

Crypto Assets: What makes them valuable?

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Introduction

A difficulty with a new asset class is understanding why they exist, how they operate and why they are valuable.

In this latest research report by Apollo Capital, we go back to basics to answer this last vital question: how and why do crypto assets become valuable?

To answer this question, we look at the four fundamental asset classes: equity, debt, commodities and currencies. We interrogate these asset classes - how and why are each of these established asset classes valuable? Despite crypto assets being complex, made all the more difficult by their intangible nature, we learn that crypto assets aren't as unfamiliar as perhaps first thought.

We break down crypto assets as follows:

- 1. Digital gold
- 2. Commodity-like crypto assets
- 3. Equity-like crypto assets backed by cash flows
- 4. Debt-like crypto assets
- 5. Currency-like crypto assets

We show that a number of crypto assets are similar in nature to these established asset classes. In understanding how crypto assets become valuable, it can be helpful to see that many are valuable in the same way as traditional assets.



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Valuable Assets

Value in established asset classes comes from one, or a combination, of:

- 1. **Rights** attached to the asset
- 2. Utility the asset provides
- 3. Belief in the value of the asset

Rights

Equity and debt assets are valuable because of the rights attached to the asset. An equity holder of a company has the right to dividends and share of proceeds in the event the company is sold. A debt holder has a right to interest and principal repayments. In the event a lender fails to make these repayments, the debt holder has rights designed to recover the debt. If the value, or the expected future value, of these rights increase, the value of the asset will increase.

Property is an interesting 'asset'. We suggest that property is not a fundamental asset class of itself. Rather, investors generally own a proprietary interest (similar to equity interest) or debt interest in the property.¹ The value of a proprietary interest in a property asset comes from both the rights attached and the demand for the asset based on its utility. The rights attached to the property include the proceeds of the sale of the property and any rental income. The utility based demand for the property comes from people wanting, and indeed needing, to live in the property.





Utility Based Demand

Commodity assets are valuable because of demand for the asset due to the utility they provide. Commodities are widely used as inputs in manufacturing and building. The utility provided by various commodities will depend on the utility provided by the end products and technological innovations which create new products that use those commodities. Iron ore demand is largely driven by demand for steel which in turn is driven by construction. Demand for lithium is increasing as the world turns to electric vehicles, most of which are currently powered by lithium batteries.

Utility

We take a narrow definition of "utility" to mean "the state or quality of being useful."² Bitcoin is not that useful - it can be stored, sent and received. As we explain in greater detail below, Bitcoin's narrative has settled as a store of value, which means Bitcoin's greatest utility is holding it. There are a number of properties of Bitcoin that make it desirable as a store of value. It is scarce, unseizable, non-sovereign, durable and others. We suggest these properties do not give Bitcoin utility. Rather, they increase the appeal of Bitcoin's utility - which is largely holding it as a store of value.

It is important to draw a distinction between the utility of assets like commodities and the utility of assets like currencies, gold and Bitcoin. The utility provided by commodity assets is integral to the value of those assets. They are directly linked. The utility provided by commodities is clearly the determinant factor in the demand for and value of commodities.

Assets like currency, gold and Bitcoin have utility. However, we suggest that while the utility of these assets may drive a little of the demand for the asset, the greater source of value is the belief in the value of the asset. This is a crucial distinction to make. For example, many 'gold bugs' will argue that demand for gold comes from its use in jewellery. On the contrary, we suggest that gold is used in jewellery because it is valuable, not the other way around. While gold has some utility, this is not the key driver of its source of value. If gold were to all of a sudden become valueless, it is safe to assume that it would no longer be used in jewellery. The same can be said of currencies.





Belief / Perceived Value

The third category of valuable assets requires philosophical interrogation. There is a narrow category of assets that are valuable because people believe them to be valuable. Examples include gold, art, collectibles and Bitcoin. There are no rights attached to these assets, other than the right to hold the asset. There is either no utility for some of these assets (like art³) or, if there is utility, it is not the source of the asset's value. There is no intrinsic value in any of these assets. Despite all this, these assets are clearly valuable.

