Bitcoin Valuation & Fundamentals

> Part I: Total Addressable Market

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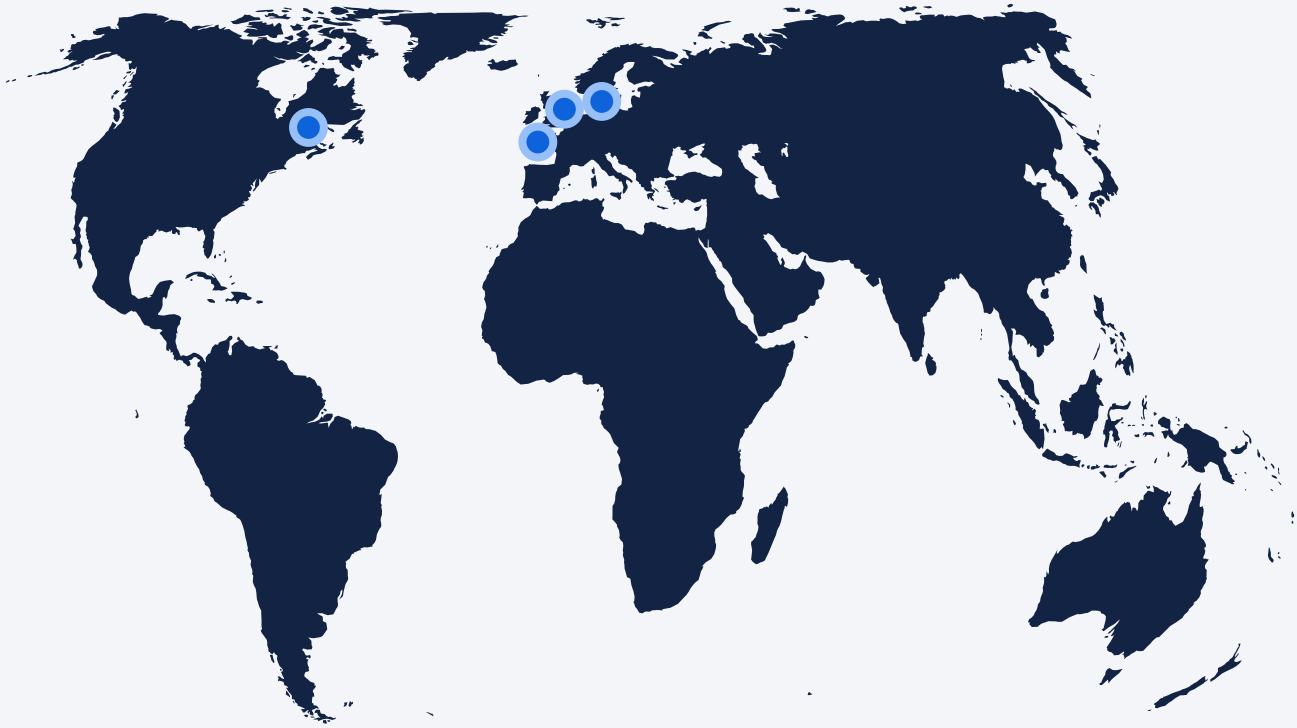

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The CoinShares Group is a pioneer in digital asset investing and manages assets on behalf of a global investor base, with offices in Jersey, Stockholm, London, and New York.

We launched the world's first regulated bitcoin investment fund in 2014 and offered the world's first bitcoin-based securities on a regulated exchange in 2015.

Our products & services include Europe's largest exchange-traded product (ETP) digital asset platform with approximately $1.6bn of assets under management as of December 2020.

We believe expertise in both traditional and crypto markets is required to take full advantage of the opportunity that digital assets represent.

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PREFACE

Before we begin our consideration of techniques for valuing bitcoin it's worth exploring the current state of thinking in established asset classes.

