

Banking on Bitcoin

The State of Bitcoin as Collateral

February 2021





Arcane Research

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Banking on bitcoin

The case for bitcoin as collateral

The value of the global market for collateral is estimated to be close to \$20 trillion in assets. Government bonds and cash-based securities alike are currently the most important parts of a well-functioning collateral market. However, in that, there is a growing weakness as rehypothecation creates a systemic risk in the financial system as a whole. The increasing reuse of collateral makes these assets far from risk-free and shows the potential instability of the financial markets and that it is more fragile than many would like to admit.

Bitcoin could become an important part of the solution and challenge the dominating collateral assets in the future.

Bitcoin's unique properties make it the perfect collateral asset

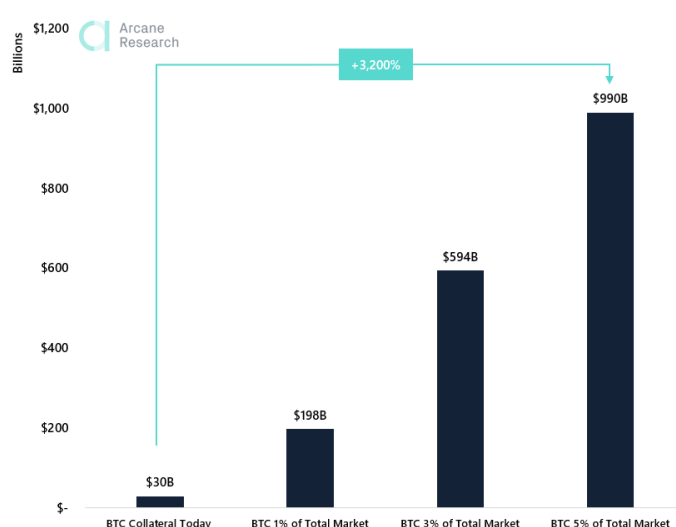
Bitcoin's combination of properties is unlike those of any other asset classes: It is an asset without both counterparty risk and credit risk. It is available for trading 24/7, 365 days a year, all over the world. In addition, it is the most portable asset the world has ever seen. Bitcoin can be transferred around the world, instantly, at almost no cost, any time of the day, and any day of the year, and with full finality. **No other assets can match these properties today, making bitcoin the perfect collateral asset for the future.**

A potential trillion-dollar market

The current size of the collateral markets is estimated to almost \$20 trillion in assets. Our estimates show the huge potential for bitcoin as collateral, even if it just captures a few percentages of the existing market.

Based on our calculations and data collected for this report, we estimate that around 625,000 BTC are used as collateral in the crypto market today, or approximately \$30 billion. This number is based on estimations of collateral held in the derivatives market, in relation to bitcoin collateralized lending and tokenized BTC in Decentralized Finance (DeFi). Comparing this number of 625,000 BTC to the total collateral market, shows that bitcoin collateral only accounts for 0.15% of the total collateral market today but the market is growing rapidly.

Figure 1: Bitcoin as Collateral - Potential Size of Market



Source: Credmark, Arcane Research

The derivatives market introduced bitcoin collateral

Arguably, the first major collateral use case for bitcoin came with the introduction and growth of the derivatives market in crypto. BTC collateralized derivatives have played an important role in BTC's price discovery, but they are currently losing market share to USD and stablecoin collateralized products.

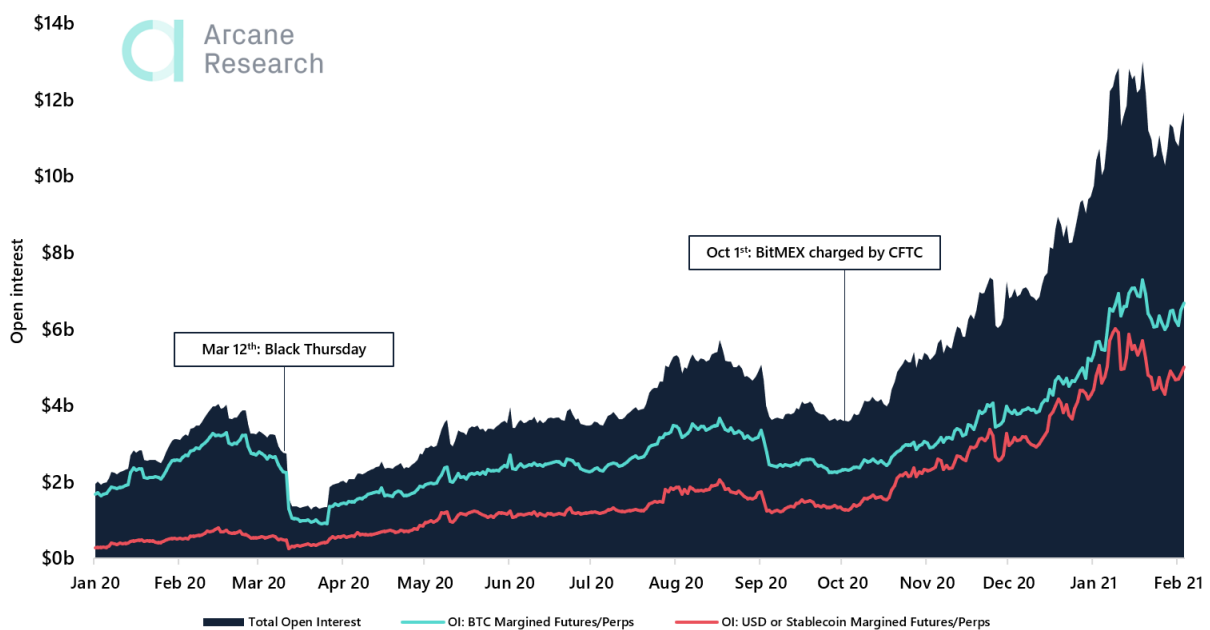
There are several reasons for bitcoin collateral's declining dominance in the futures market. Stablecoin and USD collateralized futures are more favorable for long exposure. They are also less complicated when trading altcoins than the BTC collateralized futures.

However, there are also clear advantages of using BTC as collateral in the derivatives market. BTC collateralized futures are powerful hedging instruments and come without any counterparty risk. This is different from stablecoin collateralized futures, which are exposed to risks affiliated with centralized stablecoin issuers. We therefore expect BTC collateralized derivatives to maintain a significant share in the future.

Decreasing dominance for bitcoin collateralized futures

The bitcoin collateralized futures market blossomed during 2017 and 2018 and was then heavily dominated by BitMEX. In 2018, the trading volume of BitMEX surpassed the trading volume of the entire spot market. Now, there are many exchanges competing in the space, with OKEx being the largest exchange in terms of open interest in BTC collateralized futures.

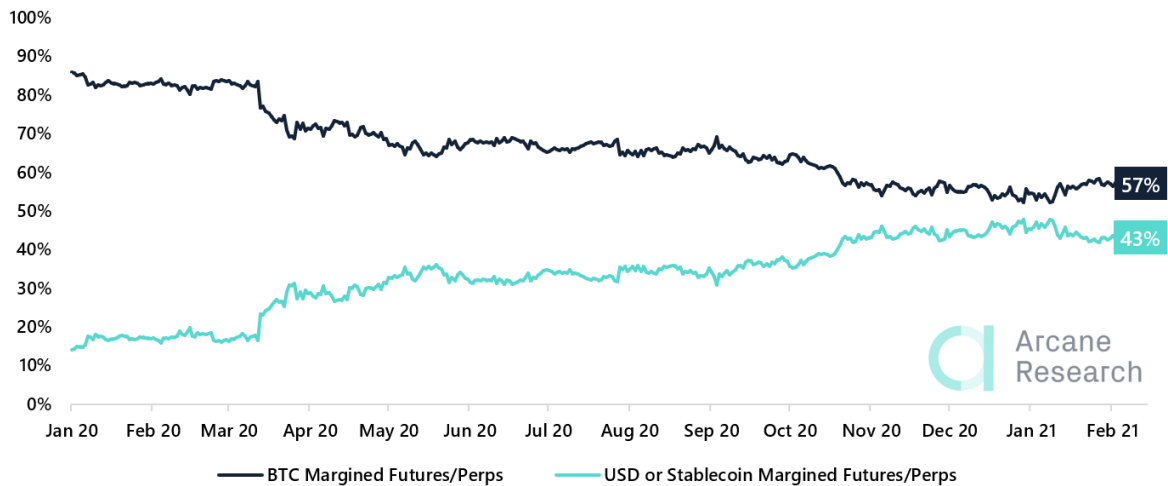
Figure 2: BTC Futures Market - Open Interest



Source: NYDIG, Skew, CoinGecko

As shown in the chart above, the open interest of the BTC futures market increased fivefold in 2020 and pushed all the way to \$14 billion in January. After the March crash of 2020, an interesting trend shift has been seen. Stablecoins and USD collateralized futures have started capturing larger parts of the derivatives market, shifting dominance from BTC collateralized futures. As seen in the chart below, BTC collateralized futures now only account for 57% of the open interest in the futures market, compared to 86% on Jan 1st, 2020.

Figure 3: BTC Futures Market: Share of Open Interest by collateral

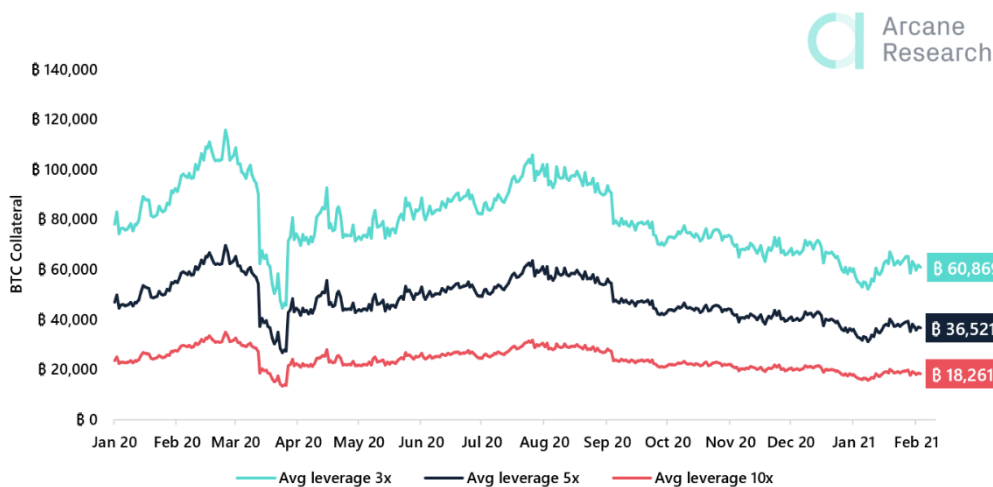


Source: NYDIG, Skew, Bybt, CoinGecko

Up to 60,000 bitcoin used as collateral in the futures market

The derivatives market is opaque, and it can be hard to produce precise estimates of collateral usage. What we do know, however, is the size of the open interest in the market. On February 3rd, 2021, the BTC collateralized futures market had a total of \$6.7 billion worth of open interest or about 182,600 BTC. The open interest cannot be mapped one to one to actual BTC held as collateral given the high leverage in the futures markets, with exchanges offering up to 125X leverage. However, our estimates based on dividing the open interest on various degrees of average leverage show that up to 60,000 BTC could be used as collateral in the futures market today.

Figure 4: Bitcoin Used as Collateral in the Futures Market (Various Leverage Assumptions)



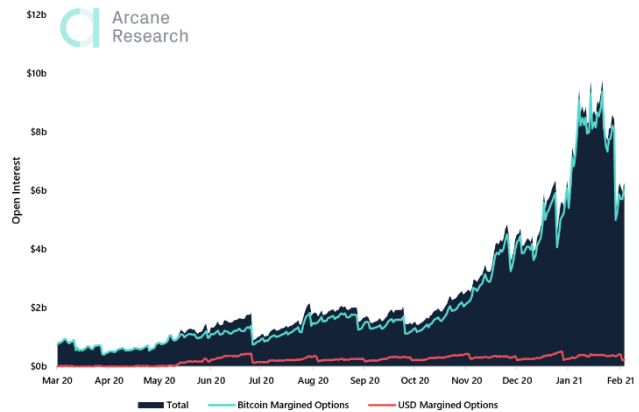
Source: NYDIG, Skew, Bybt, CoinGecko

About 95% of all the open interest in the bitcoin options market is collateralized by bitcoin

Above, we discussed the futures side of the derivatives market, but there's also a thriving options market using BTC as collateral. The open interest in the options market is approaching the size of the entire bitcoin futures market's open interest.

In contrast to the futures market, bitcoin is by far the dominating means of collateral in the options market, accounting for about 95% of all contracts. Due to the lack of transparency on how open interest is estimated in the options market, we have excluded options from our estimates of the total amount of BTC used as collateral in the crypto market. However, we assume that the collateral size compared to the open interest is much smaller than in the futures market, as traders get exposure to large contracts just by purchasing cheap options products. Hence, we assume a much smaller collateral base than for futures, despite the similar size in open interest.

Figure 5: BTC Options Market - Open Interest



Source: NYDIG, Skew, Bybt, CoinGecko

The institutions are entering the lending market

The growth in the crypto lending market has been extraordinary over the past year, and 2020 has seen billions of dollars from institutions being deployed in the lending market. The institution-focused company Genesis saw a YoY growth of 245% in their outstanding loans. Our estimation shows that over 400,000 BTC could already be in use as collateral in the lending market today.

The lending market for bitcoin is young but rapidly growing. The first companies in this sector launched their offerings only four to five years ago. This has now become a billion-dollar industry and an essential part of the overall bitcoin market.

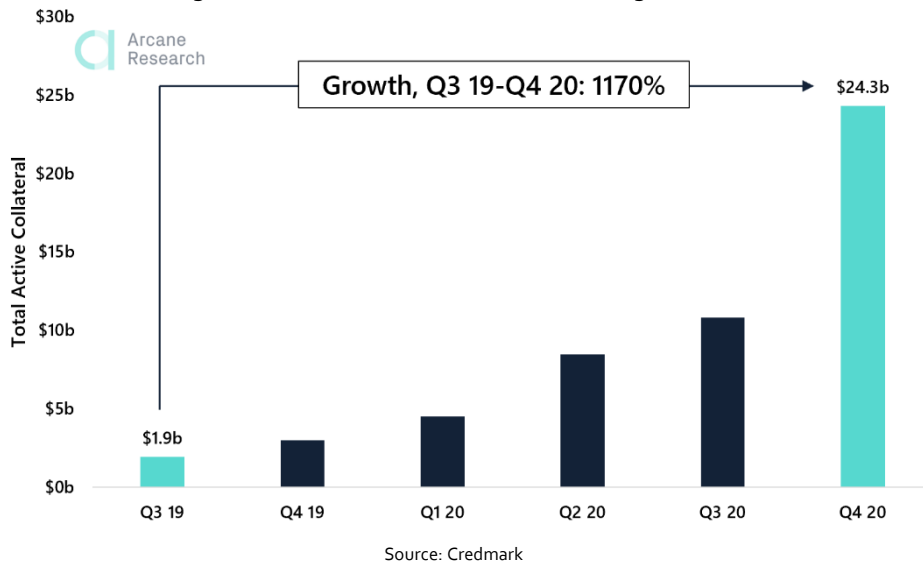
However, this is not surprising when we see how massive the lending activity in traditional markets is. Collateralized loans are seen everywhere, from mortgages and cash loans to the enormous repo market with overnight lending.

There are numerous reasons for using bitcoin as collateral for loans. The most common are leveraging up on existing crypto positions, arbitrage plays, market-making and covering operation costs without selling any holdings.

Total active collateral grew by 1170% from Q3 2019 to Q4 2020

The extensive efforts from Credmark, the market-leading crypto credit data company, shows that the lending market has seen a sharp rise over the past year. From Q3 2019 to Q4 2020, the total active collateral in the lending market grew by 1170%.

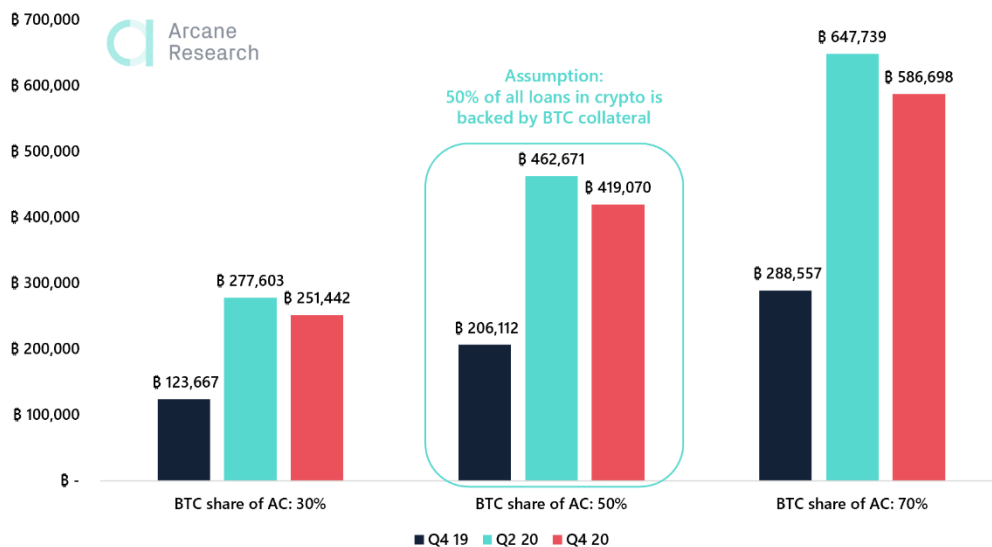
Figure 6: Total Active Collateral in the Lending Market



420,000 bitcoin used as collateral

The numbers from Credmark gives us the approximate size of 420,000 BTC used as collateral in various loans in the lending markets, with a growth of 213,000 BTC from Q4 2019 to Q4 2020. The approximate size is based on a modest estimate of 50% of active loans being backed by bitcoin collateral. In reality, this is likely to be an underestimation, as several industry experts assume that the correct estimate is closer to 70% or 80%.

Figure 7: Active BTC Collateral in the Lending Market
(Under Various Assumptions of BTC share of collateral)

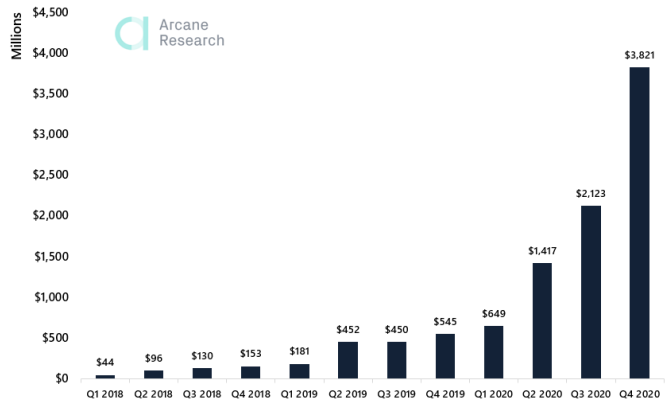


Incredible growth in 2020 for Genesis

Genesis is one of the market-leading companies in the lending market with its institutional-focused business. They have seen incredible growth over the past year, and their outstanding loans surged to \$3.8 billion in the fourth quarter of 2020, a roughly 80% growth from Q3.

The company processed almost \$20 billion on loans in 2020 to institutions only, showing tremendous demand for traditional actors entering crypto lending. In Q4, the company pointed to the inflow of institutional lenders as well. Ultra-high-net-worth individuals, corporations, traditional hedge funds, and family offices wanted to enter the market for the first time and were looking to generate excess yield on idle cash. There is clearly a significant demand for liquidity in the crypto market.