Intrinsic Value

In saying that Bitcoin and gold do not have any intrinsic value, we are sure we are stirring the ire of their respective supporters. In researching this report, we discovered that the term "intrinsic value" has varied meanings, including application in the areas of philosophy and ethics. We use the term "intrinsic value" in the traditional financial sense, defined as:

"Intrinsic value measures the value of an investment based on its cash flows. Where market value tells you the price other people are willing to pay for an asset, intrinsic value shows you the asset's value based on an analysis of its actual financial performance."⁴

For the purposes of this report, assets like gold, Bitcoin, currencies and commodities generate no cash flows and therefore have no intrinsic value.

It is interesting to analyse the drivers of value for **currency assets**. Factors like interest rates, purchasing power and geopolitical tensions all play a role. In the interests of keeping it simple, we suggest that value for currency assets comes from both utility and belief, with the latter being more important. When there is belief in a currency and it is working well as a medium of exchange in society, there is demand for the currency for its utility. Citizens will demand currency to use it to pay for goods and services, as well as earn interest.

However, we suggest that the greater driver of value in a currency is belief in its value. When citizens lose belief in a currency, as we have seen multiple times throughout history, the currency loses its value, and crucially, its utility. The currency can go from being widely accepted and used, to useless and valueless.



³ According to <u>Deloitte's 2019 Art & Finance Report</u>, the estimated value of the global art and collectible market was around \$1.74trn

⁴ https://www.forbes.com/advisor/investing/intrinsic-value/



The graph above seeks to visualise how assets derive their value. If an asset is further along the utility axis, this does not mean it is more valuable as a utility, rather, more of its value comes from its utility.

Crypto assets as a whole accrue value across all of these categories. Some crypto assets are equity-like and have rights attached to them. Usually the rights are expressed as code, with the rights of cash flows automatically flowing to the asset holder through smart contracts.

Some crypto assets accrue value based on demand for their utility, such as smart contracting blockchains like Ethereum. Some crypto assets accrue value because people believe in the story that they are valuable.

And with that, we turn to the story of Bitcoin.





Bitcoin

Bitcoin has no rights attached to it. Bitcoin has no intrinsic value. Bitcoin has limited utility - it can be stored, sent and received. Yet, as we will see, Bitcoin's value does not come from its utility. Despite these limitations, at the time of writing, Bitcoin has amassed around \$400bn worth of value.

Bitcoin is a story - an immensely powerful story based on what it stands for and its unique properties.

Bitcoin : A Story

Bitcoin was created by an anonymous party in 2008 off the back of the Global Financial Crisis and the loss of trust in the banking and financial system. Bitcoin aimed to give people the chance to seamlessly transfer value over the internet without the need for a middleman. The idea was to give people the ability to control their own money, without the need for a trusted third party. After the turmoil caused in the GFC, this concept caught the attention of those that had lost trust in the traditional financial system and was a driving force in the early and subsequent adoption of Bitcoin.

In its early days, Bitcoin was an experiment, a pursuit of hobbyists who mined Bitcoin and participated in the network for fun. There is a famous story of 2 pizzas being bought for 10,000 Bitcoin back in 2010, meaning Bitcoin was slightly more valuable than worthless.

Yet, Bitcoin's story has continued to evolve.

A great deal has already been written about the story of Bitcoin.⁵ This report will not cover those points in detail, except for a short summary where we suggest Bitcoin could stand to accrue enormous amounts of value as a non-sovereign, apolitical form of money or store of value that is open to everyone. Many countries around the world are searching for an alternative to the US Dollar as the global reserve currency. It is easy to see the appeal of a state free, independent, global reserve currency. Some may suggest that gold plays this role, but it is limited by its properties, especially its physical nature.

If the concept of investing in a story sounds uncomfortable, consider at least two other well known stories that many take for granted: currency and gold.





Currency

Currency is a story that people believe in. Currency has no intrinsic value. Currency used to be a paper representation of gold. To facilitate trade, governments issued paper 'certificates of currency' that were backed 1 for 1 by gold in government vaults.

The gold standard was abandoned in 1971, as the US government looked to create more money but was restricted by a lack of gold reserves. As we can see in the image below, the value of 1 US dollar has fallen significantly over the past 100 years. We are confident that it will continue to fall further.