When asked about valuation metrics for traditional assets, one portfolio manager said:[1]

> *"Net Present Value (NPV) is a framework, which is correct if the assumptions are correct. So you can price a government bond with precision, because there aren't many moving parts. You can value a corporate bond with precision too, although the valuation of credit risk is trickier. And you can value tranches - again, with increased difficulty given the non-linearity of tranches. But you can apply the NPV framework. For equities it gets harder still because there are even more moving parts. NPV isn't precise, but it's still the right framework, or at least the best one there is."*

By way of example, let's consider Apple – the world's first company to achieve a $2tn market capitalization, and therefore presumably pretty well modelled. According to Bloomberg, 35 analysts covering this company have provided a price forecast in the last six weeks (since 1 December 2020). The average forecast stock price is $125 (compared with current price of $119) but the range is $35 to $150[2].

Just in case you think this is an isolated example of a hard-to-measure business like Apple, how about Sainsbury's, the UK supermarket chain? What could be more boring and easy to model? There too, the range of price forecasts over the last six weeks covers 180p-270p with an average of 233p vs a current market price of 215p.[3] Not much of an exact science.

Now, it's clear that NPV is fine as a model for valuing assets that generate cash-flows but it can't be used for assets that do not generate cash-flows, such as commodities. Commodities are generally modelled instead by looking at supply/demand balances, marginal cost curves, the potential for demand substitution and so forth. Each input into these models has some uncertainty associated with it, and as a consequence the net supply/demand balance (and therefore price) is highly sensitive to relatively small changes in those inputs.

Take Palladium, for example: the LBMA panel forecasts for average 2020 prices ranged from $1575 to $2550 (published when Pd prices were $2065 in Jan 2020).[4] Since historical volatility is around 40% for this metal, the forecasts fit pretty neatly into the 'bell curve' of what is

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[1] Dylan Grice, Calderwood Capital, Personal Interview, 29 September 2020

[2] Bloomberg, 1 December 2020

[3] Bloomberg, 1 December 2020

[4] LBMA, January 2020, www.lbma.org.uk/downloads/Forecast-2020.pdf

likely to happen if prices follow a random walk. Perhaps that's to be expected if 'all the information is already in the market.'

Our point is this: in established asset classes there are widely agreed models and techniques for producing a price independent 'value', but the value in these valuation models is limited when there is reasonable disagreement regarding the right inputs – not to mention when the models produce unhelpfully vague outputs. And so an agreed model is not what we are aiming for. Rather it is a tool in pursuing our aim.

As bitcoin matures, our understanding of it, its potential, and its likely future price continues to mature as well. Our aim here is to participate in a conversation that has been ongoing since the beginning of bitcoin and our first step in joining that conversation is to lay out some important concepts and truths that underpin our approach to this topic and support our thesis.

For many, this discussion will appear to be familiar but we have found that these concepts are not yet well embedded in conversations about bitcoin. And even though the arguments we make are actually rather simple, it is still critically important to get them properly ordered and contextualised if we are to actually extract any value from them. Pun intended.

We will begin by laying out the fundamental way we approach this problem and how it leads us to our current thesis. Next, we review some prominent suggestions that have come before us for how to approach the question of bitcoin's value. We believe it is important to understand why these various models were put forward, what they get right and also what they get wrong.

The discussion is split into several parts:

- **Part I** is about monetary competition and the Total Addressable Market for Bitcoin. It discusses the function of money, the items competing to fulfill it, the properties they bring to bear, and how context affects the way they are valued relative to each other.
- **Part II** we title Valuation & Bitcoin Supply. Here, we consider the supply dynamics of bitcoin and discuss models that focus solely on this factor.
- In **Part III**, you guessed it, we look at valuation and bitcoin demand and the models that have been able to tell us some true things about the characteristics of the demand side of the equation.

Finally, in an open-ended series of subsequent blog posts, we'll look at the balance between market supply and market demand, and some of the metrics and methodologies that touch on important kernels of truth regarding the ways they ebb and flow within the context of bitcoin.

Consider this series to be CoinShares' primer on valuing bitcoin. Hopefully this will set you, the reader, as it has us, the writers, on a path towards asking better questions and arriving at better answers about bitcoin, its present and its future.

CHAPTER I > MONETARY COMPETITION & TOTAL ADDRESSABLE MARKET

Welcome to the most hotly debated topic in the bitcoin industry. The mere fact that you've picked up this paper means you're likely already curious about the biggest question in the Bitcoin industry: what, if any, is the value of a bitcoin, what *could* it be in the future, and how does this compare to its current market price?