Figure 8: Genesis - Active Loans Outstanding

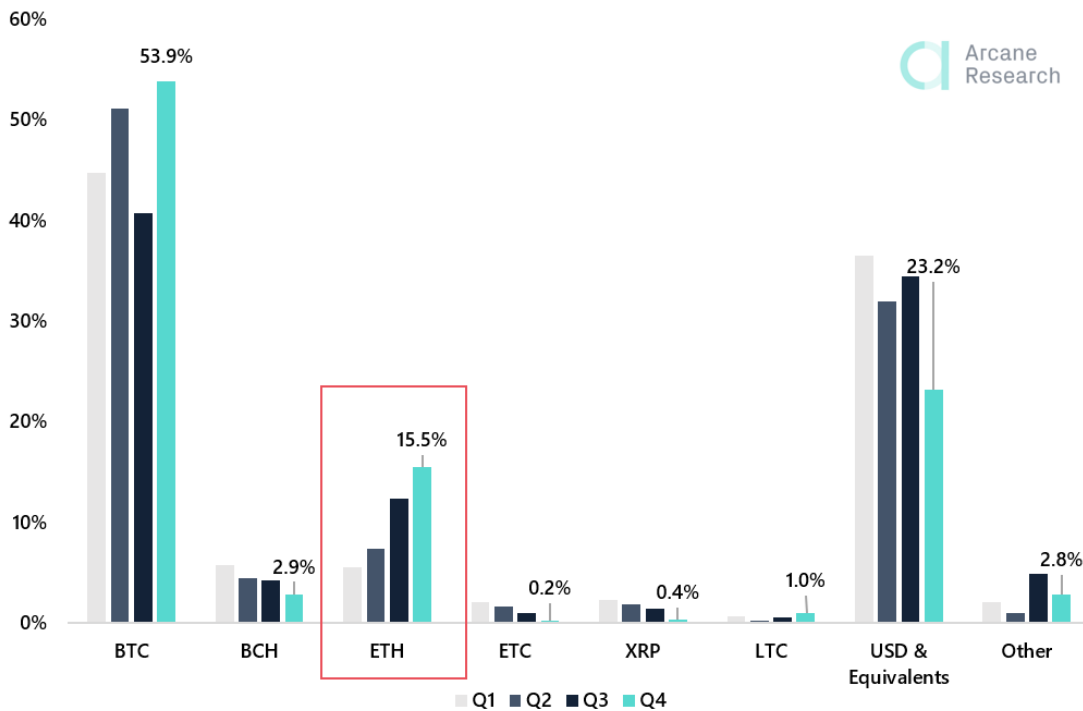


Source: Genesis

Growing demand for ETH among institutions

Although the demand for cash is clearly present, only 23.2% of Genesis' loans outstanding in the fourth quarter were USD and equivalents. The chart below shows the 2020 loan portfolio composition for Genesis.

Figure 9: Genesis - 2020 Loan Portfolio Composition



Source: Genesis

As seen above, 53.9% of all active loans from Genesis are in BTC. A substantial increase from the third quarter, when only 40.8% of loans outstanding were in BTC. However, Genesis points toward the price appreciation of bitcoin and hence its impact on its share of outstanding loans as the main reason.

However, the most exciting development of 2020 was the steady increase in ETH loans outstanding. After ending Q1 at 5.5%, the share of ETH loans outstanding grew 177% over the next three quarters, ending the year at 15.5%. Of course, some of this growth is attributable to ETH's price inflation. Still, a significant part of these newly issued loans was tied to in-kind placements in Grayscale's Ethereum Trust, according to Genesis.

Over \$4 billion in outstanding institutional loans for BlockFi

Another market-leading lending company that most readers probably are familiar with is BlockFi. The company launched in 2017 and has become one of the industry's biggest names, cleverly combining a traditional finance approach with the new possibilities of crypto finance.

BlockFi's internal numbers, shared with Arcane Research, shows that the company is a clear competitor to Genesis on the institutional side. In 2020, BlockFi processed \$18.6 billion in loans to its institutions and private clients. The company had \$4.4 billion in outstanding institutional loans by the end of 2020, and according to David Olsson, VP, Head of Institutional Distribution at BlockFi, they expect the growth to continue in 2021:

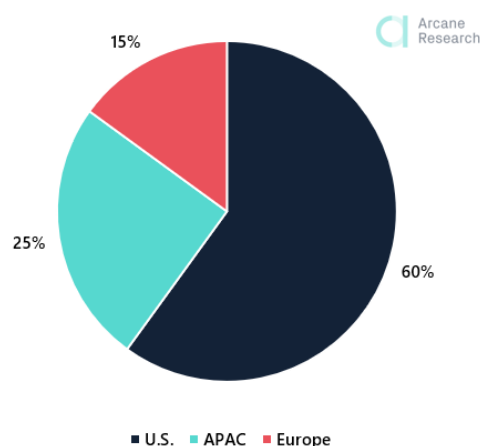
"As traditional investment firms continue to adopt digital asset strategies, there is a huge vacuum in lending, which will need to be filled by efficient capital providers. We also expect further regulatory clarity globally in 2021, which will help ease any remaining institutional concerns about investing in the space."

-David Olsson, VP, Head of Institutional Distribution at BlockFi



These clients are not just based in the U.S. but spread across the world. As seen in the chart below, 60% of BlockFi's institutional clients are based in the U.S, 25% in the Asia-Pacific and the last 15% are based in Europa.

Figure 10: BlockFi Institutional Clients

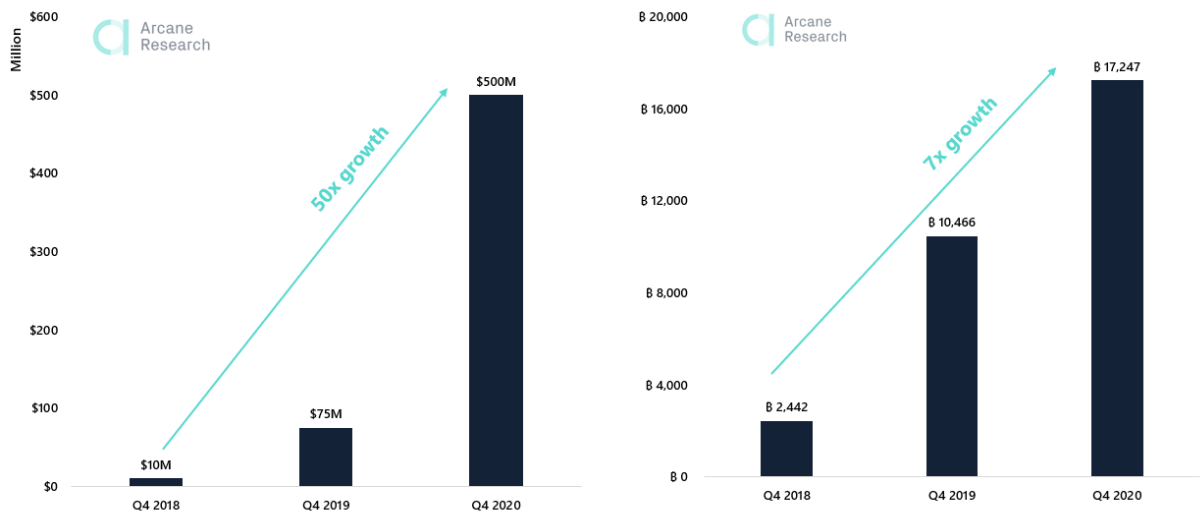


Source: BlockFi


BlockFi has a valued offering among retail investors, where individuals can earn interest on deposited cryptocurrencies, with 6%-8% interest rates. Customers can also borrow USD or stablecoins against BTC, ETH or LTH and exchange between these assets and stablecoins when needed.

As seen in the chart below, BlockFi's internal numbers, shared with Arcane Research, shows that the growth for BTC-collateralized loans has been remarkable over the past years, both in USD and BTC terms.

Figure 11: BlockFi - Retail Loans BTC Collateral (USD and BTC)



Source: BlockFi




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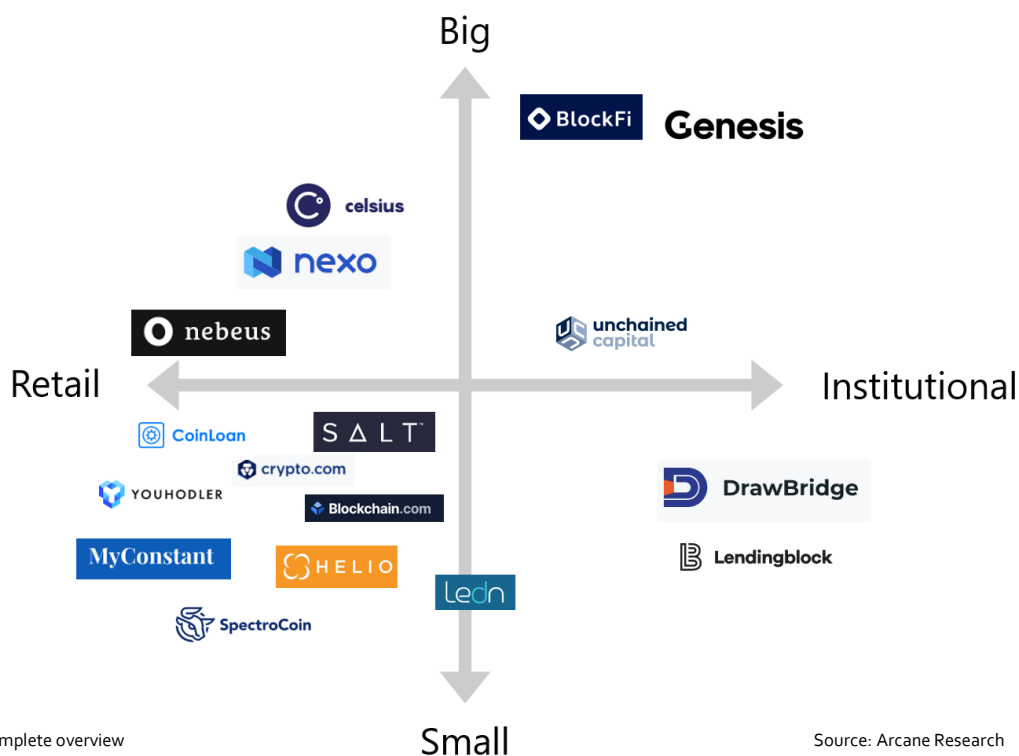
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A sea of lending companies

As already mentioned, the lending industry in crypto is rapidly growing, and new companies enter the market each year. To cover all these companies in detail is out of this report's scope, but the matrix below should give the reader a fairly good overview of the lending market.

Figure 12: Matrix of Lending Market*



Celsius: processed over \$8 billion in loans

Some of the largest companies in the lending market that we haven't already mentioned are Celsius, Nexo, Nebeus, and Unchained Capital. Celsius reports over \$6 billion on assets under management and over 350,000 customers. Different from the likes of Genesis and BlockFi, many of the retail-focused lending companies let customers earn yields on a much broader group of cryptocurrencies. Celsius lets customers borrow by using more than 25 different cryptocurrencies as collateral.

Nexo shares profits with token holders

Nexo has built a solid client base and has surpassed 1 million users, and offers their services to both retail and institutional customers through instant crypto-backed loans with their fully-automated platform. Nexo has more than \$4 million in assets under management, has processed over \$5 billion, and accepts 16 cryptocurrencies.

A notable difference from other companies is the possibility of borrowing over 40 different fiat currencies. The company is an E.U. licensed & regulated financial institution and \$100 million worth of custodial assets are insured via Lloyd's of London. Nexo has its own token, NEXO, which is backed by the underlying assets of Nexo's loan portfolio. The current market cap of NEXO is \$450 million, and 30% of Nexo's profit is shared with holders of the token in the form of dividends. The company has processed over \$8.2 billion on loans since its inception.

Nebeus as a first mover in 2014

London and Barcelona-based Nebeus was one of the first movers in the lending market in 2014, and launched in 2015 as a P2P-platform giving out loans in cryptocurrencies, but no fiat. Back then, there was no crypto-collateralized loans market.

This retail-focused company now has approximately \$300 million in AuM. The two primary use cases they see for BTC-collateralized loans are people wanting to cover everyday expenses through quick loan products and leverage up their BTC positions with cash loans. When speaking to Michael Stroev, COO and Head of Product at Nebeus, he said the following about the growth in 2020:

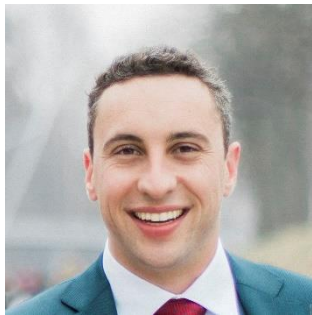
"The main trend is people realizing that companies, like Nebeus, offer services that allow people to use their digital assets to get cash and earn a profit, all without selling their digital assets. Moving their assets to Nebeus makes a lot more sense than keeping them sitting in exchange platforms that don't provide any benefits."

- Michael Stroev, COO and Head of Product at Nebeus



No rehypothecated collateral at Unchained Capital

Another exciting company worth mentioning is Unchained Capital. Unlike many other lending companies, it focuses on self-custody and making sure that collateral is not rehypothecated. As already discussed, collateral reuse is a significant challenge in the traditional lending market. Phil Geiger, Director of Product Marketing at Unchained Capital, said that the company is already seeing growth in 2021:



The demand for our bitcoin backed loans, OTC desk, and multisignature custody has accelerated so far in 2021, and we expect to see demand increase throughout the year due to the immense interest in bitcoin from corporations and traditional wealth managers. A healthy bitcoin economy to us means an increasing number of clients taking control of private keys with our multisignature vaults and an increasing number of long-term holders that are ready to improve their life with a loan from their bitcoin.

- Phil Geiger, Director of Product Marketing at Unchained Capital

The lending space is clearly full of companies that are revolutionizing how we think about lending. Over time, this competition will see the rates fall, getting more aligned with lending rates in traditional financial markets. The numbers show that retail customers are not alone in embracing crypto-collateralized loans, but Genesis' \$19 billion in processed loans in 2020 shows that the institutions are here as well.

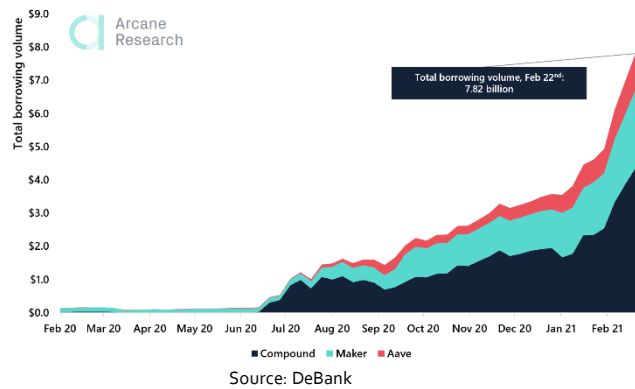
Almost 170,000 BTC tokenized in DeFi

The growth of DeFi in 2020 has incentivized bitcoin holders to tokenize their bitcoin on Ethereum, and use their bitcoin as collateral in the wide array of services offered from the various DeFi platforms. 169,991 BTC has been tokenized on the Ethereum blockchain.

DeFi platforms have over \$7.8 billion in outstanding loans

The most popular platforms in DeFi today are associated with the lending markets and decentralized exchanges. Compound, Maker, and Aave had a total borrowing volume of \$7.8 billion within the lending markets in February, as seen in the chart to the right. In June 2020, before the Compound governance token launch, the total borrowing volume in DeFi sat at \$159 million, meaning that the borrowing volume on the three major platforms has risen by more than 4,800% over eight months.

Figure 13: Total Outstanding Loans in DeFi



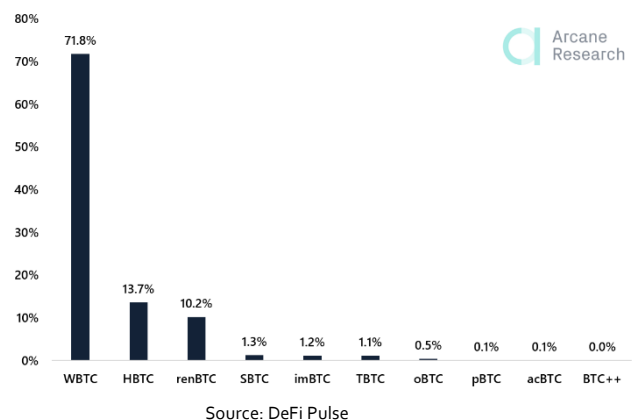
Bitcoin as collateral in DeFi dominated by Wrapped BTC

Bitcoin as collateral in DeFi is less straightforward than in centralized lending and in the derivatives sector. For bitcoin to be integrated with DeFi, ERC-20 tokens backed by bitcoin are the way to go. Several ERC-20 tokens are specialized for this use case, and they use different frameworks to maintain their bitcoin peg.

BTC at work on Ethereum grew by 3,170% from June 2020 until today, as users wanted to utilize their bitcoin as collateral in the vast field of DeFi platforms.

As we see from the chart to the right, the most influential bitcoin-backed ERC-20 token is Wrapped BTC (WBTC). It currently contributes to 72% of the total amount of BTC placed on Ethereum. Tokens on WBTC are issued through BitGo, which mints and redeems tokens as a centralized third party. Once the WBTC tokens are minted, the tokens can interact freely with DeFi platforms, and BitGo cannot intervene in these transactions. The centralized custody solution is also utilized by Huobi BTC (HBTC), currently the second-largest bitcoin-backed ERC-20 token.

Figure 14: BTC on Ethereum - Token Distribution



The future of bitcoin collateral

A glimpse into the crystal ball

We've now made some firm assumptions on the major use cases for bitcoin as collateral today. The lending market is clearly in a booming trend, and so is the case for DeFi, where bitcoin serves a role via specialized wrapped protocols. Bitcoin collateral within the derivative market has currently experienced a hiatus as stablecoin and USD margined futures are experiencing growing traction. Will this trend persist?

BTC collateralized futures will still be important

As we've seen, the open interest in the BTC futures market is currently trending towards being dominated by USD and stablecoin-margined positions, leading the BTC collateralized market to lose momentum and decline in total BTC size. Are we experiencing the end of an era in the derivatives market, or will BTC collateralized trading experience an uptick once again?

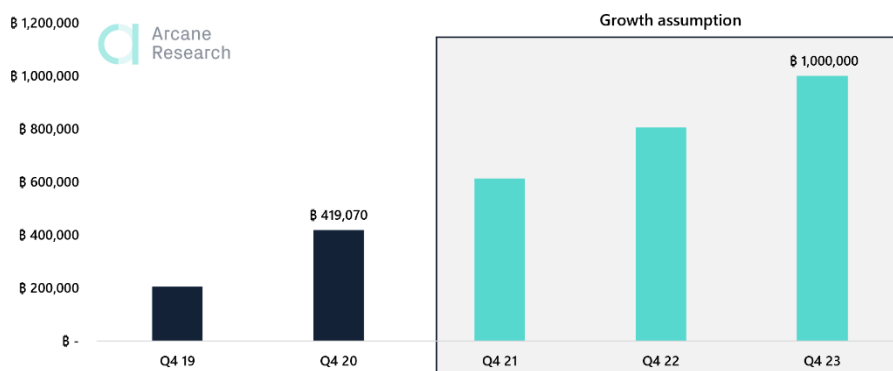
A plausible scenario as the market matures further should be reduced funding rates for BTC collateralized perpetuals in addition to a lower premium rate on the BTC collateralized futures. However, the counterparty risk affiliated with stablecoins could also maintain the status quo in terms of the basis and funding rates of the derivative instruments.

In essence, it's hard to conclude on the further developments of the derivatives market. While BTC's role as the leading collateral instrument is about to fall below 50% if the trend persists, regulatory uncertainty looms in the stablecoin space, suggesting that bitcoin collateralized derivatives instruments will continue to serve an important role onwards.

1 million BTC as collateral in the lending market by 2023?

We expect the quarterly growth rate in the lending market to stay positive. Based on our calculations and the data we have been able to collect, we estimated that the amount of BTC used as collateral in the lending market sits at around 420,000 BTC. It's not unlikely that we will see 1 million BTC used as collateral in the lending market within a three-year horizon, as illustrated in the chart below. As the market matures and more liquidity is provided, we also expect the lending market's interest rates to drop considerably.

Figure 15: Potential Growth of BTC Collateralized Loans*



Source: Credmark, Assumptions by Arcane Research

*Assuming that 50% of all collateral in the lending market is BTC

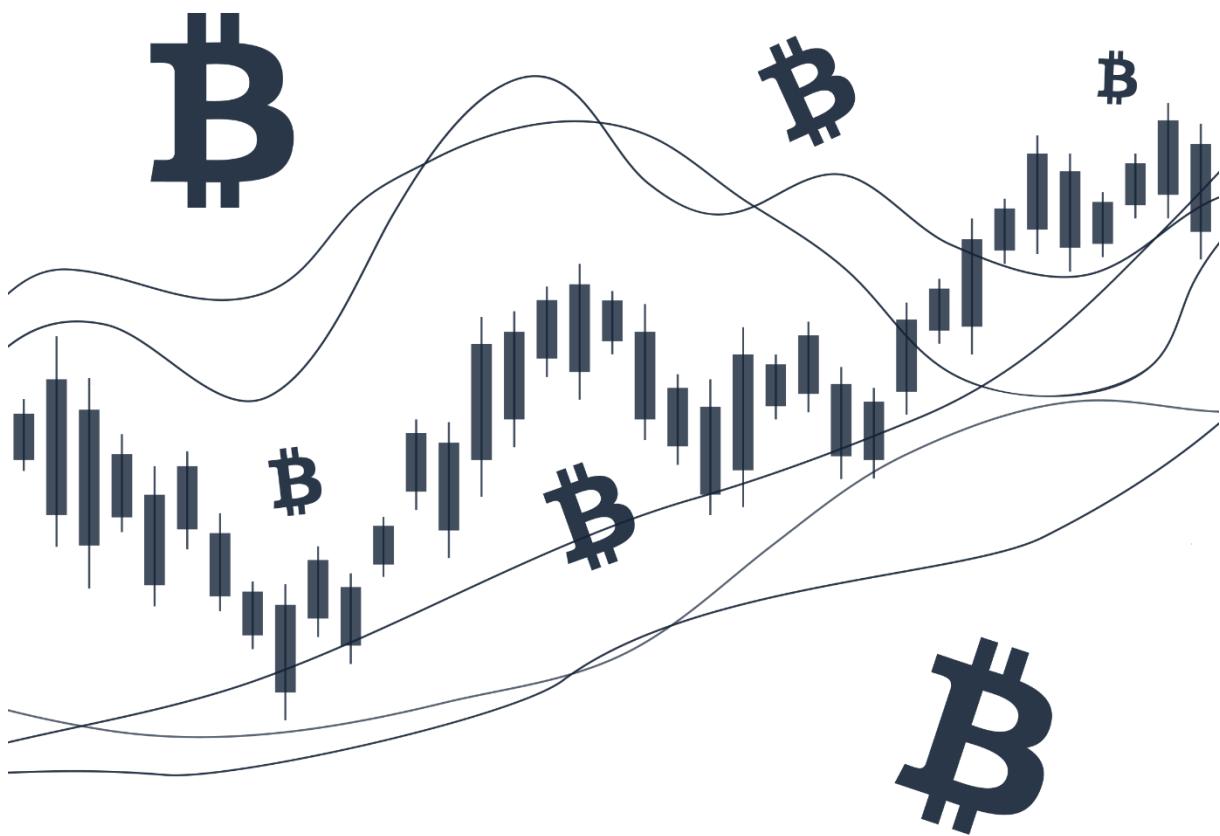
High quality collateral often comes with a price premium. This occurs as the underlying properties of the asset leads investor demand for said asset to increase. The same observation is true for bitcoin. The lending market is currently in a phase of great adoption, onboarding new customers while improving their services and offering high yields on deposits. The high interest rates will likely lead to a further growth in users of the lending markets, and can have knock-on effects on the price of bitcoin as more people demand bitcoin in order to deposit their bitcoin on lending platforms to earn a yield.

