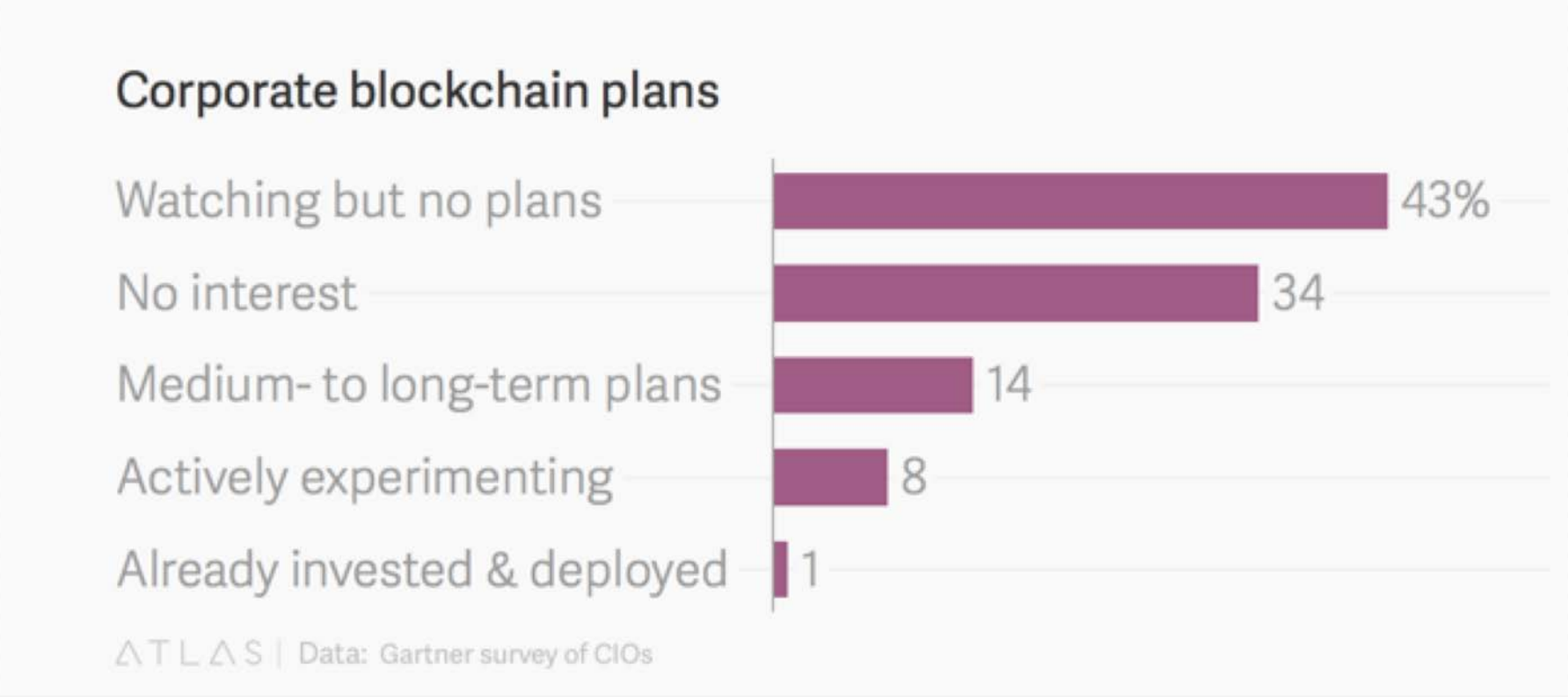
There will be a digital currency in the future…

- As we move towards digital payments, there is no reason why we cannot do so in digital currencies, which may be easier to work with and more efficient.
- That digital currency will need
  - More trust: A buy in or at least a tacit acceptance from governments and central banks.
  - More transparency: Which will require transparency on transactions and centralization (Nakamoto will not be happy.)
- It may or may not be one of the crypto currencies that are out there already.

Block Chains will survive

- Even if Bitcoin does not make it as a currency and other crypto investments struggle, the block chain technology will survive and perhaps prosper.
- The selling points for the block chain, as noted earlier, are
  - Decentralized checking of transactions (where multiple entities replace the status quo entities)
  - A more secure recording process (where tampering becomes more difficult).
- Those advantages notwithstanding, the hype may have run ahead of the reach.

Even though they are more promise than execution right now (in April 2018)



But only in some applications..

- Soft markets: There are intermediation processes, in financial services and elsewhere, where the current intermediation process is flabby, either by design or because of inertia, and block chain can deliver the same intermediation for less. (Example: bank wire transfers in the US)
- Digital opportunities: There are other processes, where trust now requires physical intermediation (bankers, lawyers, agents,) where digitalization will make block chain more efficient. (Example: real estate sales).
- Full records: With processes, where there are multiple stops along the way, where data has to be recorded (long supply chains), a block chain will be able keep records of every step.
- Lack of trust: There are markets where the intermediaries and the recording process are not trusted, where block chain can introduce trust.

Conclusion

- Go back to basics: As you listen to arguments for or against crypto currencies, my only advice is that you go back to basics about the needs that they are filling and that you ask questions about their long term staying power.
- Block Chain ≠ Crypto currencies: It is time for us to separate arguments about block chains/smart contracts from arguments about crypto currencies, since you can have one without the other.
- Not all crypto investments are the same: It is also time that we differentiate between crypto currencies, rather than defend them or abandon them all, as a bundle. Bitcoin, Ethereum, Ripple and ICOs are different enough from each other, not only in structure but also in terms of end game, that they need to be assessed independently.