The debate is most certainly not lacking in opinions, and these days just about everyone seems to have one. The intellectual spread is *huge*, and there is no shortage of strong categorical claims being made with regards to what bitcoin is or is not.

> *"Bitcoin is a fraud that will ultimately blow up."*
> *- Jamie Dimon, CEO JPMorgan Chase*
>
> *"[Bitcoin] basically [has] no value and [doesn't] produce anything."*
> *- Warren Buffett, CEO Berkshire Hathaway*
>
> *"Bitcoin is not money."*
> *- Axel Weber, Chairman UBS Group*
>
> *"[Bitcoin] may hold long-term promise."*
> *- Ben Bernanke, Former Chair of the Federal Reserve*
>
> *"[Bitcoin is] the best money ever created."*
> *- Michael Saylor, CEO MicroStrategy*

Whatever you may believe regarding the accuracy of these statements, it is clear that their radical difference is a symptom of widespread confusion. Not only about Bitcoin itself, what it does and how it functions, but also about the uses bitcoins currently have and, even more importantly, the use they may be put to in the future.

This is not as surprising as one might first think. To most people Bitcoin and how it functions is new and unconventional and the ecosystem that has grown up around it is perhaps no less so. The mental framework necessary to study it is dissimilar to almost all other assets making gainful analysis more difficult and time consuming than people are used to.

But our subject matter is not to detail how Bitcoin (upper case B for the protocol and network) functions or explaining how bitcoin (lower case b for the asset) trades, settles etc. Our subject is establishing a value or, as we'll make clear, an expected *future* value of bitcoins. This is harder than it might first appear.

To begin, we have to establish some quite clear foundations about what Bitcoin is, what bitcoins are, what makes them valuable now, and finally, what sorts of reasons might make them valuable in the future. With these things firmly established in our minds, we can start to ask *the right* questions about valuing bitcoins, allowing us to avoid a whole range of bad analogies, misfit models and misunderstandings.

So let's dive in...

CHAPTER II > BITCOINS WERE CREATED TO FUNCTION AS MONEY

The creator(s) of Bitcoin were fairly clear about their intentions: Bitcoin would be a *non-sovereign independent peer-to-peer payments system*, supporting a cash-like internet-native asset, bitcoin, designed to fulfil the functions of money. Bitcoins then, are best thought of as representing the potential for the holder to settle a transaction on the Bitcoin network.

This intention, for the network and protocol, is reflected in the fixed, or immutable, properties of bitcoins:

- They are fundamentally scarce with a strictly limited supply and an exponentially decreasing production rate;
- Their price elasticity of supply is effectively zero;
- They are bearer assets;
- They have extremely low transfer friction and can be transacted peer-to-peer over telecommunications channels such as the Internet;
- They are fungible;
- Easily verifiable;
- Impossible to forge;
- Highly divisible;
- They cannot be confiscated, and;
- Their usage cannot be meaningfully restricted without incurring a perpetual cost on the part of the censor.

All of the above properties are ones that, when embodied in certain items, make them well-suited for use as money.

Section statement: Bitcoins will become more valuable in the future than they are today, because they will become more valuable as money.

Key takeaway: To understand the future value of bitcoins, focus on their potential future use as money.

Immediately, this raises the question of what money actually is, and then, how a specific money could become more valuable than it already is.

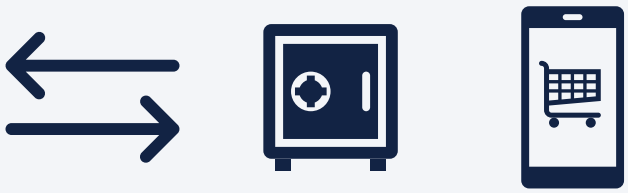
CHAPTER III > MONEY IS AN ITEM FUNCTIONING AS STORE OF READILY CONVERTIBLE PURCHASING POWER

Money has been described and categorised in a whole host of different manners and at length, but the simplified way we look at it is as follows: Money is a *function* an item can perform. It is not an inherent *property* of an item or class of items. That means that one cannot say categorically that one item is money and another is not. It is a spectrum.