Furthermore, as the acceptance of bitcoin as collateral increases, the opportunity cost of holding bitcoin will drop and its value increase. Holding bitcoin will give you increased financial freedom, a freedom investors are willing to put a higher price tag on.

DeFi is just getting started

The DeFi sector has had an incredible year, and new projects are entering the scene at a high rate. Decentralized derivatives markets and exchanges see strong growth in monthly volumes, and the lending platforms have accrued a lot of value. Amid the ongoing frustration from retail investors on centralized markets being tilted towards favoring the large established institutions, we expect decentralized exchanges to prosper.

All these effects will likely lead to more growth in the BTC backed Ethereum protocols, as more users seek to utilize their bitcoin as collateral in the decentralized markets.



Where Crypto Enters the World of Finance

Bitstamp is the world's longest-running crypto exchange, serving institutional traders for as long as they've been in crypto.

As innovative products like lending platforms, Bitcoin-backed leverage and derivatives trading continue to drive the evolution of the crypto industry, having access to secure, reliable and regulated spot exchanges has become more important than ever. This is where Bitstamp comes in to strengthen the bridge between crypto and finance.

of clients: **4 M**

2020 total volume: **\$72 B**

Client assets: **\$7-8 B**

A reliable gateway into the cryptocurrency market

While diverse projects drive innovation for Bitcoin and other cryptocurrencies, the market as a whole remains a sort of walled garden. The efficiency of the entire system depends on the ability to get in and out of the market. Spot exchanges like Bitstamp are the gates welcoming you into this exciting new sector of finance.

Bitstamp is leading the charge when it comes to bringing exchange infrastructure in crypto on par with traditional finance. Bitstamp's APIs have the fastest response times in crypto¹ and the underlying infrastructure, built around a matching engine from Nasdaq, has proven its reliability during every demand spike the crypto industry has ever seen, including in 2021. Combine that with robust banking rails, including the option for select clients to settle payments 24/7/365, and the result is a fast, reliable and stable trading venue.

¹ CryptoCompare: Exchange Benchmark

“Our deep and diversified pool of liquidity, combined with the quality of our tech, is what makes institutional traders choose Bitstamp. But what makes them stay for the long term is our dedication to supporting them every step of the way and whenever they need us. We've built our brand around integrity and reliability and that's how we approach every partner.”



David Osojnik

CHIEF TECHNOLOGY OFFICER

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partners@bitstamp.net



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1 What is Collateral?

In this section, we will dive into the concept of collateral. What it is, which types of collateral are used today, and what defines good collateral. But first, we want to introduce the reader to some of bitcoin's unique properties, to keep in mind while reading the rest of this section.

1.1 Bitcoin's unique properties

Bitcoin's unique properties make it the perfect collateral asset. A global market, an asset without counterparty or credit risk, available 24/7, 365 days a year. No other asset can match these properties.

No counterparty risk

Bitcoin is not backed by anything, and the value is inherent in the asset itself, as every individual can store their bitcoin in their own wallets. The network is decentralized and secured by thousands of computers worldwide. There is no third party who can seize the user's bitcoin or censor their transactions. This makes bitcoin free of counterparty risk and leaves the individual in full control.

A global market

Bitcoin is borderless. Without centralized authority, the concept of borders is also removed, making bitcoin global and available for everyone. The world has never seen a type of money that enables instant transfer of value worldwide without relying on trusted intermediaries, such as banks or governments.

24/7/365

The bitcoin market never closes, which means that the asset is available 24/7, 365 days per year. This is without a doubt unique, as most financial markets are closed during weekends, limiting the hours when assets are available for buying and selling, but also transferring. This makes bitcoin arguably the most liquid asset in existence, as it's always available.

Portable and easy to transfer

The portability of bitcoin is at its essence. Hundreds of millions of dollars can be stored in a small USB drive or even by remembering a password. The latter is not recommended but shows how effortless it is to store and carry bitcoin. You just need to remember a password. The same goes for transferring bitcoin, which is done instantly and almost at no cost.

1.2 What is collateral?

Government bonds and U.S. Treasuries dominate as collateral assets today, as they are safe and liquid. However, these present a growing weakness and risk, as rehypothecation creates a systemic risk in the financial system as a whole. Bitcoin can be a solution to this problem but is still in an early stage of developing as collateral.

The concept

Put simply, collateral is defined as the asset a lender requires as security for a loan. Protection for the lender and secures their values in case of default or trouble with interest payments. If the borrower breaches the agreed terms, the lender can seize the collateral and sell it to secure its value.

Collateral is a useful tool to minimize risk and has grown to become a significant part of today's financial world. There are a range of collateral assets being used today, and some of the most common assets are bonds and cash-based products alike, equities, real estate, and gold. The type of collateral is often related to the kind of loan in question. Naturally, mortgages are secured by houses and car loans by cars, but there are a range of other loans secured by other assets.

Perhaps the most common type of collateralized loans are cash loans, both personal and institutional. The need for liquidity for personal use and business purposes has become an essential part of the world economy. A commonly used term is "Loan to Value" or LTV. This is the value that the borrower needs to post as collateral in relation to the loan value. For example, if a lender sets an LTV ratio of 0.5 and the borrower wants a loan of \$100,000, the collateral value needs to be 100% more than the loan value, which is \$200,000.

$$LTV = \frac{\text{Loan}}{\text{Collateral Value}} = \frac{100,000}{200,000} = 0.5$$

The kind of assets that are used as collateral vary, but the next section will look at the most common ones.

What kind of assets are used as collateral today?

The most common type of collateral in traditional financial markets are, without a doubt, **government bonds and U.S. Treasuries**. There is a massive market for overnight loans, the repo market. This enables short-term borrowing of cash in exchange for government securities, often bonds. ICMA estimates that the global repo market may be over EUR 15 trillion in outstanding size, with a turnover of about EUR 3 trillion per day. They also estimate that over 80% of EU-originated repo collateral is in the form of government bonds. Looking at the U.S. market, Treasury securities may account for about two-thirds of the repo market.

So what are government bonds or Treasury securities, you may ask? This is, put simply, debt issued by the government and is defined as one of the safest assets to hold since it's backed by the government. These are initially issued to support government spending but are also available in the secondary market.

Another type of collateral that perhaps feels more familiar for most readers is **real estate**. When borrowers apply for a mortgage, the real estate itself is used as collateral for security for the lender. Real estate is also categorized as a very attractive and safe form of collateral, as it historically has been holding its value well.

This is another huge market, and the total mortgage debt outstanding in the U.S. amounted to approximately 16 trillion U.S. dollars in 2019, according to [Statista](#).

Other related business collaterals are **inventory or plant and equipment**, where lenders secure their values through company assets.

Using **securities** as collateral is also a common practice to access more liquidity. While this is often used to reinvest in the market and increase one's exposure, it can also be used to access more cash for other purposes.

Gold has a long history as a reserve asset, and while the gold standard is not used by any governments today, it has been a common system historically. Gold's role as money and collateral faded over time, but after the financial crisis of the late 2000s, it came back on the radar. In 2011, the European Parliament's Committee on Economic and Monetary Affairs agreed to allow central counterparties to accept gold as collateral. Subsequently, gold has been reclassified to a Tier 1 asset under Basel III and increasingly accepted as collateral over the past ten years.

Even as gold has emerged as a global safe-haven asset and become a trillion-dollar market, gold's collateral market is just a fraction of the likes of governments' bonds, equities, and real estate. Greg Muecke of Tradewinds Markets [highlights](#) the lack of digital ownership records as the main reason. This makes it challenging to separate the value of gold from its physical location. The logistical challenges of transferring physical gold make it less attractive. Muecke furthermore explains:

"Seven hundred years later, lenders still face the same issue they faced in 14th century England: physically moving metal around the globe is time-consuming and costly."

While gold satisfies many of the desired attributes for good collateral, which will be

discussed further in the next section, the challenge of transferability takes us to a new and emerging asset that can be used as collateral: **bitcoin**.

As already mentioned at the beginning of this report, bitcoin has several unique properties that make it optimal as collateral. It is the first hard asset without any credit or counterparty risk. It is available in a global and liquid market at all hours of the day. It's even easily transferable at a minimal cost.

This sounds like the perfect collateral asset, but let's dive into a more detailed analysis of what defines good collateral. Not even bitcoin is perfect. Yet.

The examples above show us that it is possible to categorize collateral assets. On one side, we have bonds, securities, equities, and cash. These assets have several issues, with counterparty risk being the most problematic.

A typical activity in financial markets is the reuse and rehypothecation of collateral. The IMF [estimated](#) in 2018 that the same collateral was reused 2.2 times. Meaning that, on average, collateral received in one transaction is reused for more than two new transactions. Institutions typically receive collateral in the repo market or derivatives transactions. If this is eligible for reuse, they may post this as new collateral or use it in short sales. [According to the IMF](#), collateral reuse has become a significant financial market activity and is a common practice.

The reuse rate has increased again over the past few years after a substantial setback after the financial crisis in 2008, as a result of counterparty risk aversion. This leaves some regulators and supervisors concerned. For example, the former Vice-President of the ECB, Vítor Constâncio, has stressed that:

"activities of rehypothecation and reuse of securities amplified the creation of chains of inside liquidity and higher leverage"

The Financial Stability Board (FSAB) has also analyzed this more broadly and found that appropriate monitoring of collateral reuse at the global level will be an important step forward, but that no immediate regulatory actions are needed.

The IMF further highlights that collateral reuse significantly increases asset price volatility since more collateral becomes available in the financial market. This allows participants to build up leverage beyond what is feasible in a situation where no reuse of collateral is possible. Another issue is the risk of losing purchasing power. The current monetary

experiment with quantitative easing like we've never seen before and the constant cuts in interest rates, puts fiat currencies under extraordinary pressure and risk of devaluation. The money supply increase, yield curve suppression, and debt monetization have historically shown to create a bad environment for the pricing of bonds and cash instruments.

On the other side, we find real, hard assets. Real estate, gold, and more recently, bitcoin, fulfill these requirements. There is no counterparty risk in these assets, as the value is inherent in the asset itself.

What defines good types of collateral?

To define which attributes define good collateral, we will rely upon the framework used by the European Central Bank (ECB). This framework has further been simplified by [Fulgur Ventures](#) in their brilliant piece on bitcoin as collateral.

Fulgur highlights that although more collateral always makes the lender's values more secure, the ECB argues that collateral transfer to the lender is a costly process. Hence, the optimal loan arrangement concentrates on the use and transfer of collateral in a default situation. In this scenario, the collateral quality is critical, and the ECB defines the quality of the collateral as its **liquidity** and **safety**.

A liquid asset is then defined as one that:

1. Has high market liquidity

The asset's liquidity is defined by the difference between the bid and the ask price, the spread. In a liquid market, this spread is minimal, and it's possible to sell a large amount of the asset without moving the market price. If a borrower defaults, it is unfortunate for the lender if the collateral is illiquid. This can lead to a situation where the lender has trouble selling the asset to cover the borrower's losses.

2. Is easy to value

The asset used as collateral must be easy to value for the lender. This is important for risk management if the borrower defaults. A lengthy process of valuing the collateral in a situation where the borrower is defaulting is not desirable and puts an extended risk on the lender.

3. Is easy to transfer

Transferability is naturally important when it comes to collateral assets. Highly portable assets have a lower cost of debt. The importance of fast and uncomplicated transactions where the borrower needs to post additional collateral in a margin call situation is valuable for the lender.

4. Has a low deadweight cost

It is favorable if the collateral transfer from the borrower to the lender creates a minimal loss in its value. A house as collateral is a great example, as the lender will sit with an excess burden if the borrower defaults and the lender is "stuck" with a house. The more fungible an asset is, the lower the deadweight cost.

5. Is easy to verify

To be able to verify the asset used as collateral is understandably significant. If the asset is challenging to verify, this creates extra cost for the lender, which will be passed on to the borrower in the form of a higher interest rate. A lender will mitigate its own risk by increasing the cost of borrowing if the posted collateral comes with uncertainty.

Furthermore, the ECB focuses on two important attributes for the safety of the collateral:

6. Low volatility

A stable value of the collateral is essential for the lender. High volatility in the asset value increases the risk of the collateral being insufficient to cover a default. This is not a desirable situation for any lender.

7. Anti-cyclical

Unlike the other attributes, this point is not related to the asset's characteristics but rather the cyclical nature of the asset. The optimal collateral asset would be non-correlated to other assets or the economy in general. Negative shocks in the economy that leads to cascades of defaults would not necessarily impact the collateral value of its anti-cyclical.

Take mortgage loans with houses as collateral as an example: If the borrower gets fired because of a struggling economy, this will most likely also affect the borrower's house value and hence the collateral value, as the demand in the housing market goes down because of the struggling economy. These "double effects" create additional risk for the lender, as external factors can impact the collateral value.

Fulgur highlights another attribute for the collateral to be deemed safe and attractive.

8. Store of value

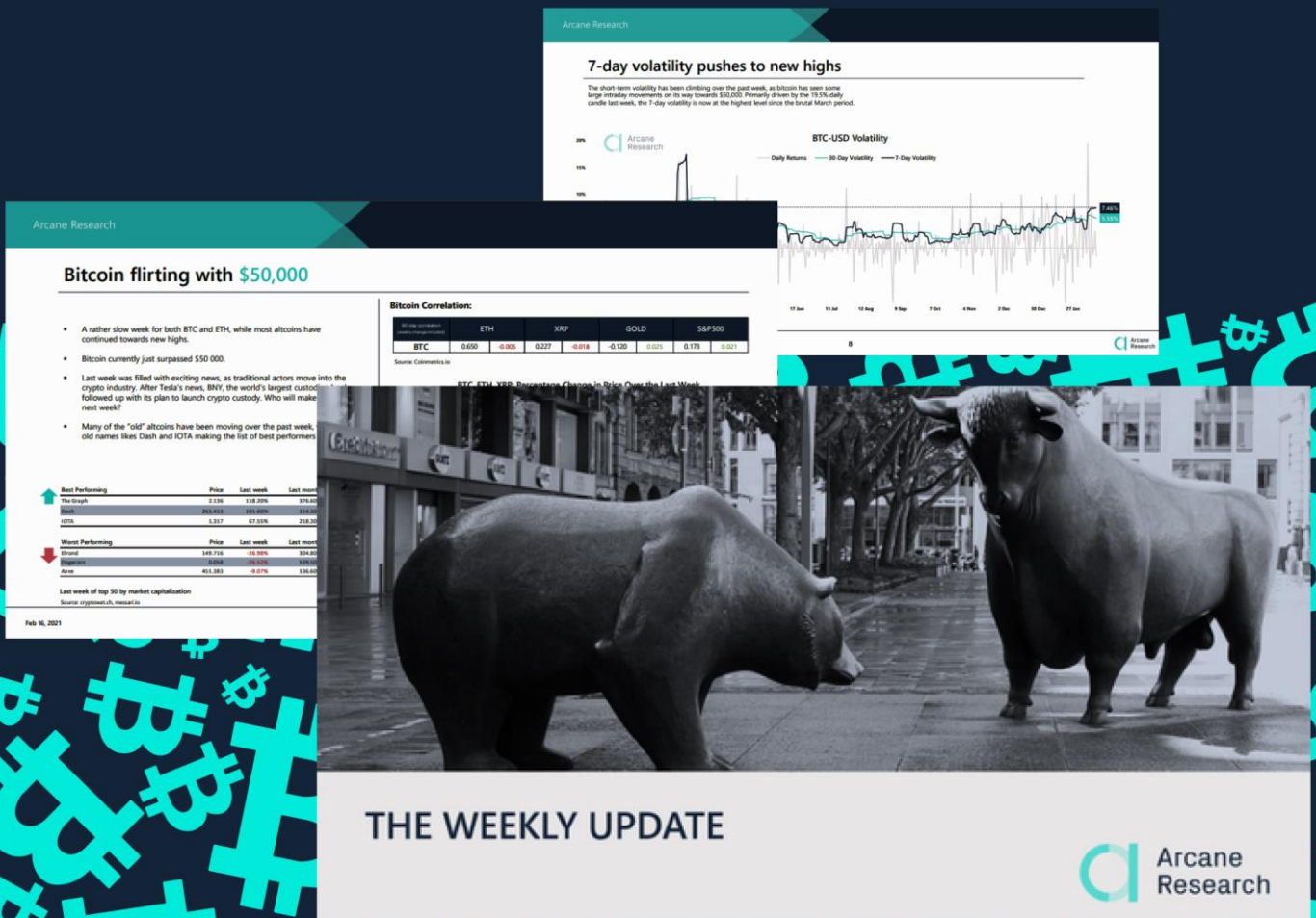
This attribute is not included in the ECB framework, but we agree with Fulgur that it indeed is an interesting attribute to discuss when comparing different collateral assets. Both the lender and the borrower are interested in a collateral asset that preserves its value over time. The lender will maintain its purchasing power in case of default. The borrower would also want its collateral to keep its value until it's back in possession after the loan is repaid.

As mentioned in the previous section, we can divide these collateral assets into two categories. See the Appendix for an extensive discussion.

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7-day volatility pushes to new highs

The short-term volatility has been dimming over the past week, as Bitcoin has seen some large intraday movements, on its way towards \$50,000. Primarily driven by the 153% daily candle last week, the 7-day volatility is now at the highest level since the brutal March period.

Bitcoin Correlation:

	ETH	XRP	GOLD	S&P500
BTC	0.656	-0.300	0.227	-0.618
	-0.120	0.025	0.170	-0.001

Bitcoin flirting with \$50,000

- A rather slow week for both BTC and ETH, while most altcoins have continued towards new highs.
- Bitcoin currently just surpassed \$50,000.
- Last week was filled with exciting news, as traditional actors move into the crypto industry. After Tesla's news, BNY, the world's largest custodian followed up with its plan to launch crypto custody. Who will make next week?
- Many of the "old" altcoins have been moving over the past week, old names like Dash and IOTA making the list of best performers.