Source: Visual Capitalist

In extreme but not uncommon cases, the value of a currency can disappear altogether. Many will argue that currency and cash are valuable because it's backed by the state: one can pay one's taxes in it. As history has demonstrated multiple times, this is only the case until it's not.



Currency is only valuable if the other party will receive it. If the other party loses confidence in it, paper cash is more valuable as fuel for a fire. The table below shows a number of countries that have defaulted, effectively rendering their currencies valueless.

While a number of these are developing countries, looking back further in history reveals many advanced economies that have been serial defaulters.

Country	Year of default	External public debt/revenue	Total public debt/revenue
Mexico	1827	1.55	4.20
Spain	1877	4.95	15.83
Argentina	1890	4.42	12.46
Germany	1932	0.64	2.43
China	1939	3.10	8.96
Turkey	1978	1.38	2.69
Mexico	1982	3.25	5.06
Brazil	1983	0.83	1.98
Philippines	1983	0.23	1.25
South Africa	1985	0.09	1.32
Russia	1998	3.90	4.95
Pakistan	1998	3.32	6.28
Argentina	2001	1.59	2.62

Source: The Forgotten History of Domestic Debt, Reinhart and Rogoff

Gold

Gold has value because it always has. Ancient civilizations such as the Egyptians and the Incans valued gold as an important symbol. The value humans have placed on gold has permeated throughout history and still exists today, with gold's physical qualities as a shiny, lustrous element adding to its perception as a valuable asset.

Gold has also been used as a medium of exchange throughout history. Gold was a logical choice as the first medium of exchange, given other elements were either not durable, too abundant, too scarce, radioactive or unsuitable for other reasons. Fast forward a few thousand years, gold is no longer used as a medium of exchange, but is still prized as a store of value. Investopedia agrees:

Gold's value is ultimately a social construction: it is valuable because we all agree it has been and will be in the future.

In other words, Gold is a story we believe in.



Gold and Bitcoin

Bitcoin and gold are valuable predominantly because of their unique properties and because people believe they are valuable. They have no rights attached to them, other than the right to hold the asset. Neither has any intrinsic value. Both have degrees of utility, but as we explained above, their utility is not what drives their value.

The table below compares the properties of Bitcoin and gold. If gold can amass a roughly \$12 trillion dollar market capitalisation, it is easy to see how Bitcoin could also become enormously valuable.

Property	втс	Gold
Portability	Able to be sent through a decentralised blockchain to any recipient in a matter of minutes	Portable but in certain sizes. Cannot be easily transferred long distances.
Scarcity	Finite supply of 21 million tokens.	Finite supply, however exact amounts are unknown.
Durability	Theoretically durable but has only been around for 13 years	Highly durable
Fungibility	100% fungible as one Bitcoin is verifiably the same as any other unit	Generally considered fungible as 1g of gold is worth the same as every other 1g of gold
Divisibility	1 Bitcoin can be divided into 100 million parts.	Divisible with smelting and proper equipment

We suggest that Bitcoin is superior to gold in respect of most of these properties. Bitcoin is more portable, more easily divided, more scarce, tamper proof, unseizable and programmable. Gold's track record is superior to Bitcoin - it has been around for thousands of years compared to Bitcoin's thirteen. Gold is also generally less volatile than Bitcoin, although this is not always the case.



Estimates of the market captilisation of gold vary, but on one estimate,⁶ it is approximately 30x larger than Bitcoin's market capitalisation of US\$400 billion.

If Bitcoin was to reach the market capitalisation of gold, we would see the price of a single Bitcoin be valued at around US\$600,000.



Market Capitalisation of BTC and Gold (in \$trillions)





Smart Contract Platforms

Smart contracts are automated programs that execute transactions without the need for an intermediary. The key advantage of smart contracts is they run on decentralised blockchains, meaning parties interacting with the smart contracts can verify the code themselves and trust that it will be free from manipulation. In contrast, programs run on private systems like private computers or corporate infrastructure like Amazon Web Services require placing trust in the companies or entities that run the programs.