When we say 'a US Dollar *is money*' what we mean is that a US Dollar is being used by a group of people to fulfil their need for the function of money. The extent of that use is its success as money which, in turn, depends on its properties within various contexts of use.

As an example to the contrary, we of course all know that certain items such as air or sand are not presently and probably have never been used anywhere as money. This is not because they categorically *cannot* be used as money, it is because they would both be absolutely awful at fulfilling the function of money and are therefore not used as money.

Since the time of Adam Smith, money has traditionally been defined as a three-part function. To be money, an item must function as:



1. A medium of exchange;

2. A store of value, and;

3. A unit of account.

Out of these three we believe the first two are actually the same function, and would argue that the third is a convenience rather than a necessity. Let's unpack that a bit.

Examining the first function in more functional detail, an item used as a medium of exchange is one that is used for short-term liquidity needs. It is an item one uses to cover short-term liabilities such as immediate purchases. For it to successfully do so, it needs to be readily exchangeable for other goods and services on short notice. In other words, it must at least be able to store value[5] over a short period of time.

Let's then look at the second function. In this context, what is meant by an item functioning as a store of value is that the item is used for long-term liquidity needs. In other words it is an item one uses to cover longer term liabilities. Therefore the item needs to be readily

[5] This is of course a figure of speech. Value is a subjective and impermanent perception which cannot be stored. So the term 'store of value' is intended here to describe an item's historical and perceived future ability to retain its exchange ratio against other goods and services.

exchangeable for other goods and services *at some unspecified later time*. For that to be possible it must be able to store value over a longer period of time.

Clearly, the medium of exchange function and the store of value function *is the same function*. The only difference between the two is the time scale.

As for money supposedly having to function as a common unit of account, we would argue that this is a convenience, not a necessity. An item, such as gold, can function as money without being a unit of account. But an item, such as sand or the Zimbabwe Dollar cannot function as money without the ability to store value.

Fundamentally then, *the primary function of money is acting as a store of readily convertible purchasing power throughout time*.

Section statement: Bitcoins become more valuable as money when they become better stores of readily convertible purchasing power.

Key takeaway: To evaluate the increasing usage of bitcoins as money, focus on their potential use as a store of value/medium of exchange.

Let's now look at the factors which drive an item's potential for use as money into actual use as money.

CHAPTER IV > ITEMS COMPETE FOR USE AS MONEY BASED ON THEIR PROPERTIES IN CONTEXT

Many items both can and have been used to store liquid purchasing power across time. Human history is full of examples of a wide variety of items, most often commodities, being used as money.

But even though any item *can* be money, very few items are actually well-suited to serve the functions of money. This is because items differ in their properties and it is an item's properties which makes it more or less suited for functioning as money. The table below summarises and briefly describes some common properties among items historically used as money:

Common Monetary Properties (Non-Exhaustive)

Property	Description
Saleability (scarcity)	The ease with which a holder can dispose of an item in the market
Durability	The resistance of an item to the degrading forces of nature and time
Fungibility	The degree of equivalence of any two units of the same item
Portability	The ease with which an item can be transported through space and time
Verifiability	The ease with which a receiver can verify the authenticity of an item
Transactability	The ease with which a holder can transfer an item to another holder
Unforgeable Costliness	The scarcity of an item and its provable expense of production

Source: CoinShares Research

We break down the grounds on which users judge a given item's attractiveness for use as money into three separate categories:

1) **Fixed properties.** A fixed property is one that is inseparable from the item itself and true regardless of context. In the case of gold, its fixed properties are those that result from the laws of nature, such as its physical and chemical properties. Examples include its atomic number, absorbance (colour), density, chemical reactivity, etc. If those properties were to change, the substance would no longer be gold. In the case of bitcoin, its fixed properties are those that are set in stone by the protocol, such as the 21m limit, its cryptographic ownership enforcement etc. If those properties were to change, the asset would no longer be bitcoin.