Best Performing


Altcoin	Price	Last week	Last month
Bitcoin	51,000	+13.30%	+194.0%
Ethereum	2,611.41	+10.00%	+145.0%
IOSTN	1.317	+87.03%	+118.3%

Worst Performing

Altcoin	Price	Last week	Last month
Strat	148.718	-26.16%	-204.8%
Bitcoin	51,000	-26.16%	-204.8%
Arcx	451.383	-0.07%	-136.6%

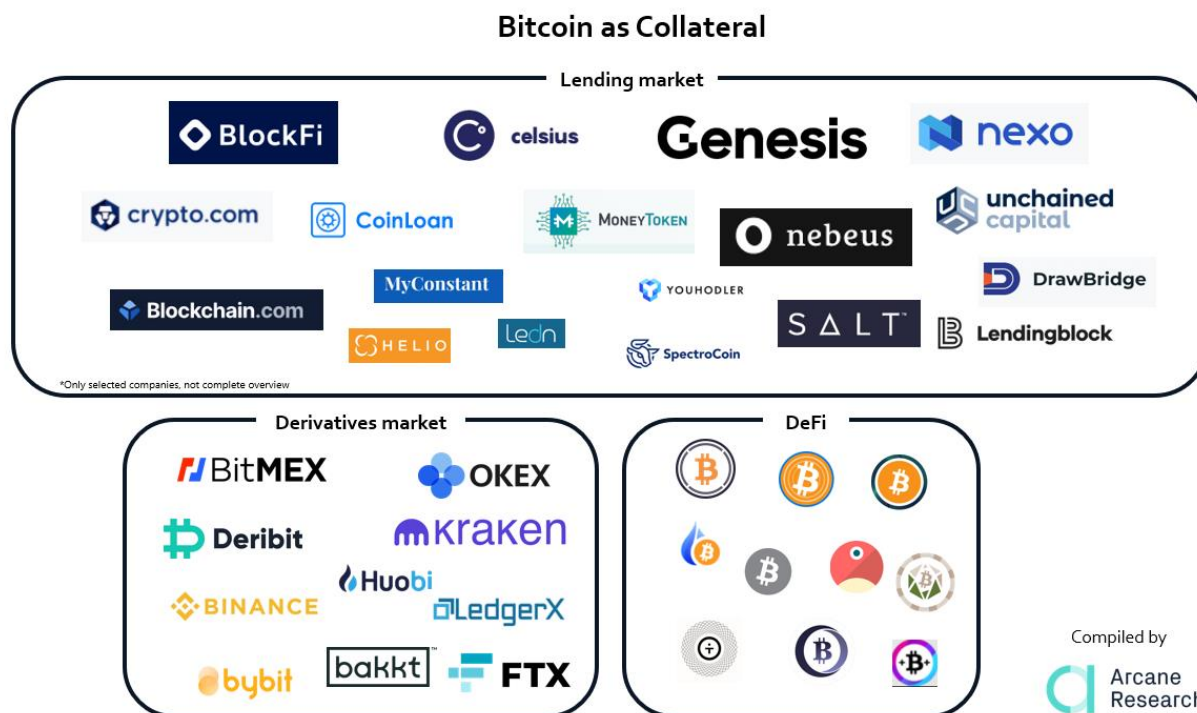
Last week of top 50 by market capitalization
Source: cryptomarket, messari.io
Feb 16, 2021

THE WEEKLY UPDATE



The BTC collateral market

The map below shows an overview of some of the platforms and companies where bitcoin is used as collateral. This is a growing market, with new entrances every year, with more investors seeing the value in using bitcoin as collateral. We firmly believe that we're in the very beginning of the era of bitcoin as collateral, especially in the lending market and decentralized finance.



Derivatives Market

Arguably, the first significant collateral use case for bitcoin came with the introduction and growth of the derivatives market in crypto. BTC collateralized derivatives have played an important role in BTC's price discovery, but they are currently losing market share to USD and stablecoin collateralized products.

Lending Market

The growth in the crypto lending market has been extraordinary over the past year, and 2020 has seen billions of dollars from institutions being deployed in the lending market. The institution-focused and market-leading company Genesis saw a YoY growth of 245% in their outstanding loans. Our estimation shows that over 400,000 BTC could already be used as collateral in the lending market today.

Decentralized Finance

The growth of DeFi in 2020 has incentivized bitcoin holders to tokenize their bitcoin on Ethereum to use their bitcoin as collateral in the wide array of services offered from the various DeFi platforms. By February 23rd, a total of 169,991 BTC has been tokenized on the Ethereum blockchain.

2 The Derivatives Market

Arguably, the first significant collateral use case for bitcoin came with the introduction and growth of the derivatives market in crypto. BTC collateralized derivatives have played an important role in BTC's price discovery, but they are currently losing market share to USD and stablecoin collateralized products.

As bitcoin started to gain traction, demand for arenas to hedge and increase exposure arose. Exchange infrastructure inspired by the framework of the traditional finance scene was built, of course, with some disruptive innovations given the crypto sector's experimental nature.

Initially, the derivative exchanges in crypto all utilized bitcoin as collateral for trades. Bitcoin was mainly used as collateral out of sheer convenience.

Bitcoin became a convenient collateral in the derivative market for several reasons. First of all, the regulatory framework applied to the derivatives market is strict. This made it difficult, if not impossible, for new exchanges to offer derivative products using fiat currencies as collateral for trades. Secondly, the stablecoin market was relatively nascent and small by the time the first major derivative exchanges were built and started to gain traction. Third, bitcoin is superb collateral for the exchanges. But why?

-
1. Bitcoin's fast, reliable, and global transaction infrastructure enables derivatives exchanges to expand globally at a rapid pace, as customers in every corner of the world are eligible and able to send collateral and start trading in mere minutes.
 2. Bitcoin collateralized exchanges are the clearinghouse. The exchange itself acts as the clearinghouse and seize collateral when the counterparty defaults. The exchanges themselves decide the optimal maintenance margin threshold and automate the liquidation process while also building insurance funds to cope with extreme market movements.
 3. By using bitcoin (or other crypto assets), the exchanges can offer trading products with far higher leverage than those of the regulated markets. While the higher tiers of leverage are extreme, and expected returns are more analogous with those of casinos, [data from BitMEX](#) clearly show that users are not shy to commit to trades with the highest tiers of leverage available.
 4. Traders who don't want to have stablecoin exposure or sit with dollars have an option to put their bitcoin at work in leveraged trades.
 5. The inverse nature of the bitcoin collateralized derivatives is ideal for shorting.

2.1 Futures market

The BTC collateralized futures market has experienced strong growth since futures became more widely adopted between 2017 and 2018. However, throughout 2020, the BTC collateralized futures has lost massive market shares to its USD and stablecoin collateralized peers.

In its essence, bitcoin collateralized futures exchanges work the following way:

A trader post bitcoin as collateral and commits to a trade. If the counterparty defaults, the exchange act as a clearing house, seizing the position using auto-liquidation engines, stepping in to forcefully sell the trade in the market (if more collateral is not posted). Therefore, traders can decide to transfer additional collateral to the exchange and avoid liquidation.

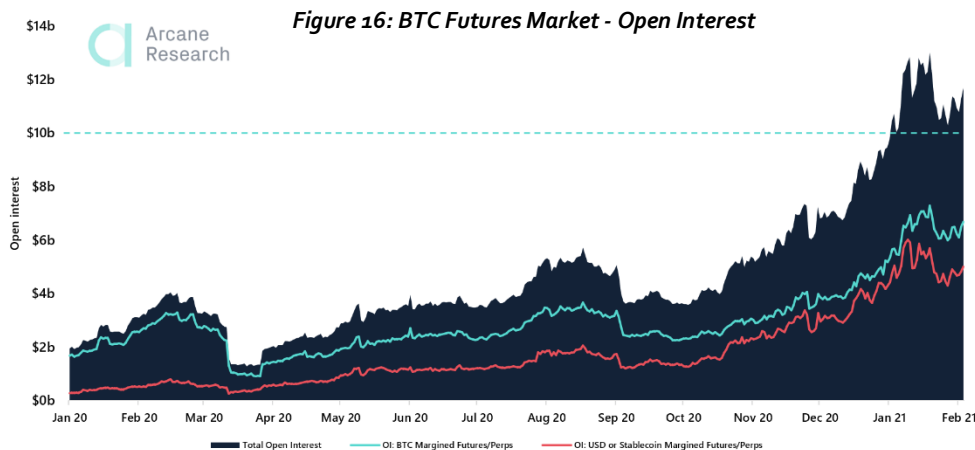
In other words, given Bitcoin's 24/7 up-time, traders can post more collateral at any time, if needed. Thus, traders can manage their margin balance in case the trade is about to become liquidated.

Bitcoin-collateralized futures are inverse, meaning that the price is quoted in one currency, usually the dollar, and margined and settled in the base currency, bitcoin. Meaning that the traded contract is priced in USD but settled in BTC with the underlying contract being worth \$1/BTCUSD, while the PnL calculations are priced in BTC.

Trading on the futures exchanges is peer to peer. The counterparty is another trader,

rather than the exchange itself. In a case of a massive, rapid price move, large numbers of bankruptcies may occur. Resulting in a BTC deficit in the market. I.e., the funds are insufficient to cover the profits of the profitable traders. In this case, the deficit is proportionally distributed between the traders who made a profit that day. Meaning the traders get paid, but not the full amount. This process is called socialized losses. To prevent socialized losses, the derivatives exchanges have insurance funds. The insurance funds act as the last line of defense to prevent auto deleveraging. During normal volatility, the insurance fund is built up steadily by liquidating trades on the maintenance margin (0.5% of the margin).

The open interest in the BTC collateralized futures market has trended upwards (when denominated in USD) ever since inception. Currently, around \$6.7 billion worth of open interest is tied up in BTC collateralized futures trades. In BTC terms, the open interest has fallen. It peaked at around 350,000 BTC on Feb 25th, 2020, and has since fallen to 182,606 BTC, while stablecoin and USD margined futures has taken large market shares.



Source: NYDIG, Skew, Bybt, CoinGecko

Market composition: Bitcoin collateralized futures market

The bitcoin collateralized futures market blossomed during 2017 and 2018 and was then heavily dominated by BitMEX. In 2018, the trading volume of BitMEX surpassed the trading volume of the entire spot market. Now, there are many exchanges competing in the space, with OKEx being the largest exchange in terms of open interest in BTC collateralized futures.

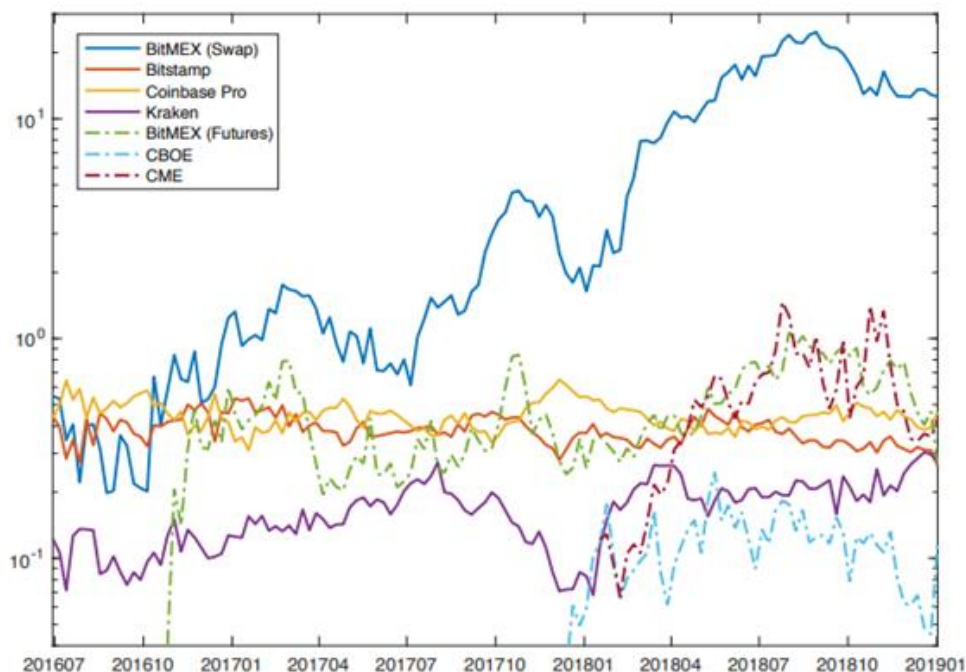
The bitcoin collateralized futures market is currently a space affiliated with fierce competition and many influential exchanges holding significant market share. The BTC collateralized futures market saw booming interest following the 2017 bull market, as traders sought to leverage their bitcoin to hedge and speculate amid the bear market. The market was then heavily dominated by BitMEX.

The main reason behind BitMEX's dominance can be traced back to May 2016, when BitMEX launched the perpetual inverse swap contract (perp).

The perp was an innovative derivative instrument. It shared most of the traits of traditional futures contracts while differentiating itself from futures contracts by not having an expiry date. By using funding rates, the perps maintain a close peg to the spot markets. This funding rate is the quintessential ingredient enabling the perps to trade without any expiry date.

This quickly became a very popular derivative instrument in crypto, namely due to the convenience of not having to roll over any positions. According to a paper issued by Carol Alexander of University of Sussex Business School, the trading volume of BitMEX's perps surpassed those of the entire spot market in 2018, as illustrated in the chart below.

Figure 17: Trading Volume of Different Bitcoin Products

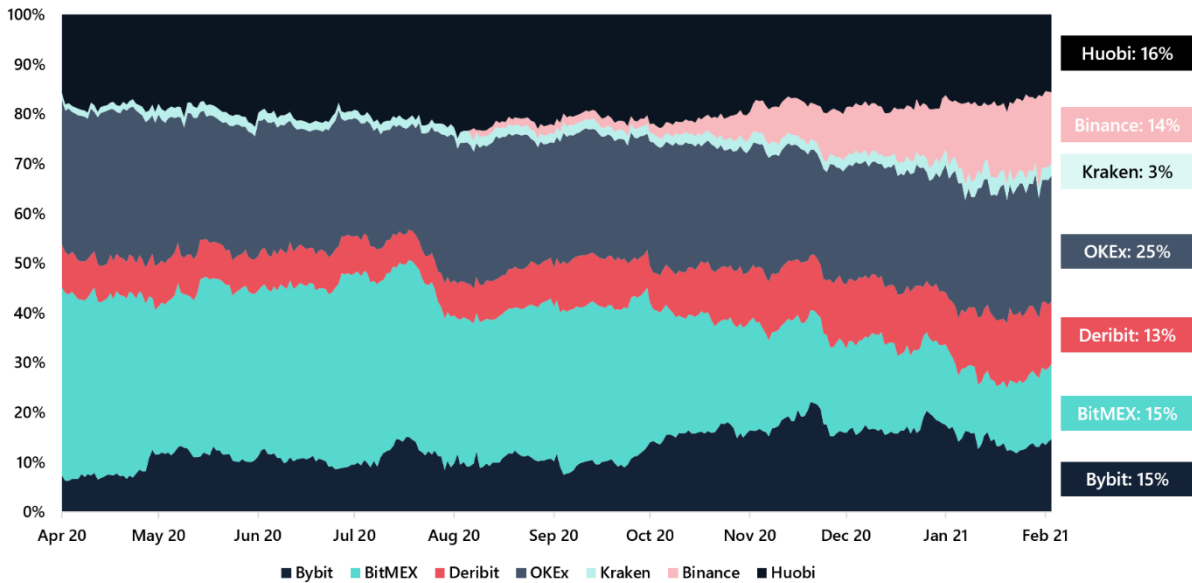


Source: Carol Alexander

The BitMEX dominance persisted for a while, but as exchanges saw the success of BitMEX's perpetual, they launched similar derivative instruments. Over time, this made the derivative scene more diverse, and throughout 2020 BitMEX lost its role as the market-leading BTC collateralized derivative platform, as visible in the chart below.

On January 1st, 2020, BitMEX alone contributed to 58% of the open interest in the BTC collateralized futures market. By January 17th, 2021, BitMEX's dominance in the BTC collateralized futures market had declined to 15% of the total open interest for reasons we will discuss later in this report.

Figure 18: BTC Collateralized Options Market Dominance



Source: NYDIG, Skew, Bybt, CoinGecko

Now, OKEx is the leading entity in the market, accounting for 25% of the total open interest. Interestingly, most of the open interest on OKEx is found in the futures contracts, whereas the perpetual contract has not really garnered the attention on OKEx as it has on other exchanges.

Bybit has the largest BTC collateralized perpetual contract but does not offer any futures. Bybit holds 15% of the total open interest in the market.

Huobi and Deribit offer both perps and futures on bitcoin and respectively contributes to 16% and 13% of the open interest in the BTC collateralized futures market.

Binance is also a significant player in the BTC collateralized futures market, contributing to

14% of the total open interest. Yet, Binance's most popular derivative instrument, their linear perpetual swap, is collateralized in Tether. There are advantages of stablecoin-collateralized derivatives, and we will uncover them later in the discussion.

FTX offers a vast amount of derivative instruments and is arguably the most innovative force in the derivative market. They allow traders to post bitcoin as collateral for their trades. However they use a cross-collateralization model that leads the collateral to be converted to USD if the margin becomes insufficient. We, therefore, exclude them from the market composition. All the while, we both acknowledge their services, their usage of bitcoin collateral, and also their enormous growth over the last year.

Market sizing the bitcoin collateral held in the futures market

Our own calculations and estimations size the BTC collateral in the futures market to be somewhere between 18,200 and 60,000 BTC.

The derivative market is relatively opaque. What we do know is the size of the open interest in the market. On February 3rd, 2021, the BTC collateralized futures market had a total of \$6.7 billion worth of open interest or about 182,000 BTC. The open interest is not representative of the actual BTC held as collateral given that the futures markets are high leveraged. In order to estimate the size of the BTC collateral held by exchanges, we would either need to receive information from the derivative exchanges themselves on their AUM or the average leverage ratio of their positions in the market.

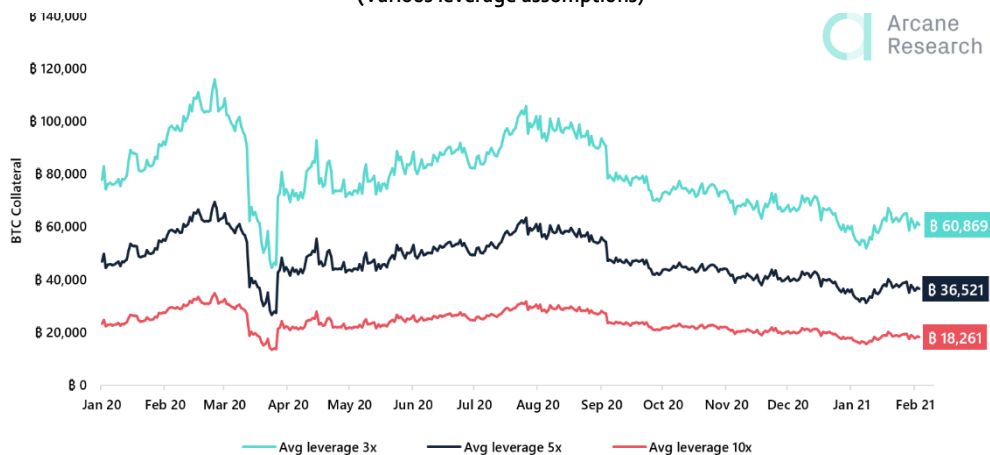
Most exchanges were reluctant to disclose this information, so we're currently unable to conduct any precise information on the total collateral held on these exchanges. However, back in 2019, in a fresh breath of transparency, BitMEX published [a blog on their leverage statistics from May 2018 to April 2019](#), disclosing the average leverage ratio of trades on the platform while also revealing the distribution of contracts held under various degrees of leverage.

The reported weighted effective average leverage ratio trended between a whopping 15x-40x for the entire duration. However, a large bulk of the contracts traded on the platform were structured between 1-10x leverage. Given the maturing market and the lack of recent data, we will base our market sizing on a more conservative leverage ratio, and acknowledge that we might overstate the size of the collateral held on the derivative exchanges.

Below we've made a chart illustrating the amount of BTC held as collateral on the derivative exchanges under various leverage assumptions.

Given an assumed average leverage ratio across the BTC collateralized futures market of 5x (blue line), we find that around 36,500 BTC is currently used as collateral on the exchanges. Under higher leverage ratios, such as 10x (red line), the amount of BTC held as collateral shrinks to 18,300 BTC. While an average leverage ratio of 3x (teal line) gives a collateral size of 60,869 BTC.

Figure 19: Bitcoin Used as Collateral in the Futures Market (Various leverage assumptions)



Source: NYDIG, Skew, Bybt, CoinGecko

Collateral discussion

Stablecoin and USD collateralized futures have taken large market shares from BTC collateralized futures, and BTC collateralized futures now only account for 57% of the open interest in the futures market, compared to 86% on January 1st, 2020.

As the derivative market in crypto has matured, more kinds of collateral have been introduced. With the launch of CME's BTC futures in December 2017, accredited investors could partake in leveraged bitcoin positions posting USD as margin (also settled in USD). Meanwhile, exchanges have also begun offering stablecoin-margined derivatives.

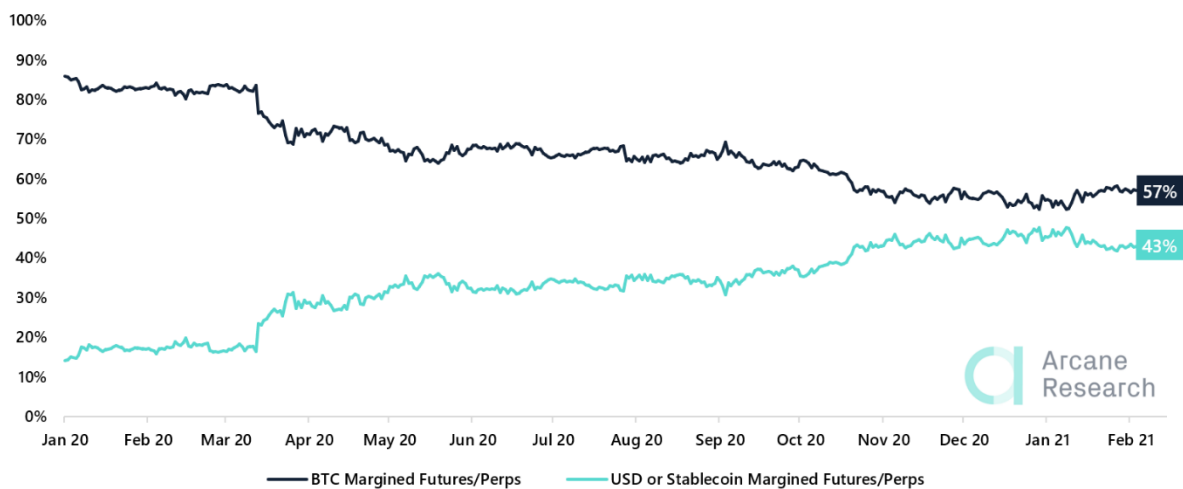
The trend throughout 2020 has been that more traders have moved over to stablecoin and USD margined futures contracts, with bitcoin collateral losing major market shares the last year.