Smart contract platforms are ecosystems that enable users and developers to interact with smart contracts, digital assets and decentralised applications.

Smart contract platforms have their own naitive token which is core to their function. This asset is used as 'gas' paid to the miners or validators to complete tasks on the blockchain such as interacting with DApps and sending assets to different wallet addresses.

Ethereum is the largest decentralised smart contract platform with the largest ecosystem of decentralised applications (DApps) across Decentralised Finance (DeFi), Gaming and NFT ecosystems. ETH (pronounced "eeth") is the native cryptocurrency on the Ethereum network and is used to interact with smart contracts, pay for transaction fees (gas fees), and perform various on-chain tasks. ETH tokens are required to use the ever-increasing range of applications on the Ethereum ecosystem.

Ethereum is the largest and most well known smart contract platform. The following sections focus on Ethereum, but the principles discussed can equally be applied to other smart contract platforms.

Ethereum as a Commodity

We explained above that Bitcoin has limited utility. Ethereum was developed in part due to Bitcoin's inflexibility. We can think of Ethereum as a more flexible, general purpose blockchain which offers builders and users far greater utility than Bitcoin. We suggest that Ethereum is a commodity-like asset whose value comes from demand based on the utility it provides.





Let's compare electricity's role in powering a building and Ethereum's role in powering a decentralised application. We realise the comparison is not perfect. Electricity may or may not be a commodity and we realise that value does not necessarily accrue to electricity as an asset. Let's assume it does for the purposes of the illustration.

In the case of a building, electricity is used both in the construction of the building and the utility of a building. Electricity is used to power the tools that are used to construct a building. Electricity is then used once the building is constructed, to power lights and appliances. The more the building is used, the higher the demand for electricity and making the assumption above, the higher the value for the electricity. If we zoom out and see that more and more buildings are being built, demand for electricity will continue to increase.

Ethereum works in a similar manner. Developers write code to develop applications built on top of Ethereum. Developers use Ethereum to deploy the smart contacts that power these applications. Once the application is deployed, there is demand for Ethereum based on the demand for the application. The more applications that are built and the more applications are used, the greater the demand for Ethereum.

We can think of Ethereum as the electricity powering the development and operation of decentralised applications. Ultimately the demand for both electricity and Ethereum depend on utility. If people stop demanding electricity because of a construction slow down, the price will fall. If people stop building and interacting with applications on Ethereum, all else being equal, the price of ETH will drop.

Ethereum Use Cases

The focus of this report is explaining how crypto assets accrue value. We could write many research reports on the key applications we see being built on Ethereum, those that ultimately drives ETH's utility. For current purposes, we quote our focus on the area of DeFi as written in our <u>Investment Thesis</u>:

We believe that DeFi is in the early stages of automating the financial sector by providing an alternative to traditional intermediaries, an alternative driven by open source software, permissionless usage and censorship resistance. By using smart contracts and blockchain technology, developers are pioneering a more efficient, fair, open, decentralised and trustless financial system.



There are many use cases for Ethereum that we don't know about. It has an ever expanding utility range which continues to drive demand and help it accrue value.



The Ethereum Layer 2 Ecosystem. Layer 2 means applications built on Ethereum, where the Ethereum blockchain is Layer 1, the base, foundational layer. Source: Coin98 Analytics





Equity-Like Crypto Assets

There is a growing category of crypto assets which are even easier to understand than gold-like Bitcoin and commodity-like smart contracting platforms. These crypto assets are like equities, deriving their value from the rights attached to the assets. These rights are usually in the form of cashflows which automatically flow to the assets according to the code on which these assets are based.

We mentioned above that Apollo forecasts greater value for Ethereum and other smart contract platforms due to increased demand from a range of DeFi applications. DeFi is an innovative financial system that is permissionless and inclusive, which uses smart contracts on the blockchain to provide transparent, real time transactions. DeFi's decentralised, permissionless model has driven significant adoption and applications. Unlike the local bank branch which shuts promptly at 4:30pm each weekday afternoon, DeFi operates 24/7. DeFi gives people full control over their assets and provides financial data that is not available in centralised finance. These protocols are all unique with utility including exchanges, derivatives platform, staking or yield protocols, lending platforms and many more.