2) **Relational properties.** A relational property is one that can change, either based on context or any other external impetus. An example of a relational property of both gold and bitcoin is their market volatility. Market volatility is not a fixed or unchanging property. It will vary depending on usage, market depth, sentiment etc. If more people engage in the trade of gold, its liquidity will increase, and vice versa. Interestingly, all properties of fiat monies[6] are relational, meaning that they are all liable to change.

3) **Context.** Context doesn't change the properties themselves but can instead change the way people value properties relative to others. An example of a contextual change would be a positive change in the performance of the US economy relative to e.g. that of the UK. In this instance, US interest rates would be likely to exceed those of UK interest rates and this would cause flows from GBP to USD. Another example might be increased financial repression within any given area. Such a change would lead people to value a censorship resistant money higher relative to a censorship vulnerable one (and perhaps also the opposite if and when repression is liberalised). Neither of these contextual changes have altered the properties of the monetary items, only the way they are valued relative to each other.

Summing up the above, relational properties can improve or deteriorate with human action, whereas fixed properties cannot. And adding to that, a change in context can alter the way users value properties, both fixed and relational, relative to others.

When buyers choose to store their value in gold as opposed to US Dollars, they do so due to the properties gold has which US Dollars do not, all within the context of the individual buyer. Over time, the relational properties of gold may fluctuate, but its fixed properties will remain the same. In addition, contextual changes will change how these properties are valued against the properties of the US Dollar (all of which are relational).

The same is the case for investors choosing to store their value in US Dollars instead of whatever local monetary item happens to be the local legal tender. In this instance, it is easy to observe that relational properties such as the US Dollar's liquidity depends heavily on where the user happens to be – within the US, Dollar liquidity is excellent, in the UK, much less so.

In this same exact manner, all items used as money compete based on their properties within their individual contexts of use.

Section statement: Bitcoins will become more compelling stores of convertible purchasing power if:

Their fixed properties continue to make them suitable to function as money, and;

[6] Except the physical properties of existing coins and notes, which, for all intents and purposes do not actually differ between fiat monies, and are therefore irrelevant to this discussion.

Their relational properties such as liquidity and volatility continue to improve, or, the context in which they compete makes their characteristics more desirable, relative to the competition.

Key takeaway: To estimate future value of bitcoins, first understand these properties (both fixed and relational), the ways they are likely to improve or deteriorate, and the way context can change users' relative valuation thereof.

Holding any specific type of item as a monetary store of value is expressing a liquidity preference based on the most desirable properties on offer within a certain context and market. And even though most modern monies enjoy monopolistic protections through legal tender laws within their jurisdictions, they are still subject to competition from other monies – such as gold, silver, bitcoins, Swiss Francs, US Dollars, etc. – whose properties and international availability often make them globally desirable.

In the case of bitcoin this is particularly interesting because bitcoins have properties that are unique among all other competing monies. Such properties include absolute scarcity, censorship and confiscation resistance, strong privacy capabilities, and peer-to-peer transferability over the Internet. This means that demand for the combined properties of bitcoins cannot be filled by any other single competing money.[7]

Precisely *because* bitcoins embody the properties they do, properties that make them particularly well-suited for use as global money, in less than ten years bitcoin has already established itself as a nascent yet serious contender in the global competition among items functioning as money.

Section statement: Bitcoins' fixed properties are highly unique amongst existing global monies and its relational properties are difficult to replicate/build.

Key takeaway: To estimate future value, consider where and why these unique fixed properties may drive increased demand.

[7] It's important to note here that while bitcoin's fixed properties may be seemingly trivial to copy, copying the combination of relational and fixed properties is not.

CHAPTER VI > THE VALUE OF BITCOINS IS IN THEIR FUTURE EXCHANGE VALUE

Because bitcoins are a monetary type of asset with no appreciable alternative use,[8] their value lies entirely in their *future exchange value*, measured in terms of other monies, goods or services. Any *use value* apart from exchange use is effectively an insignificant addition and can be disregarded for the purposes of this discussion. But estimating the future exchange value of any item is a tricky issue.

Part of what makes it difficult is that the amount of wealth available to trade for money is a crucial factor in determining the total exchange value of that money. This is a complex equation and both its sides can and do move. There could be more money chasing less wealth, more wealth chasing less money, or any combination thereof. For example, technological improvement can drive prices down, just as monetary inflation can drive them up. As a result, no silver-bullet methodologies exist for ascertaining the future exchange value of any current money.