This is illustrated in the chart below, showing that the total open interest of USD or stablecoin collateralized futures (teal) approaches the open interest of BTC collateralized futures. BTC collateralized futures now only account for 57% of the market.

Several forces have driven these developments. The catalyst has been BitMEX's fall from grace, with the main drivers being the "Bloody Thursday" March 12th crash and the October 1st CFTC charges on BitMEX.

The March 12th crash impacted the leveraged long positions, as it led to a cascading of liquidations dragging bitcoin down from \$8 000 to \$3 800 in the course of 24 hour. The crash ended as BitMEX went down for maintenance. Following this crash, the bitter consequences of over-leveraged trades became clear, and the derivative market's open interest took a hard hit. In addition to that, BitMEX's reputation was also impacted and by examining the open interest in the market as a whole, it becomes clear that many traders moved from BitMEX's perpetual to other markets. Many of which use stablecoin as margin.

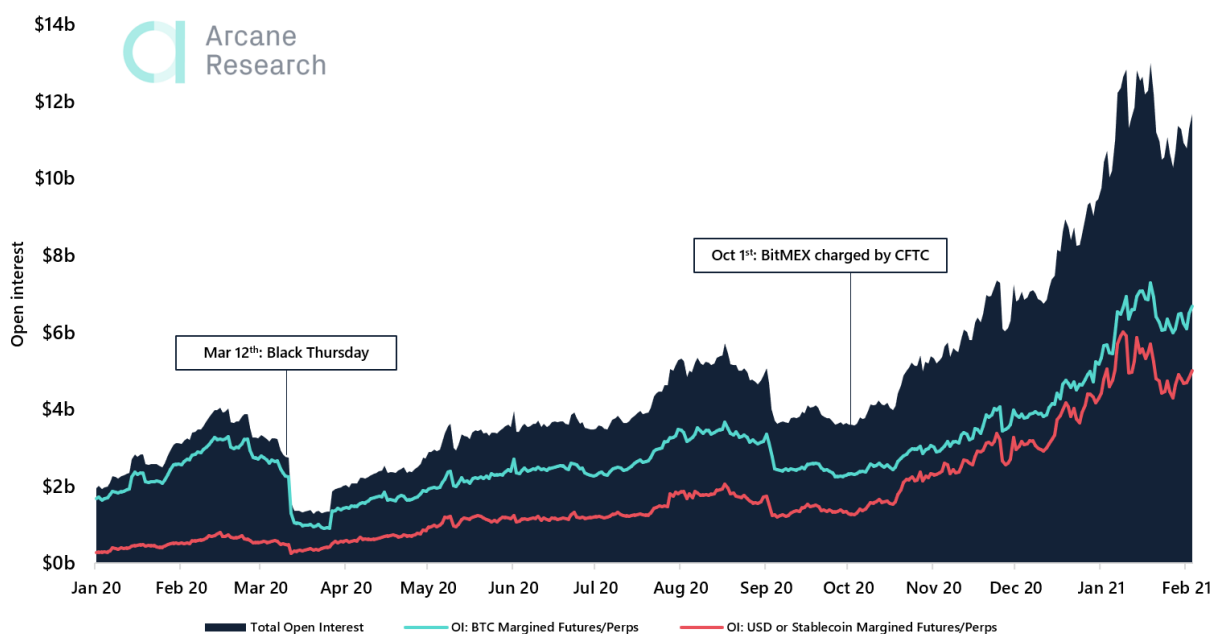
Figure 20: BTC Futures Market: Share of Open Interest by Contract Margin



Source: NYDIG, Skew, Bybt, CoinGecko

On October 1st, BitMEX took another heavy hit as the CFTC charged the exchange for illegally operating a cryptocurrency derivatives platform and anti-money laundering violations. This led to a large outflow from BitMEX over to other competitors – at large to Binance. In addition, it led more exchanges implementing stricter KYC-procedures to avoid the same faith that struck BitMEX. The chart below illustrates the impact of these two events and how USD and stablecoin margined futures now contribute to a significant amount of the open interest in the futures market of \$13 billion.

Figure 21: BTC Futures Market - Open Interest



Source: NYDIG, Skew, Bybt, CoinGecko

The reasoning behind the movement of funds from BitMEX to stablecoin margined derivatives products could be coincidental, but there are several arguments as to why stablecoin-margined futures might be a better instrument than bitcoin-margined futures for leveraged crypto exposure.

Linear contracts

Firstly, the stablecoin-margined contracts are linear, meaning that exposure is constant, whereas the bitcoin-margined contracts are inverse. In a case where the trader enters a long position on an inverse contract and the bitcoin price declines, the underlying collateral for the trade will depreciate alongside the long position itself.

As the value of the collateral declines, the risk of liquidation increases, meaning leveraged long trades on the inverse perpetuals are even more dangerous when collateralized in bitcoin than with stablecoins. The convexity of BTC margined contracts is unfavorable for longs.

Absolute dollar return

Secondly, stablecoin margined perpetuals are used more for absolute dollar return, than they are for hedging market exposure, meaning they are more frequently used by speculators and arbitrageurs.

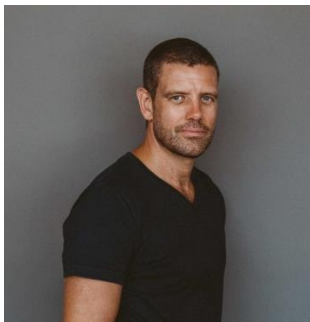
Less complex

Thirdly, stablecoin-collateralized derivatives on altcoins are less complex than bitcoin-collateralized derivatives. Bitcoin

collateralized derivatives on altcoin pairs are often solved by constructing quanto derivatives. They are collateralized and settled in BTC, but the underlying pair does not involve BTC. Meaning, that if a trader longs an ETHUSD quanto derivative, and ETHUSD goes up, while BTCUSD goes down, the trader realizes a BTC gain, but BTCUSD dropped, and in the end, her USD gain is much lower. Quanto contracts are thus more complex as they involve more variables, while stablecoin-

collateralized trades are more straightforward.

These nuances could explain the 2020 trend of the market moving towards linear futures, highlighting that there clearly are some disadvantages to using bitcoin as collateral on derivatives. This has prompted both BitMEX and Deribit to seek to add new margin assets to their exchanges in 2021.



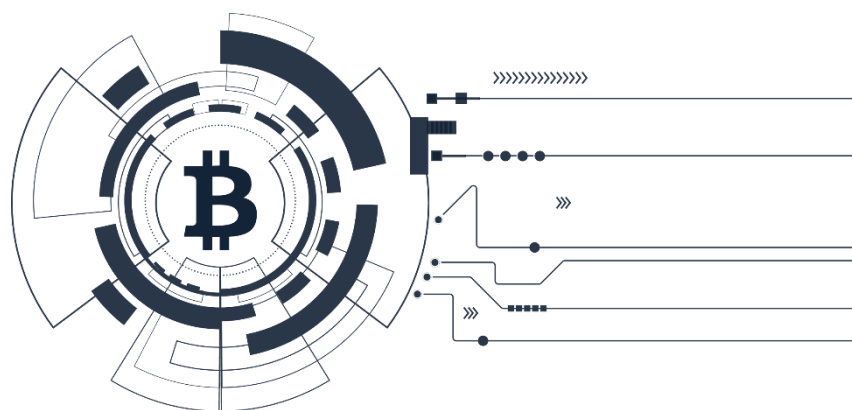
"The focus for 2021 is on delivering the new products and features our growing client base has been asking for, including support for additional margin assets, expanding the list of contracts we offer, and integrating more closely with the infrastructure and services that have become core to the industry."

- Ben Radclyffe, Commercial Director at 100x Group



"In line with several of our peers we are preparing the introduction of stablecoin margined products, final introduction date to be confirmed."

- Luuk Strijers, CCO Deribit



Yet, while stablecoins have *some advantages* compared to BTC as derivative collateral assets, the picture is not all black and white.

Inverse futures are ideal for hedging

The inverse payoff carries some advantages, especially for those who seek to hedge. A 1x leveraged short position on a bitcoin-collateralized future contract is a way for investors to hedge their USD value, in effect entering into a synthetic USD.

Say a trader holds an account balance of 1 BTC, and the current bitcoin price is \$30 000. If the trader wishes to hedge her position, she enters a short position of \$30 000 dollars. Her account will maintain its USD value of \$30 000, no matter which way the price moves. If she enters this hedge on the perpetual contract, the trader will be exposed to the funding rate of the perpetual. The funding rates vary. The annualized funding rate in 2017 was at 65.9%, while the annualized funding rate in 2018 was -7.6%. In 2019 the annualized funding was once again positive of 7%. A negative funding rate of -7.6% means that hedging using the inverse perpetuals during the bear market of 2018 came at a cost.

In addition, the convexity of the inverse contracts enables shorts to make more BTC as the price falls, and lose less and less as the price rises. Hedgers using CME or stablecoin margined contracts have a fixed BTC exposure regardless of the price, as the USD exposure varies linearly with respect to price.

Bitcoin exposure

Also, bitcoin purchased to hedge a short CME position cannot be used as collateral. This

presents some challenges for hedgers who hold physical bitcoin, and market makers who must divide capital between derivatives and spot markets with no cross-collateral relief.

No counterparty risk

Stablecoin exposure involves counterparty risk. Currently, there are **one key event** that might influence the stablecoin markets.

Several lawmakers have introduced the STABLE act. This bill seeks to amend the Federal Deposit Insurance Act to provide for the classification and regulation of stablecoins.

As proposed, this bill will impact the stablecoin sector. Any stablecoin issuer would need to obtain a banking charter and be in full compliance of existing banking regulations.

Any stablecoin issuer would be required to obtain the approval of both the Federal Reserve and Federal Deposit Insurance Corporation six months before issuance, and stablecoin issuers would either need to obtain FDIC insurance or deposit dollar reserves directly at the federal reserve.

This legislation is still pending, and the U.S. congress has not passed any substantive legislations on blockchain and crypto bills throughout 2020. But, if the STABLE act were to be realized, the implications would likely be huge and lead the market share of the BTC collateralized derivative instruments in the unregulated derivative market to grow.

2.2 Options

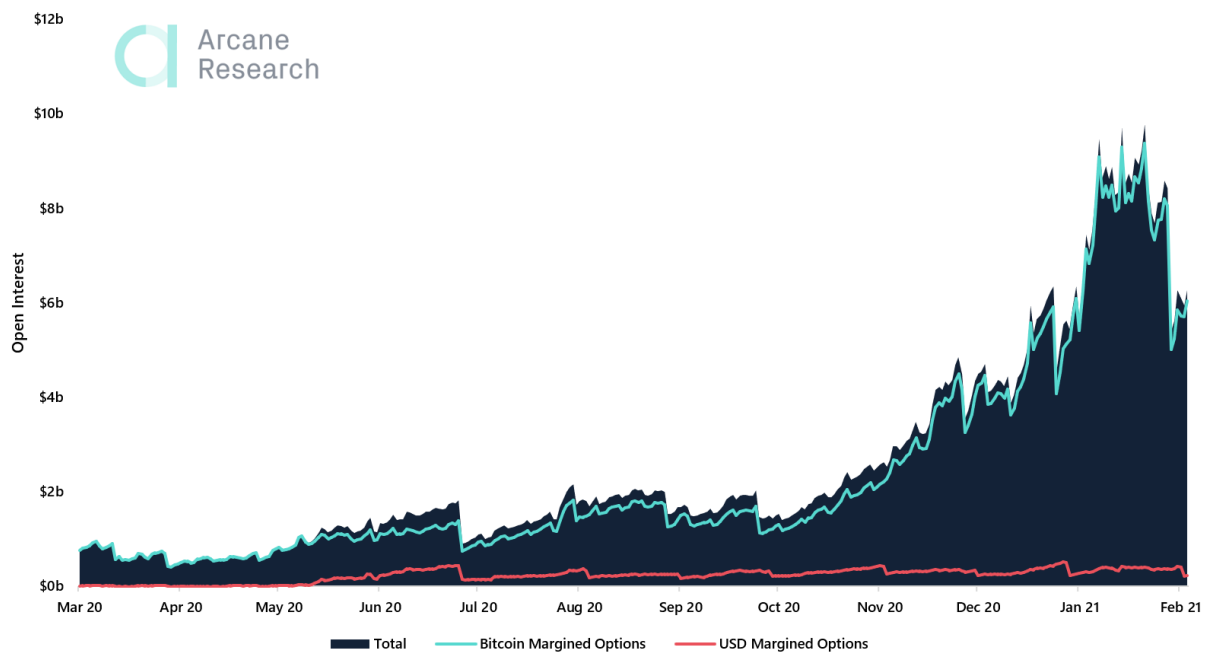
Here we've mainly focused on the futures side of the derivative market, but there also is a thriving option market using BTC as collateral. The open interest in the options market is approaching the size of the open interest of the entire futures market in bitcoin and has surpassed the open interest of the bitcoin collateralized futures market.

2020 – The breakthrough year for bitcoin options

In 2016, Deribit launched the first platform in the world offering plain vanilla European options with bitcoin as margin. These options enable more sophisticated leveraged exposure to bitcoin and are efficient vehicles for the experienced trader to take advantage of bitcoin's volatility. Still, BTC options saw a relatively slow adoption the first years since launch. However, during 2020 the adoption of BTC options accelerated considerably.

On March 1st, 2020, the total open interest in the BTC options market sat at \$760m. Now a year later the total open interest sits at **\$6.3 billion** after peaking at **\$9.8 billion** by the end of January. That's a growth of **1,186%** in one year, marking 2020 the breakthrough year for bitcoin options!

Figure 22: BTC Options Market: Open Interest



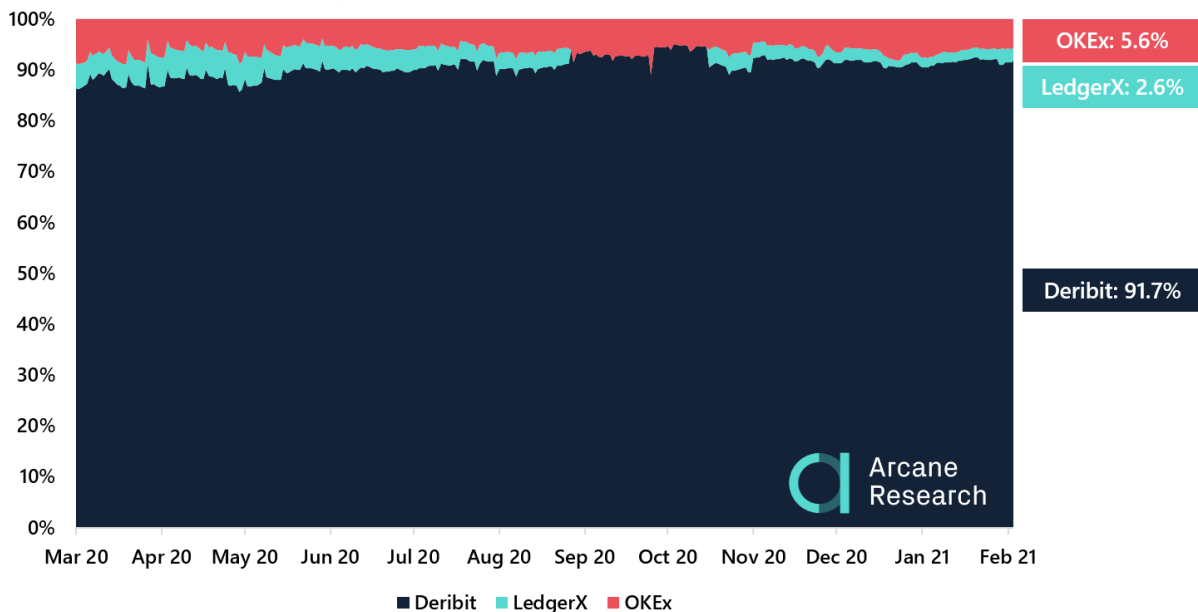
Source: NYDIG, Skew, Bybt, CoinGecko

BTC - The dominating collateral asset in the bitcoin options market

Bitcoin is by far the dominating asset posted for margin in the BTC options market. This is in stark contrast to our findings from the bitcoin futures market. Currently about **95%** of the open interest in bitcoin options is based on bitcoin collateralized positions, with the USD settled options accounting for the remaining 5%.

The huge dominance of BTC collateralized options can at large be prescribed to Deribit's absolute dominance in the space. Currently, Deribit accounts for **88%** of the open interest in the BTC option markets, and **92%** of the open interest in the BTC collateralized options market. The remaining exchanges in the space offering BTC margined options are Ledger X (3%) and OKEx (6%).

Figure 23: BTC Collateralized Options Market Dominance



Source: NYDIG, Skew, Bybt, CoinGecko

While Deribit has a fiercely strong grasp of the BTC options market as of now, the exchange remains bullish on the further growth potential for the platform and industry in general.



"We believe and see on a daily basis that institutional investors entering the crypto space trade instruments they are familiar with like spot and options. Due to this we have seen spectacular open interest growth throughout 2020. In January at its peak options open interest on Deribit reached USD 10 billion. Besides institutional demand, we have seen a remarkable increase in retail activity as well. We have thousands of unique accounts active in our options segment clearly indicating the upside potential. When looking at global options traders in the various asset classes and the growing number of BTC addresses & exchange accounts the untouched retail potential of our niche is enormous."

- Luuk Strijers, CCO at Deribit

3 The Lending Market

The growth in the crypto lending market has been extraordinary over the past year, and 2020 has seen billions of dollars from institutions being deployed in the lending market. The institution-focused and market-leading company Genesis saw a YoY growth of 245% in their outstanding loans. Our estimation shows that over 400,000 BTC could already be in use as collateral in the lending market today.

The lending market for bitcoin is young but rapidly growing. The very first companies in this sector launched their offerings only four to five years ago. This has now become a billion-dollar industry and an important part of the overall bitcoin market.

However, this is not surprising, when we see how massive the lending activity in traditional markets is. As discussed in section 1, collateralized loans are seen everywhere, from mortgages and cash loans to the gigantic repo market with overnight lending.

One of the first companies that introduced bitcoin-collateralized loans was Salt Lending. It was launched in 2016 by a group of bitcoin enthusiasts and introduced asset backed lending to the cryptocurrency market and later grew to become a 40+ employee company offering both institutional-grade crypto custody and blockchain monitoring products.

Other companies that are well-known today later joined Salt. BlockFi and other large players like Genesis, Celsius, Nexo, Lend came into the market in 2017 and 2018, and more platforms are popping up each year, and the industry is indeed on the rise.

Credmark, the industry-leading credit data firm, has been collecting data from all crypto lending firms since 2018 and has invaluable insights into the untransparent world of crypto lending data. When talking to the CTO and Co-founder of CredMark, Neil Zumwalde, he explains that collecting lending data from all the companies has been as challenging as it looks from the outside:

"We have literally been running around NYC for several years to gather all this data. It's not been easy"



*Neil Zumwalde,
CTO & Co-Founder, Credmark*

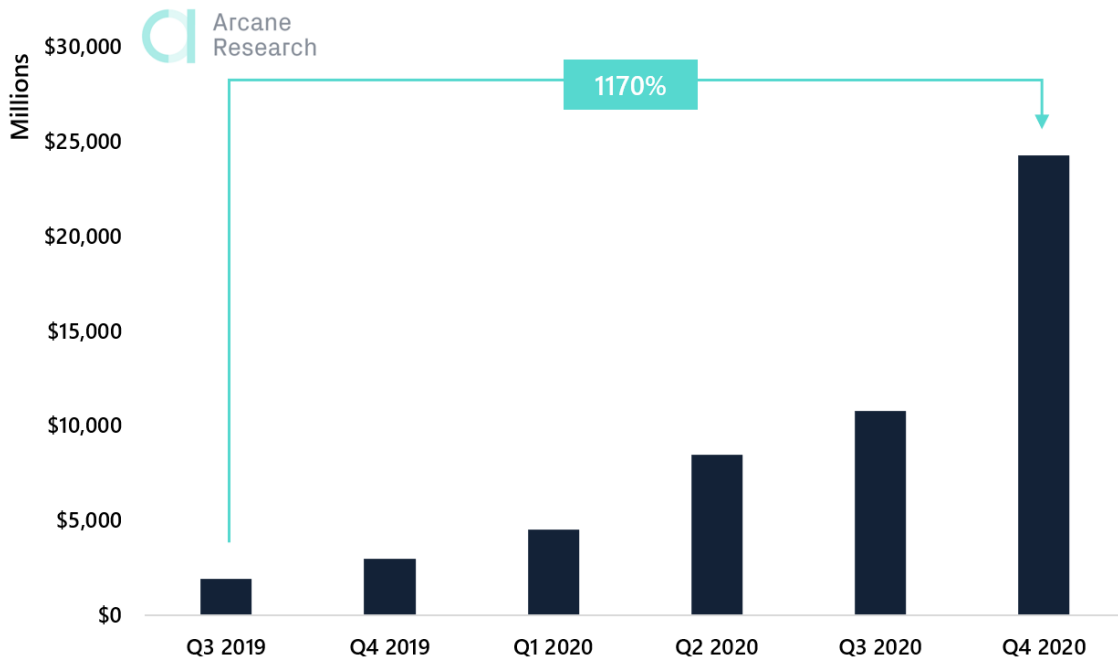
The table below shows the estimated size of the crypto lending market and the growth over the past years. As seen, the growth of 2020 has been extraordinary.