Many DeFi applications are equity-like and backed by cash flows. Traditional financial markets participants value equities as the present value of their future cash flows. If Apple is expected to increase earnings in future, all else being equal, the Apple share price will rise. DeFi assets operate and accrue value in a similar manner. If the expected future cash flows of these applications increases, the value that accrues to these tokens will also increase.

We provide two examples below of Synthetix and GMX to highlight how these tokens accrue value.

Synthetix

Synthetix is a decentralised derivatives liquidity protocol built on the Ethereum network. This unique protocol is one of Apollo's most successful DeFi investments. The protocol has a built in Decentralised Exchange (DEX) as well as being a synthetic asset issuer - where users can create synthetic assets (synths) pegged to a range of assets.





As the Synthetix website explains:

Synths are derivative tokens providing exposure to a range of assets. They can be traded with infinite liquidity and zero slippage by leveraging the Synthetix protocol's unique pooled collateral model. Trades between Synths generate a small fee that is distributed to SNX collateral providers.

SNX is the utility token of Synthetix ecosystem. SNX token holders are incentivised to stake their tokens by earning staking rewards and a portion of exchange trading fees (0.3% trading fee - distributed as sUSD to holders). The revenue sharing aspect of Synthetix makes it an equity-like asset as holders have a right to receive part of the value generated from trading on the platform.

SNX's value is driven by the trading activity on the Synthetix platform. The higher the transaction fees generated by the protocol, the higher the revenue holders will earn from staking their SNX tokens. As transaction volume increases, we expect to see the value and the demand of SNX also increase as the token will yield more revenue to token holders.



SYNTHETIX PLATFORM

Source: Apollo Capital



GMX

GMX is a decentralised spot and perpetual exchange. GMX allows users to trade crypto derivatives to hedge, leverage and speculate in much the same ways as traditional market participants use derivatives. Derivatives markets are often significantly larger than the markets for the underlying assets.

GMX is a revenue sharing protocol with two fundamentally different tokens, the GMX token and the GLP token. The GMX token is one of Apollo's most recent and exciting DeFi investments. The GMX token is the platform's utility, staking and governance token, whereas the GLP is the liquidity provider token that consists of a basket of crypto assets. Like Synthetix, GMX is an equity-like crypto asset backed by cash flows.

Users who stake GMX share 30% of the protocol revenue (trading fees) including emissions (esGMX - vested GMX token), whilst the GLP token holders earn 70% of the protocol revenue including emissions. It is important to note that the fees generated by the GMX protocol are organic and are paid in AVAX and ETH. This brings additional value to the GMX token as it accrues revenue for the token holders which drives the price and demand for the token. The more actively the GMX exchange is used, the more value token holders will gain.

GMX is available on Arbitrum (a Layer 2 Ethereum scaling solution) and Avalanche (an Ethereum competitor).





Debt-Like Crypto Assets

Debt-like crypto assets are assets that accrue value through interest payments from borrowers. Many decentralised lending protocols have their own debt-like crypto assets that they distribute to the lenders on the platform. Lenders are entitled to these debt-like crypto assets for providing collateralised lending on decentralised platforms.

The simplest debt-like crypto assets in DeFi are known as a-Tokens. A user receives an a-Token token when they deposit a crypto asset into a major decentralised lending protocol, such as AAVE. An a-Token represents a deposit into the lending market, the same way a certificate of deposit represents a deposit into a bank with the intention of earning yield. Examples of a-Tokens are aUSDC, aDAI, aWBTC (wrapped Bitcoin), aWETH (wrapped Ethereum). The balance of an a-Token held in a users wallet automatically increases over time due to the interest that is constantly being accrued in the lending market. This interest is variable and is dependent on the supply and demand of funds in the lending market, with the interest rate being algorithmically calculated and applied autonomously via smart contracts. When a depositor requires their original crypto asset, they simply redeem their a-Tokens for the underlying plus interest.