Section statement: The anticipated future value of bitcoins is defined in terms of the goods and services (or other assets) for which they can be exchanged, making future price in terms of current purchasing power the focus of our enquiry.

Key takeaway: Bitcoin has no appreciable utility as anything other than money, therefore, for all intents and purposes, its entire future value is in its exchange value.

[8] Although to be fair you can absolutely wear an OpenDime on a chain as swag.

CHAPTER VII > DEMAND FOR MONETARY ITEMS CAN SHIFT WHEN THEIR PROPERTIES CHANGE

When context changes, the relational properties of items can also change alongside it. For example, simply moving from one jurisdiction to another can drastically reduce the liquidity of most government monies. Moving in time from one part of the economic cycle to another can drastically change the total demand for and price of money itself. Moving in time from one technological era to another can drastically change the total amount of wealth available for exchange against money.

On the one hand, if properties such as liquidity and volatility can improve with usage, this means that increased usage in itself can improve an item's ability to function as money. On the other hand, if properties such as total supply, transaction friction, or privacy protection are not immutable and can change for the worse, this can cause a deterioration in an item's ability to function as money.

This also means that demand for a new type of money will likely increase if overall its properties change for the better. Likewise, demand for an old type of money will likely decrease if its properties change for the worse. For any item competing as money, it is therefore crucial that its most beneficial properties are as fixed as possible whereas its least beneficial ones have the ability to improve.

Section statement: At CoinShares Research, our thesis is that bitcoin's relational properties such as liquidity and volatility will continue changing for the better, making it increasingly capable of fulfilling the function of money. Simultaneously, its fixed/immutable properties such as its fixed supply and cryptographic ownership protection will remain fixed, causing no deterioration in its ability to function as money. Adding to that, the context in which most users find themselves may also end up changing in bitcoin's favour.[9]

We believe bitcoin's fixed properties are its most beneficial ones whereas its relational properties are the ones that need to improve. Any contextual change would amount to an added bonus. All of these factors taken together suggest that bitcoin will continue to absorb an increasing share of the global demand for money.

[9] Several existing researchers (Winklevoss Capital, Kraken) point to contextual change as the most likely primary driver of increased bitcoin value. While we don't doubt that such contextual changes may continue to favour bitcoin's properties and that this could impact its price positively, our argument is that this is a sufficient, but not a necessary condition for the value of bitcoins to increase.

Key takeaway: Bitcoin has excellent fixed properties, its less beneficial relational properties are continually improving and there is an added chance that changes in context turn out in bitcoin's favour.

With all this in mind, let's have a look at the current magnitude of some of the monetary demand bitcoin is eating into.

CHAPTER VIII> WE CAN ESTIMATE FUTURE MONETARY DEMAND BASED ON CURRENT MONETARY DEMAND

A reasonable and practical way to estimate the size of long-term future demand for money is to look at the current demand for money[10] and assume the two will be similar. In other words, we make an attempt to sum up the current global total demand for money and make the assumption that future demand will at the very least not be smaller than current demand.

This type of estimation models the *potential* future demand of bitcoins, not the *expected* demand. That said, potential future demand is a necessary condition for any expected future demand.

We can therefore use this type of estimation as a first step to establish a likely upper bound of future possible bitcoin exchange values.

[10] In this context it is important to remember the point we made in a previous section: It is the purchasing power of a money that determines its value, not its exchange ratio against some other item.

All things being equal, an asymmetrical transfer of value from one monetary asset to another, especially (as the FCA lucidly remarked in CP 19/22) from one whose supply is unlimited (a soft asset) to one whose supply is limited (a hard asset), will ultimately drive the exchange ratio of the hard asset in terms of the weak asset, to infinity.

The possibility therefore arises that in the end, no amount of soft money would entice any holder of hard money to enter into an exchange, leading to an infinite soft-money-denominated exchange ratio. Yet this tells us nothing of the exchange value, or purchasing power, of any amount of the hard money at such a time.