The observant reader can see that the dollar amount of all outstanding loans is much smaller than the amount of active collateral. This takes us back to the Loan to Value (LTV) ratio that was discussed in section 1. Lending companies are not interested in losing any money on their business and hence ask borrowers to lock up more than they're borrowing. This LTV ratio varies from the type of borrower that is taking the loan, but is often

between 0.5 -1. A LTV ratio of 0.5 means that the borrower needs to deposit twice as much as the loan value, meaning that a loan of \$100,000 would require that the borrower deposits \$200,000 as collateral.

This may seem like an unnecessary high buffer, as the lender is secured against any loss as long as the value of the collateral doesn't drop more than 50% before some of it is sold to cover losses. However, as we saw in March last year, a 50% can happen within a few days, and lending companies do not want to take any unnecessary risk.

Figure 24: Active Collateral - Lending Market*



Source: Credmark

*DeFi excluded

3.1 Why bitcoin is used as collateral for loans

There are numerous reasons for using bitcoin as collateral for loans. The most common are for leveraging up on existing crypto positions, arbitrage plays, market-making and covering operation cost without selling any holdings.

There are several reasons for why crypto lending has grown over the years. First of all, the world of digital assets enables a fast, easy, and uncomplicated loan process, which is much more appealing than going through a bank and mountains of paperwork. These collateralized loans are also available for anyone that can fulfill the collateral requirements. No credit checks or evaluations from your bank, making lending available for a broad range of people. These are also available worldwide, and you don't need a personal relationship with your local bank to get a loan. A new, digital and borderless lending market is emerging.

So what are the most common use cases for these bitcoin-collateralized loans? Are borrowers just taking out loans to get better cash flow in their everyday life? Not exactly. There are many reasons why someone would want to borrow against their crypto holdings:

Leverage up: buy more crypto

This is most likely the most common reason and a clever way professionals increase their exposure in a cryptocurrency. By locking up BTC or other cryptocurrencies, borrowers get a cash loan that is used instantly to buy more cryptocurrency. Why don't these people just go to derivatives exchanges and increase their exposure like other traders?

There is one big difference: automated liquidations. Leveraged trading through lending gives a totally different liquidation process. Many derivatives exchanges have automated liquidation bots that sell your positions when the price drops below a given

level. Referring back to the March crash of 2020 once again, we recall how the price crashed brutally. Many have later blamed some of this on massive liquidation cascades from BitMEX and other derivatives platforms. A dangerous situation when the liquidity in the crypto market was drying up due to the fear that was spreading across all financial markets due to the Covid-19 outbreak.

Many retail traders experienced life-changing losses during the March crash. However, institutional players in the lending market did not see the same liquidation problem, according to Neil Zumwalde from CredMark:

"Only 10% of institutional borrowers saw their positions getting liquidated, much lower than what was seen in other sections of the market"

The structure of collateral in the lending market differs from that seen in the derivatives market. Borrowers are not always automatically liquidated and often get up to 72 hours to deposit additional collateral to save their positions. Lending companies do not have an interest in their customers getting liquidated, as their business is to provide loans. In the derivatives market, many platforms even have liquidation fees, locking in profits on traders' losses.

This shows the fundamental difference between leverage in the lending market and the derivatives market, and explains why this is growing in popularity.

Arbitrage

Another widespread use case for lending cryptocurrency is arbitrage. The crypto market is still young and presents plenty of opportunities for traders to lock in profit from small spreads between different contracts and products. This is mostly a professional occupation, requiring large sums of money to capitalize on the small pricing differences. In these situations, it comes in handy to, for example, lock up bitcoin as collateral and borrow cash. Cash and carry arbitrage is a common strategy, where traders shorts a futures contract with a premium to the spot price, and holds the underlying asset to expiry. This will lock in a profit of the spread between the two contracts, minus the fees.

Another hot topic on arbitrage lately, has been the Grayscale Trusts, where shares are available in the secondary market at a premium to the share's underlying value. The dynamics of these products are presented on [our blog](#) which explains how institutional investors buy into these in the primary market and sell their shares after a lockup period for a nice premium in the secondary market. The direct investments can be made both "in kind" or with cash. If these participants lock up BTC as collateral and borrow cash (or other cryptocurrencies), they can keep their exposure to the underlying asset and still exploit the arbitrage opportunity. Grayscale has several trusts, and the premiums on some of the smaller trusts are nothing but extraordinary.

Market-making

It is of great importance that exchanges and marketplaces in crypto stay liquid, and lending companies have a crucial function to make this

happen. [BlockFi said in 2019](#) that roughly 70% of the companies participating in the crypto lending market were market makers, 25% funds, and 5% exchanges. A portion of these are most likely borrowers of stablecoins for liquidity provision elsewhere, which is collateralized by bitcoin. However, the largest portion of market makers borrow crypto assets and not stablecoins.

Tax deferral and the need of fiat

Perhaps not the most common use case for loans and probably more common among retail borrowers, but some people do not want to sell their crypto holdings and trigger tax events. By borrowing cash with crypto as collateral instead of selling when fiat liquidity is needed, you can postpone this.

Miners covering cost

On the more professional side of needing fiat liquidity, we find miners. This is a complicated and capital-heavy business. The regular need to cover operational costs can be covered through a loan and avoiding selling freshly minted bitcoin. BlockFi is even encouraging miners to do this and highlights several reasons to do this:

- **Fund mining rigs with crypto**
- **Pay mining electricity bills with crypto**
- **Pay for business expenses with crypto**

3.2 The lending market in 2021

Genesis and BlockFi are the two market-leading companies in the lending market with their institutional-focused businesses. They have seen incredible growth over the past year, and both had around \$4 billion in outstanding institutional loans by the end of 2020.

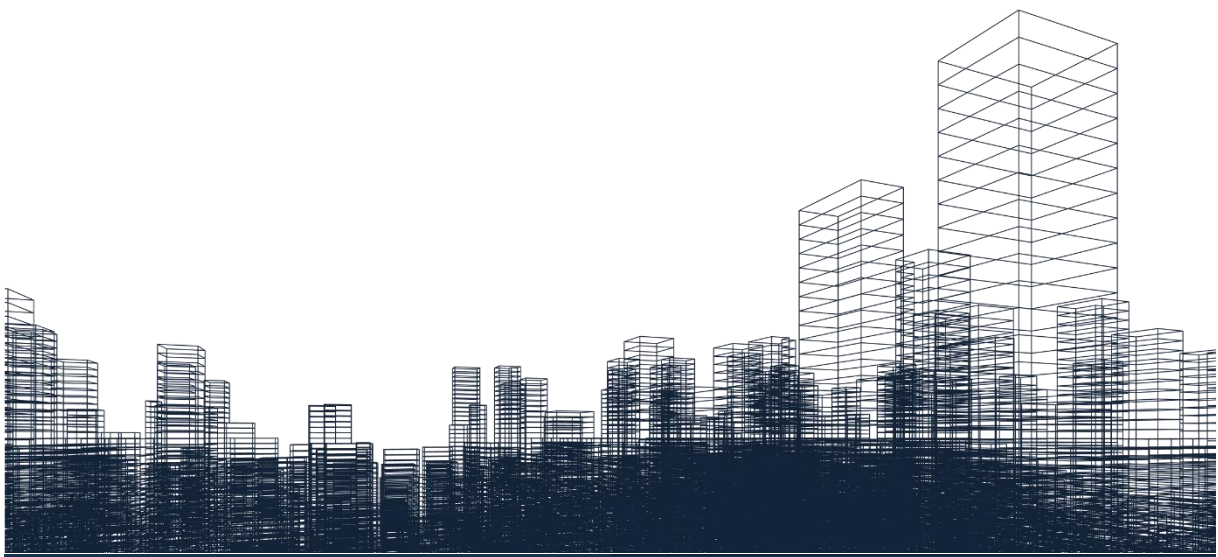
There is a sea of companies in this section of the crypto industry. Some are heavily-focused on institutional customers, others solely targeting retail and the consumer market. Nevertheless, the lending market is currently in a state of rapid growth. It's been a great year for most companies, driven by the increased demand for bitcoin and the price rise of late.

Several companies we have talked to are highlighting the increase in the bitcoin price as a clear driver of new loans over the past year and at the beginning of 2021, as mentioned by Phil Geiger, Director of Product Marketing at Unchained Capital:



"We've noticed that the increase in price of bitcoin is the primary driver for the demand to take out a bitcoin loan for our target client, since many of our loan clients are looking at bitcoin as multi-generational wealth and do not want to sell it if they don't have to."

- Phil Geiger, Director of Product Marketing at Unchained Capital

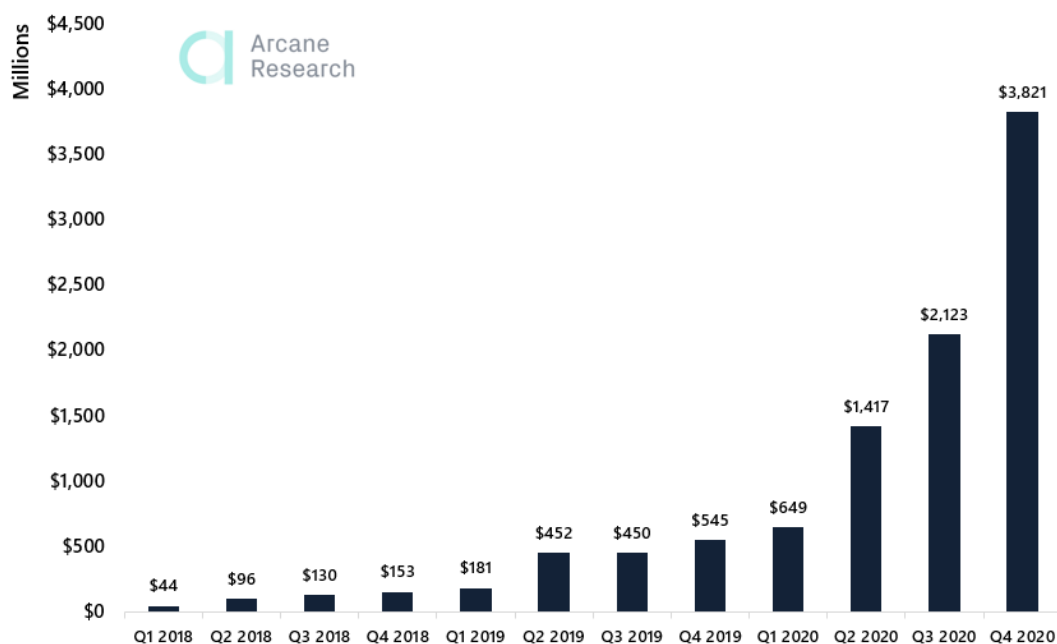


Genesis

One of the most prominent players in the lending market is Genesis. The company just published its Q4 2020 report and had an absolute banger of a year. The last quarter of the year was described as "tremendous growth", and the company's active loans surged to \$3,8 billion. This is a roughly 80% growth from Q3. As seen below, the dollar amount of outstanding loans started growing exponentially during 2020 with a YoY growth of 245%.

Genesis started in 2013 when the company launched the first U.S OTC bitcoin trading desk. Today, the company facilitates billions of dollars monthly in trades, loans, and transactions. Genesis Products and Services are only available to qualified Accredited Investors and Institutional Investors. Their one-stop-shop for institutional digital asset needs has given Genesis a market-leading position.

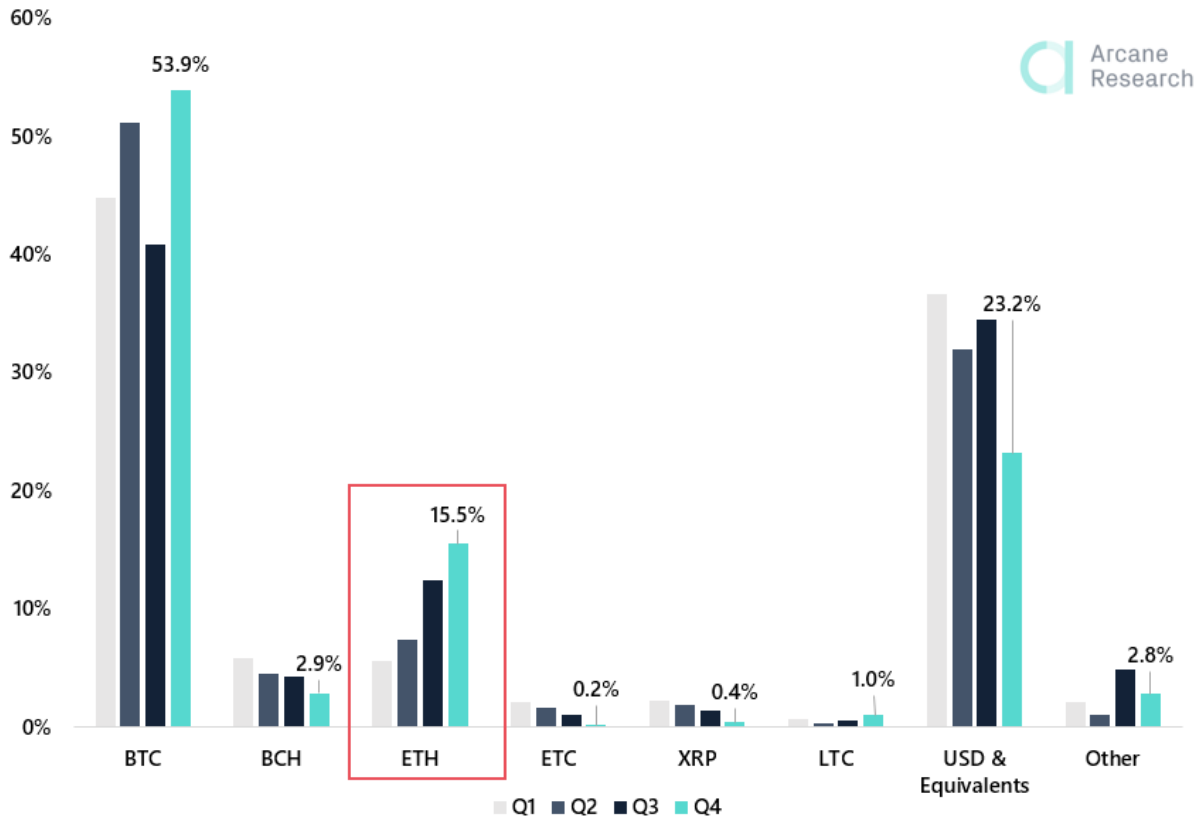
Figure 25: Genesis - Active Loans Outstanding



Source: Genesis

In Q4, the company pointed to the inflow of institutional lenders. Ultra-high-net-worth individuals, corporations, traditional hedge funds, and family offices wanted to enter the market for the first time and were looking to generate excess yield on idle cash. There is still a significant need for liquidity in the crypto market, which results in favorable yields for participants who lend cash or stablecoins to companies like Genesis. The counterparties to these institutional lenders are borrowers at Genesis, who bring the liquidity out in the crypto market to profit on spreads and mispricing. Genesis emphasizes that the recent bull run has shown that there still is a lack of cash to sophisticated trading firms to fully collapse the structural basis that continues to persist between the futures and the spot markets. Even with the possibility to earn double-digit yields on these spreads, Genesis highlights that: "The funding curves continue to widen out given how much long exposure is being taken via levered products relative to fully-funded spot buying".

Figure 26: Genesis - 2020 Loan Portfolio Composition



Source: Genesis

Although the demand for cash is clearly present, only 23.2% of Genesis' loans outstanding in the fourth quarter were USD and equivalents. The chart below shows the 2020 loan portfolio composition for Genesis.

As seen above, 53.9% of all active loans from Genesis are in BTC. A substantial increase from the third quarter, when only 40.8% of loans outstanding were in BTC. However, Genesis points toward the price appreciation of bitcoin and its impact on outstanding loans as the main reason.

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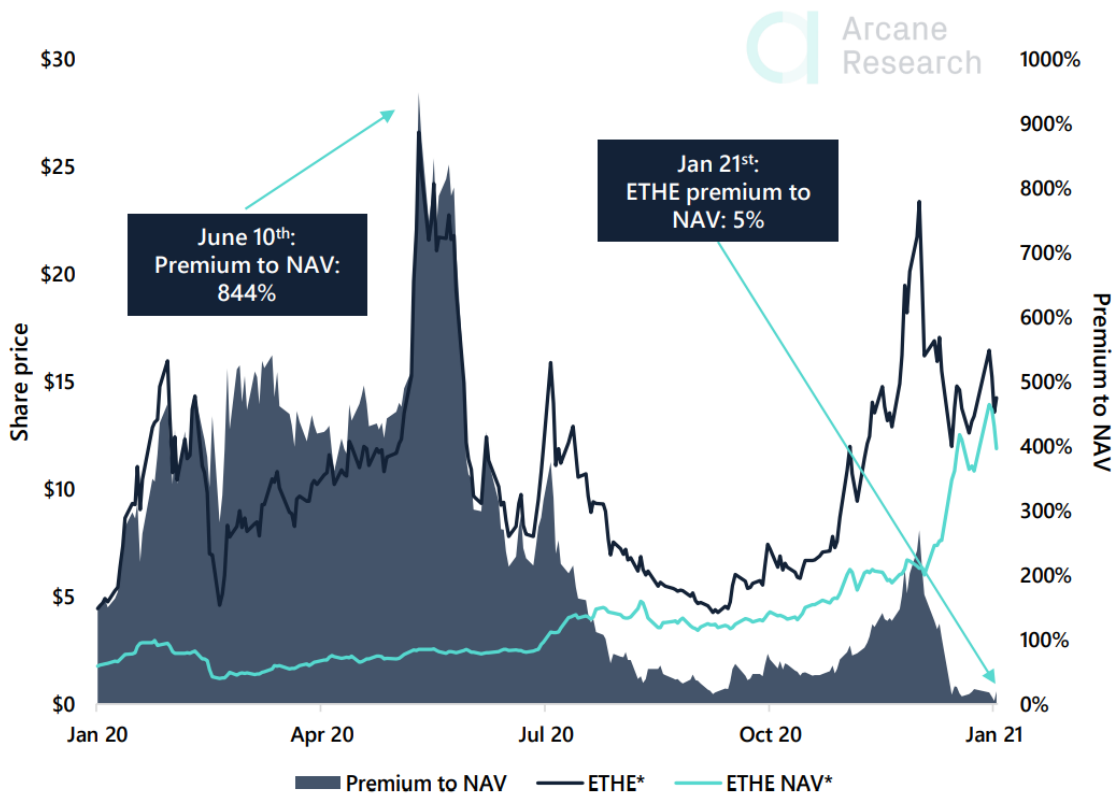


However, the most interesting development of 2020 was the steady increase in ETH loans outstanding. After ending Q1 at 5.5%, the share of ETH loans outstanding grew 177% of the next three quarters, ending the year at 15.5%. Some of this growth is, of course, attributable to ETH's price inflation but a significant part of these newly issued loans was tied to in-kind placements in Grayscale's Ethereum Trust, according to Genesis.

As mentioned earlier in this section, accredited investors can do these in-kind placements in Grayscale's products and receive shares after a lock-up period, where these historically have been trading at a large premium to the net asset value (NAV).

Arcane Research recently highlighted the decline in the premium of the Grayscale Ethereum Trust. It's not hard to see why some investors have been placing ETH in Grayscale's Trust this year, as the chart below shows how the premium has been extremely high. The sharp decline in the premium could suggest that at least some determined sellers have wanted to cash out on the shares received after the lock-up period.

Figure 27: Grayscale Ethereum Trust



Source: NYDIG

*ETHE and ETHE NAV adjusted for 9-1 stock split pre Dec 17th

BlockFi

Another market-leading lending company that most readers probably are familiar with is BlockFi. The company launched in 2017 and has become one of the industry's biggest names, cleverly combining a traditional finance approach with the new possibilities of crypto finance.