The main risk in using a-Tokens is smart contract risk. As we have seen in DeFi, the platforms are only as secure as the code, which are subject to attack from unscrupulous actors. In addition to many other factors, we take the view that the 'battle-tested' platforms with long track records have reduced smart contract risk.

Below is an example of a DeFi user providing DAI as debt on AAVE and receiving aDAI in return. The DAI deposited will then be lent out to other users for a fee tracked by aDAI. After a period of time the DeFi user will be able to redeem his DAI plus the interest earned by returning aDAI to AAVE.







Currency-Like Crypto Assets

As discussed above, it is hard to define why currencies are valuable. There are theoretical reasons like interest rates, purchasing power, ability to pay taxes, but there is no intrinsic value in a \$50 note. A \$50 note is valuable because the recipient accepts it as such, and unfortunately history is littered with examples of currencies becoming worthless.



The Zimbabwean One Hundred Trillion Dollar Note

There are a number of crypto assets that are like currencies. The simplest example is stablecoins. Stablecoins are designed to be pegged to a fiat currency, often the US Dollar. Stablecoin adoption in crypto markets has surged over recent years, with the two largest USDT ("Tether") and USDC now the 3rd and 4th largest crypto assets by market capitalisation (over \$100bn combined at the time of writing).

Stablecoins, however, do not accrue value. They are designed to be pegged to a fiat currency (usually US\$1). USDT and USDC market cap has increased because more USD dollars have been deposited into the bank accounts that back the crypto assets. USD stablecoins might periodically increase in value relative to the EUR, or any other fiat currency, but we suggest these are usually short term fluctuations, rather than long term value accrual.

Other examples of currency-like assets include crypto assets that are designed to function as a medium of exchange. Examples include Litecoin, Bitcoin Cash and Bitcoin SV. Proponents of these assets suggest that one day these assets will function as a medium of exchange, used to buy and sell goods and services ubiquitously. Unlike Bitcoin or Ethereum which have been affected by scaling issues, these assets are designed with enough throughput or capacity to allow hundreds of thousands of transactions per second.





We believe it is very hard for currency-like crypto assets to accrue significant value and we do not invest in currency-like crypto assets. It is an enormous challenge for a volatile crypto asset to be used as a widespread medium of exchange.

We would argue the same for Ethereum and Bitcoin. Even though currency-like crypto assets might have large throughput, we think it is highly unlikely that they will replace fiat currencies as the de facto medium of exchange. Stablecoins are much more likely to succeed as they combine the stability and acceptance of fiat currencies with the digital nature of crypto assets.

Fun Fact:

We prefer the term "crypto assets" over "cryptocurrencies" for two reasons: it's a broader and more accurate description and secondly, as described above, we aren't particularly bullish on currency-like "cryptocurrencies."





Conclusion

Crypto assets are complex.

The field of crypto assets draws upon a diverse range of disciplines including finance, computer science, mathematics & cryptography and technology. Understanding crypto assets in detail requires an understanding of each of these disciplines. To complicate matters further, we cannot touch or feel crypto assets, which makes them even more difficult to grasp.

This research report has put forward a framework that will hopefully make it easier to understand crypto assets. We take a step back and consider what makes traditional assets valuable, whether it be the rights attached to those assets, the utility provided by those assets, the belief that those assets are valuable, or a combination of all three.

We take this framework and apply it to crypto assets. In doing so, we realise that crypto assets are not as unfamiliar as perhaps first thought. Crypto assets accrue value in much the same way as traditional assets. Some crypto assets are equity-like, some crypto assets are commodity-like, some crypto assets are debt-like and some crypto assets are currency-like.

We can apply this framework when evaluating specific crypto assets - how does this particular crypto asset function and how will it accrue value? Does it require belief in the asset, is it backed by cash flows or will there be demand for the asset based on the utility it provides?

Apollo Capital's investment activities are focussed on commodity-like crypto assets and equity-like crypto assets. We believe the utility and applications provided by these assets is groundbreaking.

Most of this differentiation stems from the fundamental tenets of crypto assets: applications and infrastructure which are decentralised, natively digital, censorship resistant, operate 24/7 and open to any one of the estimated 5 billion people worldwide that have access to the internet and a smartphone.





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