This highlights that exchange rates between items are not interesting outside of the context of purchasing power, and we therefore need to hold the US Dollar measurement unit fixed to its current purchasing power when we are estimating asset values to perpetuity.

CHAPTER IX > A TOTAL ADDRESSABLE MARKET (TAM) MODEL FOR MONETARY BITCOIN DEMAND

Estimating the size of current global monetary demand, that is, *demand for readily exchangeable purchasing power*, can be done by looking at the value of pools of monetary assets that currently fulfil that function. Four such pools are: above-ground gold; central bank foreign exchange reserves; treasury assets held by the 3,000 largest listed companies; and, global M2.

We believe the total size of the above value pools represent a solid estimation of an upper limit to the future value that could accrue to bitcoin, although we fully acknowledge that this does not represent all current monetary value, nor all possible demand that might at some point flow into bitcoin. And while it is not likely that bitcoin will absorb the entirety of any of these four value stores, it does compete against all of them for use as money, and can therefore draw market share from any of them.

Applying a TAM model rests on four separate assumptions which we will evaluate separately:

- The first assumption is that bitcoin is being used as 'digital gold' and that it is therefore capable of replacing some or all of gold's use as a monetary store of value. We see this evidenced by increasing use of bitcoin as a store-of-value asset (more in this report), and it is likely that at least some current holders of bitcoin have made their investment decisions based on similar rationales as some investors in gold.

- The second assumption is that bitcoin will be used as a reserve asset by central banks continuing to issue their own currencies on top of a set of monetary reserves consisting of gold, foreign exchange and bitcoin. At present, no central bank has a direct known exposure to bitcoin as a part of their FX reserves, and so the current market capture in this segment is zero.

- The third is that bitcoin is being used by individuals and corporations as a long-term liquidity store or treasury asset, and that it is therefore capable of replacing some or all of competing monetary store-of-value assets such as US Treasury Bonds. We're already observing the first public instances of this type of use with the recent bitcoin purchases by MicroStrategy, Mode, and Square (see overleaf).

Known Bitcoin Holdings of Listed Funds and Companies

Sector	Entity	Source	Bitcoin (in USD)
Fund	Grayscale Bitcoin Trust	Bloomberg	$10,124,968,200
Fund	CoinShares / XBT Provider	Bloomberg	$1,181,302,432
Public	MicroStrategy inc.	250M Aug,175M Sep 2020, Learn How	$742,050,000
Public	Galaxy Digital Holdings	$134M on Jun-30-2020	$323,029,400
Fund	3iQ The Bitcoin Fund	Bloomberg	$303,104,100
Fund	Stone Ridge Asset Management LLC	Oct 2020 Ann. BTC @ NYDIG	$211,231,688
Fund	Other funds	Bloomberg	$166,971,348
Fund	ETC Issuance GmbH	Bloomberg	$219,115,779
Fund	21Shares AG	Bloomberg	$69,208,373
Public	Square inc.	50M,Bitcoin Investment Whitepaper	$91,354,600
Fund	WisdomTree	Bloomberg	$102,196,100
Public	HUT 8 MINING CORP	Q2 2020	$57,307,600
Public	Voyager Digital LTD	March 31 2020	$24,036,600
Public	Riot Blockchain, Inc.	$7.2M on Jun-30-2020	$20,428,200
Public	Bit Digital, Inc	SEC Filings	$18,420,300
Public	Coin Citadel Inc	December 2015 report	$9,952,200
Public	Advanced Bitcoin Technologies AG	Q1 2018	$4,923,720
Public	DigitalX	215 BTC 2019	$4,171,000
Public	Cypherpunk Holdings Inc.	$1.63M on Jun-30-2020	$3,938,200
Public	BIGG Digital Assets In	SEDAR Reports	$2,774,200
Public	Argo Blockchain	September, 2020	$2,444,400
Public	Hive Blockchain	31 March 2020 financial statements	$1,484,100
Public	FRMO Corp.	March 21, 2020	$1,218,320
		Total	$13,685,630,860
		Share of Bitcoin market	4.1%

Sources: See Table, CoinShares Research. Data available as of 15 December 2020

- The fourth, and by far most wide-reaching assumption is that bitcoin is being used as a generic savings or store-of-value product and is therefore capable of taking market share from global M2. This last assumption has some overlap with the previous assumption and so their results should not be taken as additive.