The U.S.-based and fully regulated company doesn't have a utility token like many of its retail-focused competitors, but is backed by some of the biggest names in the crypto industry. Their latest Series C funding round was led by Morgan Creek and raised \$50 million, taking the total equity funding to \$100 million.

BlockFi has a valued offering among retail investors, where individuals can earn interest on deposited cryptocurrencies, with 6%-8% interest rates. Customers can also borrow USD or stablecoins against BTC, ETH, or LTH and exchange between these assets and stablecoins when needed.

Per company documents shared with [The Block](#), 55% of retail customers have used more than one BlockFi product, and nearly a third have traded with BlockFi.

Moreover, BlockFi now has more than \$10 billion in asset on its platform with over 125,000 funded accounts.

Over \$500 million in BTC deposits from retail borrowers

As seen in the chart below, BlockFi internal numbers, shared with Arcane Research, shows that the growth for BTC-collateralized loans have been remarkable since launch, both in USD and BTC terms.

The chart shows the total collateral from retail customers at BlockFi. As BlockFi offers up to 50% in Loan-to-Value (LTV) for retail customers, that indicates outstanding USD/stablecoins loans of more than \$250 million by the end of 2020. This number does not include loans that have ETH or LTC as collateral, so the total USD value of BlockFi's outstanding retail loans is most likely well above \$250 million.

Figure 28: BlockFi Retail Loans BTC Collateral (USD value and BTC value)



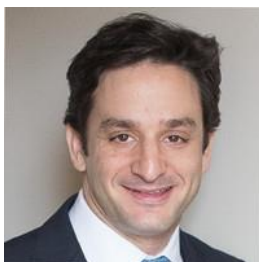
Source: BlockFi

More than \$4 billion in outstanding institutional loans

The company also has several offerings for institutions. Clients can borrow BTC, ETH, and LTC for hedging, market-making, shorting or other working capital needs, but also borrow USD or stablecoins for dollar financing. BlockFi also has an OTC desk and performs derivatives transactions.

BlockFi's internal numbers, shared with Arcane Research, shows that the company is a clear competitor to Genesis on the institutional side. In 2020, BlockFi processed \$18.6 billion in loans to its institutions and private clients. The company had \$4.4 billion in outstanding institutional loans by the end of 2020, and according to David Olsson, VP, Head of Institutional Distribution at BlockFi, they expect the growth to continue in 2021:

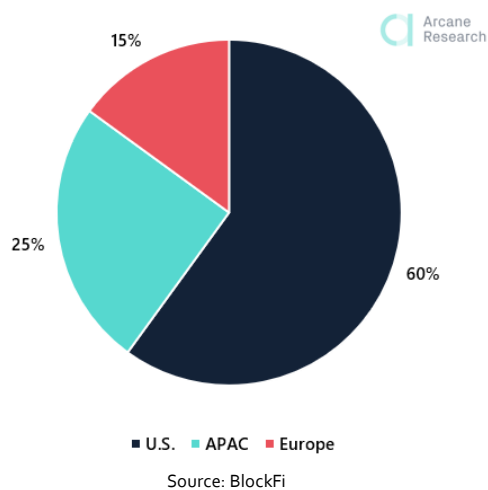
"As traditional investment firms continue to adopt digital asset strategies, there is a huge vacuum in lending, which will need to be filled by efficient capital providers. We also expect further regulatory clarity globally in 2021, which will help ease any remaining institutional concerns about investing in the space."



David Olsson,
VP, Head of Institutional
Distribution at BlockFi

These clients are not just based in the U.S, but spread across the world, as seen in the chart below.

Figure 29: BlockFi Institutional Clients



As mentioned in the last chapter on Genesis, the demand for cash is relentless and more liquidity in the crypto market is needed to take down spreads and clear out arbitrage opportunities.

BlockFi's platform lets the company leverage retail deposits on their institutional offering. The demand for USD and stablecoins is high, and BlockFi can then offer attractive interest rates for stablecoin deposits on the retail side. This is in turn used in institutional lending offerings.

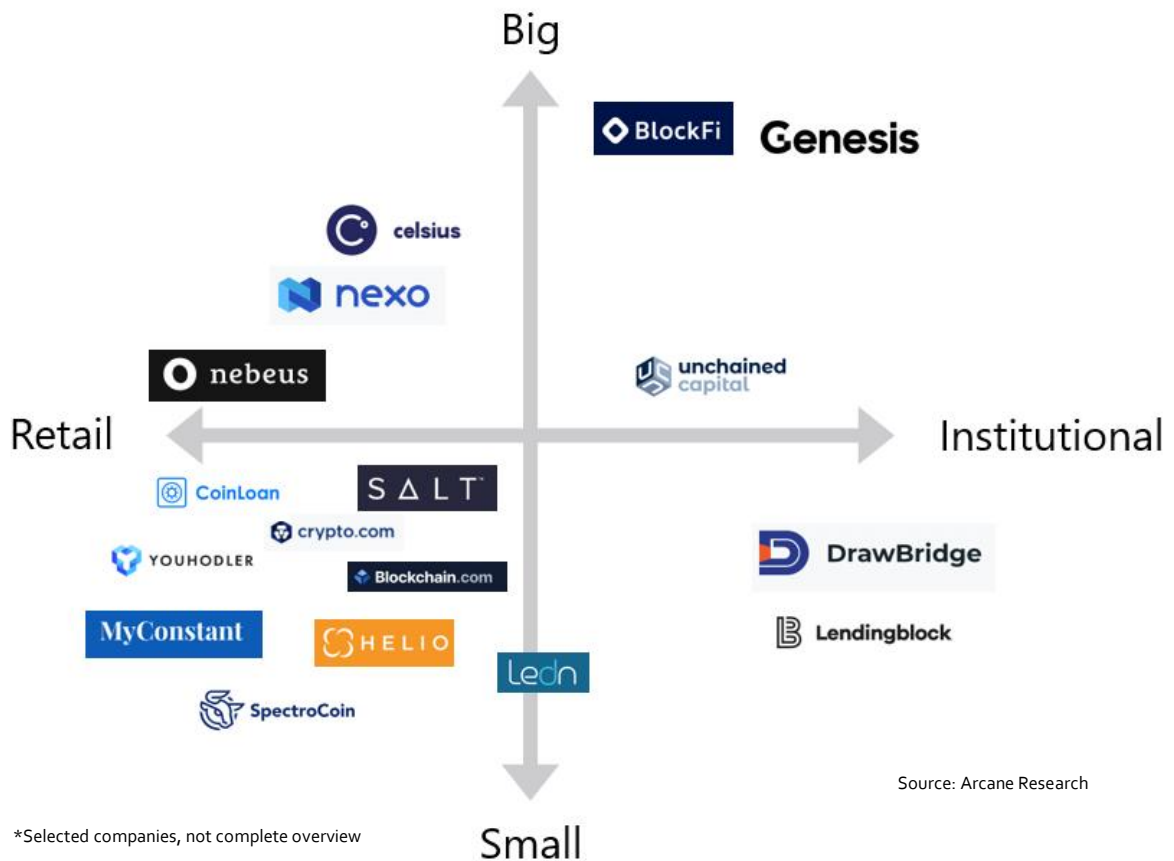
In addition, BlockFi engages in other market activities. BlockFi currently owns around \$800 million worth of shares of Grayscale's Bitcoin Trust, and is the second largest holder of GBTC.

We've already mentioned that many buy into these Grayscale products in the primary market with the possibility of locking in the premium on the shares as profit after a lockup period. BlockFi seems to find that interesting as well. BlockFi is also a liquidity provider for CME's bitcoin futures and options, announced in October 2020.

A sea of lending companies

As already mentioned, the lending industry in crypto is growing rapidly and new companies are entering the market each year. To cover all these companies in detail is out of the scope of this report, but the matrix below should give the reader a fairly good overview of the lending market.

Figure 30: Matrix of Lending Companies*



Celsius: processed over \$8 billion in loans

Some of the largest companies in the lending market that we haven't already mentioned are Celsius, Nexo, Nebeus and Unchained Capital. Celsius reports over \$6 billion on assets under management and over 350,000 customers.

The company has processed over \$8.2 billion on loans since its inception, and customers can take loans as small as \$100. Celsius did an ICO in March 2018, and their token, CEL, currently has a market capitalization of \$1.8 billion and is ranked 47th by market cap, according to [Coingecko](#).

Different from the likes of Genesis and BlockFi, many of the retail-focused lending companies let customers earn yields on a much broader group of cryptocurrencies. Celsius let customers borrow by using more than 25 different cryptocurrencies as collateral.

Nexo shares profits with token holders

Nexo has built a solid client base and has surpassed 1 million users, and offers services to both retail and institutional customers through instant crypto-backed loans with their fully-automated platform.

As many of its competitors, it offers both the possibility to earn interest on cryptocurrency deposits and to borrow with cryptocurrency as collateral. Nexo has more than \$4 million in assets under management, has processed over \$5 billion and accepts 16 cryptocurrencies.

A notable difference from other companies is the possibility of borrowing over 40 different fiat currencies. The company is a EU licensed & regulated financial institution and has a \$100

million insurance on custodial assets via Lloyd's of London. Nexo has its own token, NEXO, which is backed by the underlying assets of Nexo's loan portfolio. The current market cap of NEXO is \$450 million and 30% of Nexo's profit is shared with holders of the token in the form of dividend.

Nebeus as a first mover in 2014

London and Barcelona-based Nebeus was one of the first movers in the lending market in 2014, and launched in 2015 as a P2P-platform giving out loans in cryptocurrencies, but no fiat. Back then, there was no crypto-collateralized loans market.

This retail-focused company now has approximately \$300 million in assets under management, and the two primary use cases they see for BTC-collateralized loans are people wanting to cover every day expenses through quick loan product and to leverage up their BTC positions with cash loans. When speaking to Michael Stroeve, COO and Head of Product at Nebeus, he said the following about the growth in 2020:

"The main trend is people realizing that companies, like Nebeus, offer services that allow people to use their digital assets to get cash and earn a profit, all without selling their digital assets. Moving their assets to Nebeus makes a lot more sense than keeping them sitting in exchange platforms that don't provide any benefits."



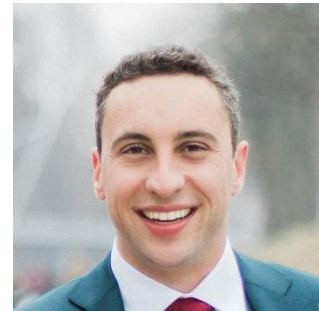
- Michael Stroeve, COO and Head of Product at Nebeus

No rehypothecated collateral at Unchained Capital

Another interesting company worth mentioning is Unchained Capital. Different from many other lending companies, it focuses on self-custody and making sure that collateral is not rehypothecated. As discussed in the first part of this report, reuse of collateral is a significant challenge in the traditional lending market. Unchained Capital uses collaborative custody models for both loans and their vaults.

A multi-institution 2-of-3 model is used for loan collateral, where keys are held by three separate parties: the customer, Unchained Capital and their third-party key agent, Citadel SPV. Their key agent acts primarily as a backup, creating redundancy and reducing the risk of trust in any single party. Phil Geiger, Director of Product Marketing at Unchained Capital, said that the company is already seeing growth in 2021:

The demand for our bitcoin backed loans, OTC desk, and multisignature custody has accelerated so far in 2021, and we expect to see demand increase throughout the year due to the immense interest in bitcoin from corporations and traditional wealth managers. A healthy bitcoin economy to us means an increasing number of clients taking control of private keys with our multisignature vaults and an increasing number of long-term holders that are ready to improve their life with a loan from their bitcoin."



Phil Geiger, Director of Product Marketing at Unchained Capital

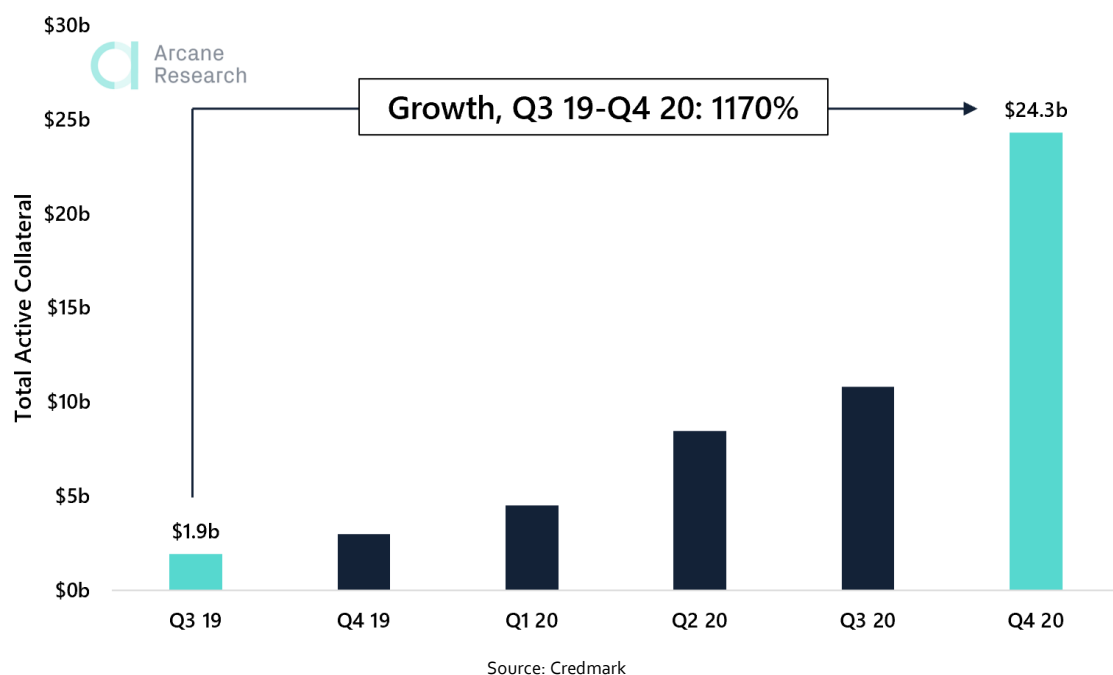
The lending space is clearly full of companies that are revolutionizing how we think about lending. Over time, this competition will see the rates fall, getting more aligned with lending rates in traditional financial markets. The numbers show that not only retail customers are embracing crypto-collateralized loans, but Genesis \$19 billion in processed loans in 2020 shows that the institutions are here as well.

Another interesting development in 2020 was the rise of the DeFi lending market, where retail customers deposited billions of dollars into both audited and unaudited smart contracts. The year saw the rise of names like MakerDAO, Aave and Compound, and last year ended with roughly \$3.5 billion in outstanding loans from these three platforms, with almost \$9 billion deposited as collateral. By comparison, Genesis had \$3.8 billion in active outstanding loans by the end of 2020, which shows that the lending market in DeFi is significant and will challenge many CeFi companies over the next years. While the DeFi space is mostly based on Ethereum, some have found clever ways to use bitcoin as collateral in DeFi as well, which will be explained in more detail in the next section.

3.3 Sizing the lending market

Based on the extensive efforts from Credmark, we have information regarding the size of the lending market. Credmark reports that the size of the total active collateral in the lending market was \$24.3 billion by the end of Q4 2020. The numbers are based on both reported volumes from lending platforms, but also non-disclosed information received by Credmark. As we can see by the chart below, the lending market has seen a sharp rise over the last year. From the end of Q3 2019 to the end of Q4 2020, the total active collateral in the lending market grew by 1170%.

Figure 31: Total Active Collateral - Lending Market

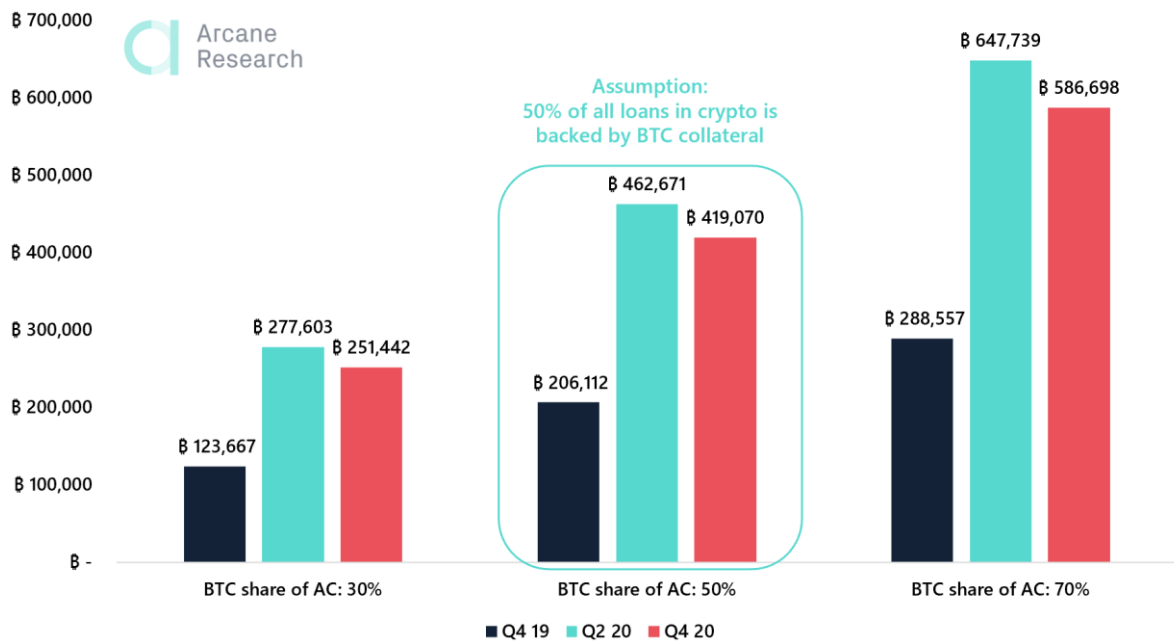


Information regarding the distribution of the various assets used as collateral on the different lending platforms is not disclosed. We've heard assumptions of 70-80% of the active collateral being structured in the lending market, but have also found reporting that suggests the share of bitcoin used as collateral is lower than that.

Recently, Genesis published their Q4 report highlighting that 53.9% of the loans outstanding were BTC loans. This suggests that at least 53.9% of the loans from Genesis are not backed by BTC collateral. Given that Genesis serves institutional investors and market makers, it's natural that the demand for bitcoin loans is higher than on other platforms, so we've established 50% as a satisfying assumption of the size of bitcoin's share as collateral in the lending market.

This gives us the approximate size of 420,000 BTC used as collateral in various loans in the lending markets with a growth of 213,000 BTC from Q4 2019 to Q4 2020. We stress that this assumption is not necessarily correct, but as long as the lending participants are careful with disclosing any information regarding their AuM, it serves as a proxy to estimate the current size of BTC collateral in lending.

Figure 32: Active BTC Collateral - Lending Market



Source: Credmark, Assumptions by Arcane Research

4 Decentralized Finance

The growth of DeFi in 2020 has incentivized bitcoin holders to tokenize their bitcoin on Ethereum to use their bitcoin as collateral in the wide array of services offered from the various DeFi platforms. By February 23rd, a total of 169,991 BTC has been tokenized on the Ethereum blockchain.

One of the megatrends of 2020 in crypto was the massive growth in decentralized finance. From January 2020 till February 2021, interest in DeFi blossomed.

This is highlighted by the monumental growth in total value locked in DeFi, growing a staggering 5213% in 14 months from \$670m to \$35.6b.

In DeFi, protocols for both lending and derivatives have grown in popularity, and all the while it's all built on – and primarily utilizes – Ethereum, bitcoin's role in the ecosystem has also been significant.

Given we've already touched on the lending markets and derivatives markets, it might be seen as redundant to explore the role of bitcoin as collateral within DeFi.

However, we deem the openness and composability associated with DeFi as fundamentally important to address and thus want to expand on bitcoin collateralization and its role in this vibrant ecosystem.

In DeFi, anyone is free to participate, and the DeFi products and on-chain assets can easily interact with each other. The decentralized aspects of the sector makes regulatory enforcement far more difficult. This makes charges similar to those of BitMEX by the CFTC less likely, meaning that DeFi platforms may prosper in a more stringent regulatory realm. This could drive more adoption into platforms providing solutions similar to those the centralized vendors deliver today.

The openness in DeFi however, does not come without a cost. To some extent, the regulatory enforcement is motivated, by part, in protecting users from scams, or loss of funds via overleveraged risk. Freedom comes at a cost, and users of DeFi platforms should be aware of the potential of flawed code or illicit actors leading to a loss of capital. This discussion will not be covered more densely in this report, but we urge users to do proper research before moving their funds into DeFi platforms.



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4.1 Defi-platforms

The most popular platforms on DeFi today are associated with the lending markets and decentralized exchanges.