In the end, bitcoin may end up assuming none or all of the above roles at different times and to various extents.

We think the predictions of the TAM model are best represented as a matrix. The four rows representing each of the addressable markets in question and the corresponding columns representing the percent market share captured from these markets by bitcoin.

Two separate matrices are shown, one showing total market cap achieved (in US$tn) and the other showing the bitcoin price this would correspond (in US$/btc) to assuming full issuance (and no unspendable coins) of btc 21m. We are aware that this over-projects the total amount of future spendable bitcoins, but we prefer being conservative over making assumptions of unspendable coins.

As our total addressable market values we use the following numbers:

1) **Gold**–US$ 11.2tn, calculated from 198,000 tonnes above ground (World Gold Council, Dec 2019) at a price of US$ 1,763/troy ounce (ICE, 30 November 2020)
2) **Central Bank Fiat Reserves**–US$ 12.36tn (IMF, Dec 2018)
3) **Total treasury assets held by top 3,000 listed companies**– US$ 19.8tn (Bloomberg, September 2020)
4) **Global M2**–US$ 95.7tn (CIA, Dec 2017).

TAM Model Results

		Bitcoin Market Cap Capture of Current Value (US$tn)					
	TAM Value (US$tn)	1%	2%	5%	10%	25%	50%
Gold	11.22	0.11	0.22	0.56	1.12	2.81	5.61
Central Bank Reserves	12.36	0.12	0.25	0.62	1.24	3.09	6.18
Treasury Assets	19.80	0.20	0.40	0.99	1.98	4.95	9.90
Global M2	95.70	0.96	1.91	4.78	9.57	23.92	47.85

		Bitcoin Market Cap Capture of Current Value (US$/btc)					
	TAM Value (US$tn)	1%	2%	5%	10%	25%	50%
Gold	11.22	5,343	10,686	26,715	53,429	133,573	267,146
Central Bank Reserves	12.36	5,888	11,776	29,439	58,878	147,195	294,391
Treasury Assets	19.80	9,429	18,857	47,143	94,286	235,714	471,429
Global M2	95.70	45,570	91,141	227,852	455,705	1,139,261	2,278,523

Sources: CIA, IMF, WGC, ICE, CoinShares Research

When compared to other competitors for global monetary functions, it is clear that bitcoin's inroads into these markets thus far is miniscule. At approximately US$350bn (1 December 2020), the market capitalisation of all bitcoins is still less than 4% of its closest sized competitor: gold. Increasing that market capture to a mere 5% suggests a bitcoin price of nearly $27,000.

In other words, bitcoin has an extremely long way to go before it can lay claim to a significant fraction of the market share of global monies. At the same time, even small flows from competing monies into bitcoin could have a large impact on the still comparably tiny bitcoin market.

From a valuation perspective this gives bitcoin a large potential upside even if the exact extent of the upside is unknowable in advance. The global market for money is one of the largest in the world and the potential benefits for holders of successful monetary assets is significant.

On the whole, we believe these TAM model results are straightforward and easy to understand. Moreover, their inputs are well known and easy to source. Their main drawback is that results are highly sensitive to assumptions, but so are most valuation models relying on an unknowable future with large degrees of uncertainty.

CHAPTER XI > THE ROAD TO MONETARY DOMINANCE IS LONG AND FRAUGHT WITH OBSTACLES

Even though we do believe there is a significant upside potential to owning bitcoins, the road to monetary dominance is long, uncertain, and dependent on a whole host of ever-changing factors. In fact, and as we'll cover in the next parts of this series, most bitcoin valuation frameworks target the shape of the road ahead more than they target the destination.

Over the next few parts we will take a closer look at some of these frameworks, what they try to achieve, how, and to what extent we believe they succeed or fail. We will begin with the topic of bitcoin supply, and what is perhaps the most famous of all bitcoin valuation models: The fully supply-driven Stock-to-Flow, and Stock-to-Cross-Asset-Flow Models.

Questions?

Get in touch at research@coinshares.com

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