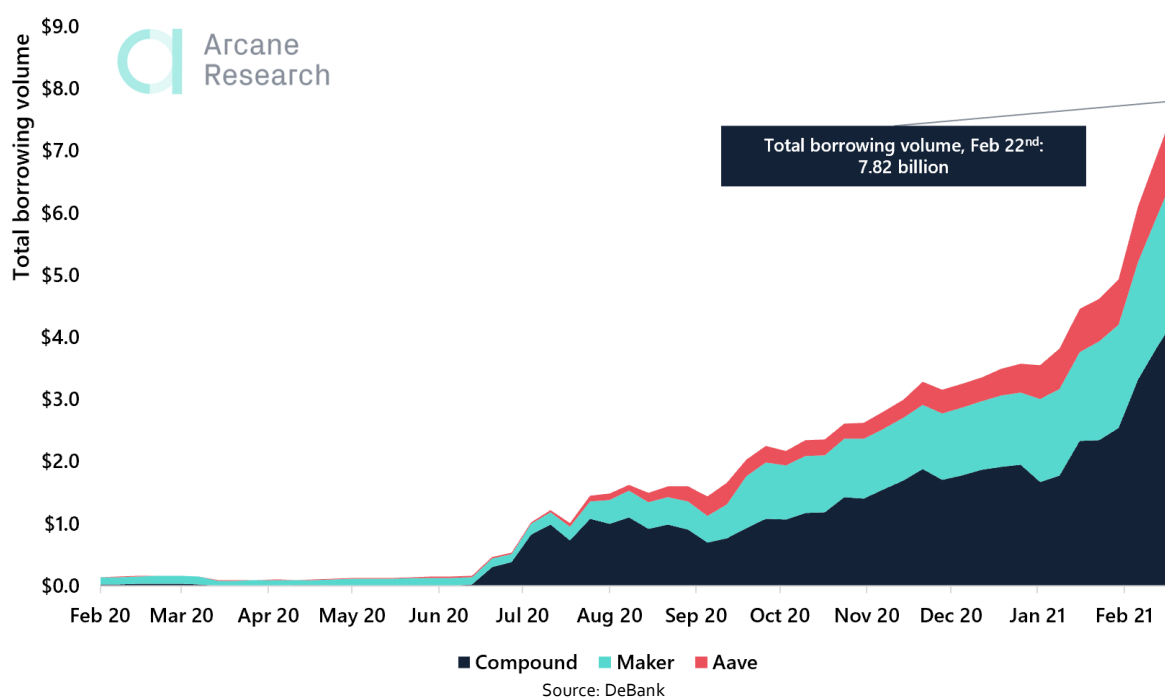
Within the lending markets, Compound, Maker, and Aave had a total borrowing volume of \$7.8 billion on Feb 22nd, 2021, as seen in the chart below. On June 15th, the day before the launch of the Compound governance token COMP, the total borrowing volume in DeFi sat at \$159m, meaning that the borrowing volumes in the three major platforms has risen by more than 4800% over the course of 8 months.

Another popular sector in DeFi is the decentralized exchanges, with Uniswap, Curve, Bancor and Sushiswap being the dominating platforms. The decentralized exchanges use an automated market maker-model.

Essentially, the automated market maker allows you to trade trustlessly in DeFi, and also employ capital and become the house by providing liquidity to a liquidity pool. Those who contribute with liquidity to the liquidity pools acts as market makers on the exchanges and are rewarded with fees for providing liquidity.

In other words, this model enables users to put their capital to work in a scene traditionally dominated by highly liquid entities in a more traditional order book centric framework. These liquid entities are often the main borrowers on the centralized lending markets. By utilizing the automated market maker model, decentralized exchanges have democratized the process of rewarding those who tighten the spreads in the market, and in turn a new way to earn yield on collateral has risen.

Figure 33: Total Outstanding Loans - DeFi



4.2 Bitcoin as collateral in DeFi

The use of bitcoin as collateral in DeFi is less straight forward than within the centralized lending and derivatives sector's. For bitcoin to be integrated in DeFi, ERC-20 tokens backed by bitcoin are the way to go. There are several specialized ERC-20 tokens for this use case, and they use different frameworks in order to maintain its bitcoin peg. We'll not go into detail on the technical aspects on how the various frameworks are built, but in general the way the frameworks can be summarized into four bundles, as defined by [DeFiPulse](#):

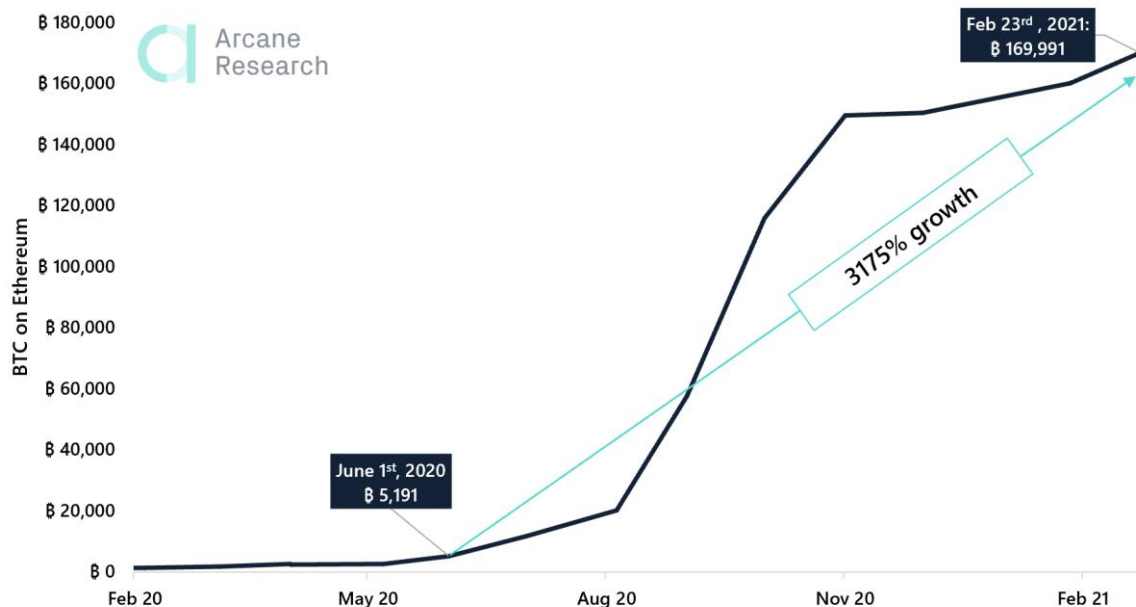
Table 1: Categories BTC (ERC-20)

Category BTC (ERC-20)	Attributes
Custodial	a BTC token backed by BTC held in custody by a third party
Hybrid	a BTC token backed by BTC held within an open protocol transitioning towards decentralization.
Synthetic	a token which follows the price of Bitcoin but is not directly backed by BTC.
Decentralized	a BTC token backed by BTC held within a fully decentralized protocol.

Source: DeFiPulse

As seen in the chart below, a total of 169 991 BTC are currently at work in various ERC-20 protocols operating in the DeFi ecosystem. BTC at work on Ethereum grew by 3000 percent from June 1st, 2020 to Feb 23rd, 2021 as users deposited their BTC onto the various bitcoin-backed ERC-20 tokens to utilize their bitcoin as collateral in the vast field of DeFi platforms.

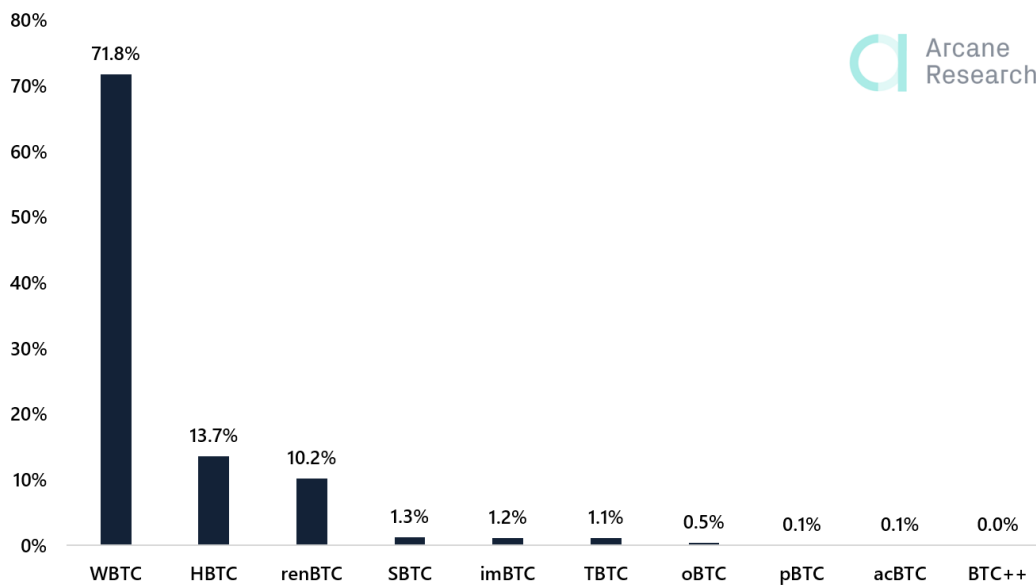
Figure 34: BTC at work on Ethereum



Source: Dune Analytics

The chart below illustrates the market distribution of the various BTC backed ERC-20 tokens as of January 27th. As we see from the chart, the most influential bitcoin-backed ERC-20 token is currently Wrapped BTC (WBTC), which currently contributes to 72% of the total amount of BTC placed on Ethereum, as 115 000 BTC has been moved to WBTC. Tokens on WBTC are issued through BitGo, who mints and redeems tokens as a centralized third party. Once the WBTC tokens are minted the tokens can interact freely with DeFi platforms and BitGo cannot intervene in these transactions. The centralized custody solution is also utilized by Huobi BTC (HBTC), currently the second largest bitcoin-backed ERC-20 token, having issued 22 000 HBTC.

Figure 35: BTC on Ethereum - Token Distribution



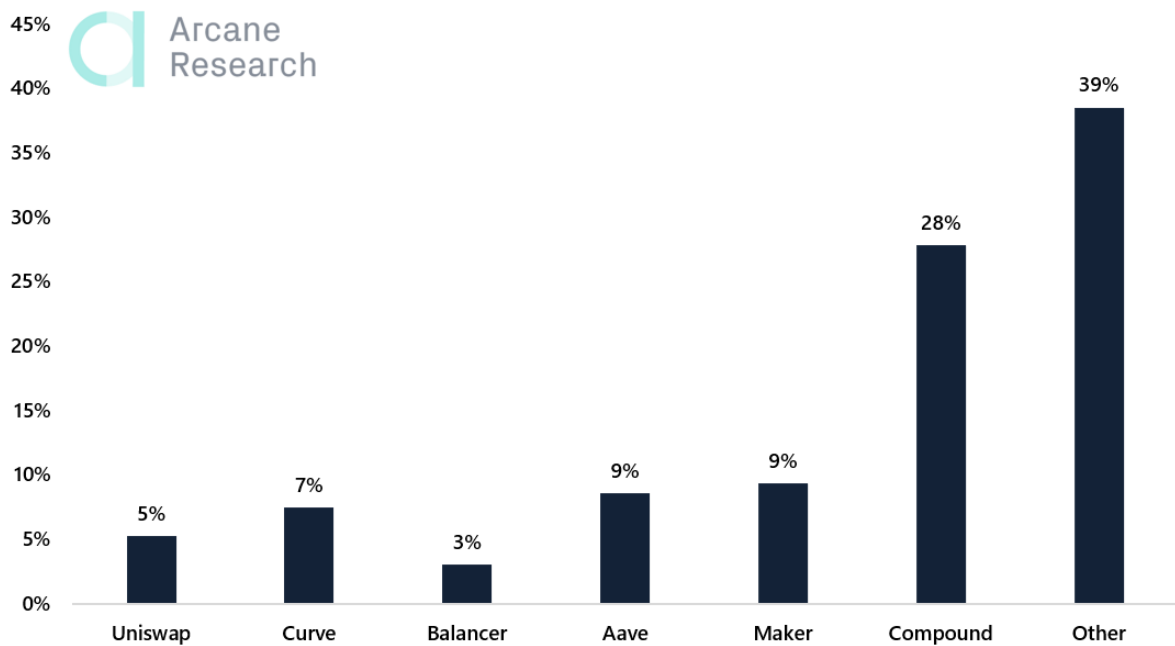
Source: DefiPulse

Among the smaller contributors to the pool of bitcoin on Ethereum we find the other custody solutions. renBTC uses the hybrid solution, SBTC the synthetic solution, while TBTC uses the decentralized custody solution.

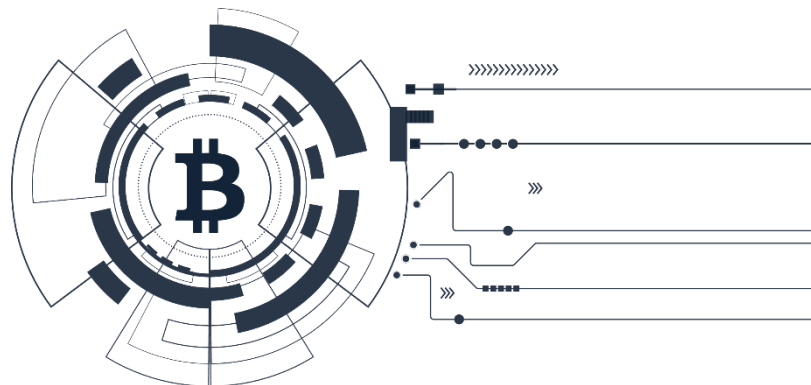
4.3 Wrapped Bitcoin – Where is this used?

A majority of the WBTC supply is currently found in the lending protocols, with Aave, Maker and Compound accounting for 46% of the WBTC supply, as seen in the chart below. 15% of the WBTC is found in various liquidity pools for the decentralized exchanges. There is a growing derivative market in DeFi and we expect more tokenized BTC to find its way over to those protocols. Most of these derivative exchange platforms in DeFi are currently building derivative products structured linearly with stablecoin margined collateral.

Figure 36: WBTC Supply Split Across DeFi Platforms



Source: Dune Analytics



5 The future of bitcoin collateral

A glimpse into the crystal ball

We've now made some firm assumptions on the major use cases for bitcoin as collateral today. The lending market is clearly in a booming trend, and so is the case for DeFi, where bitcoin serves a role via specialized wrapped protocols. Bitcoin collateral within the derivative market has currently experienced a hiatus as stablecoin and USD margined futures are experiencing growing traction. Will this trend persist?

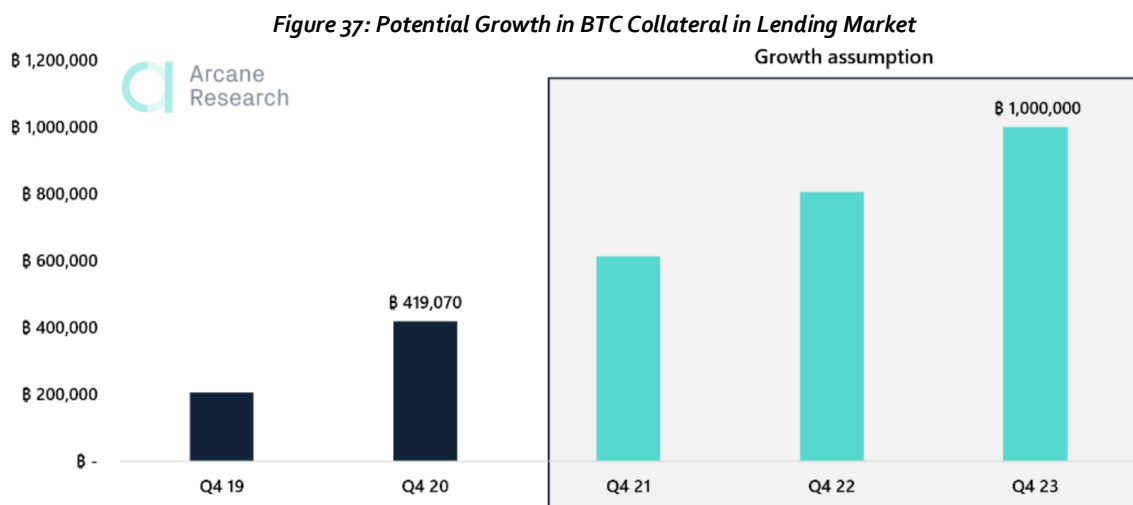
5.1 Short-term development

Lending

There is no doubt that bitcoin collateralized lending products have experienced increased demand the last year. The lending market saw a quarter-by-quarter growth rate from Q3 2019 to Q4 2020 of 69%, and overall the sector handled the March crash eloquently. This highlights a relative robustness in the sector, suggesting that most of the lending platforms are able to handle volatility in a sufficient manner. This bodes well for further adoption of the various lending products available.

1) Growth rate

We expect the quarterly growth rate in the lending market to stay positive, but we expect a declining growth rate as the market matures. With our own assumptions, we estimated that the amount of BTC used as collateral in the lending market sits at around 420 000 BTC. It's not unlikely that will see 1 million BTC used as collateral in the lending market within a three-year horizon as illustrated in the chart below.



Source: Credmark, Assumptions by Arcane Research

*Assuming that 50% of all collateral in the lending market is BTC

This will have implications on the exchange balances, as the exchange balance will likely decline as a result of BTC moving to other sectors. It should however be noted that dollar collateralized bitcoin loans are likely also to increase, with BTC borrowers moving funds to exchanges, which potentially could impact the exchange balance in the other direction. Yet, given the overcollateralization of the lending platforms with LTV ratios of .5, the overall effect should be fewer BTC available on exchanges.

2) Interest rates

As more BTC is collateralized in the lending markets, the interest rates will likely decline. The current interest rate level of 6-10% on bitcoin deposits is a clear evidence of high demand for bitcoin loans. As more BTC is deposited on lending platforms, the supply effects should lead to lower interest rates.

A second dynamic that might also impact interest rates is the profitability and growth in the sector. The major lending platforms have, as showed repeatedly in this report, experienced huge growth the last year. This will most likely tempt new entities to accept bitcoin collateral for cash loans.

The initial effect of new entities entering the market could be higher yielding products in order to attract more depositors to the new platform.

However, currently the lending space is dominated by crypto-lending specialized start ups. As more household names start offering these services the long term effects of increased competition could be a further reduction of the interest rates, as institutional investors grow comfortable with depositing their bitcoin to earn a yield, in turn leading to a further increase of the supply of deposited BTC in the lending market.

There's already evidence of more familiar names from traditional finance starting to offer these services as Fidelity recently started accepting BTC collateral for cash loans, albeit through a BlockFi partnership.

By offering these services Fidelity seeks to add more value to their custody solution. Recently both JP Morgan and Goldman Sachs have been rumored to launch custody solutions and it's not unlikely that they too will offer cash loans for BTC collateral to attract more adoption to their services.



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The advertisement features a smartphone displaying a trading interface for Bitcoin (BTC/USD). The price is shown as \$52,365.56, with a 24-hour volume of 8,822. The 24-hour high is \$58,354.14 and the 24-hour low is \$51,923.26. The interface includes a candlestick chart, a depth chart, and an order book. The background of the advertisement is dark with a faint, stylized Bitcoin logo and a grid pattern.

The derivatives market

As we've seen, the open interest in the BTC futures market is currently trending towards being evenly dominated by USD and stablecoin-margined trades and BTC collateralized trades. The momentum in the BTC collateralized market signals that USD and stablecoin-margined trades is about to overtake BTC-collateralized trades. Are we experiencing the end of an era in the derivative markets, or will BTC collateralized trading experience an uptick once again?

Due to the PNL profile of inverse futures and the added layer of complication from quanto futures, we expect the trend to persist. However, the favorable PNL profile for shorts should not dry the instruments toward extinction.

A plausible scenario as the market matures further should be reduced funding rates for BTC collateralized perpetuals in addition to a lower premium rate on the BTC collateralized futures. But, the counterparty risk affiliated with stablecoins could also maintain the status quo in terms of the basis and funding rates of the derivative instruments.

In the derivative segment of this report, we highlighted the counterparty risk associated with stablecoins.

There might be further developments in the regulatory realm of crypto and stablecoins in the future. This adds a layer of uncertainty for stablecoin exposure in the future.

In essence it's hard to conclude on the further developments of the derivative markets. While BTC's role as the leading collateral instrument is about to fall below 50% if the trend persists, regulatory uncertainty looms in the stablecoin space, suggesting that bitcoin collateralized derivative instruments will continue to serve an important role onwards.

DeFi

The DeFi sector has had an incredible year and new projects are entering the scene at a rapid rate. Decentralized derivative markets and exchanges are seeing strong growth in monthly volumes, and the lending platforms have accrued a lot of value. Amid the ongoing frustration from retail on centralized markets being tilted towards favoring the large established institutions, we expect decentralized exchanges to prosper.

All these effects will likely lead to more growth in the BTC backed Ethereum protocols, as more users seek to utilize their bitcoin as collateral in the decentralized markets.

5.2 The potential long-term development

Given the ICMA market sizing of the repo market at around €15 trillion, there is clearly a lot of room to grow and develop for bitcoin to become a more frequently used collateral in the broader market. Albeit, the infrastructure would need to mature further for this effect to take off.

The current lending infrastructure is not sufficient, more large institutions must partake in the market to legitimize the business, which will likely lead to lower interest rates in the future.

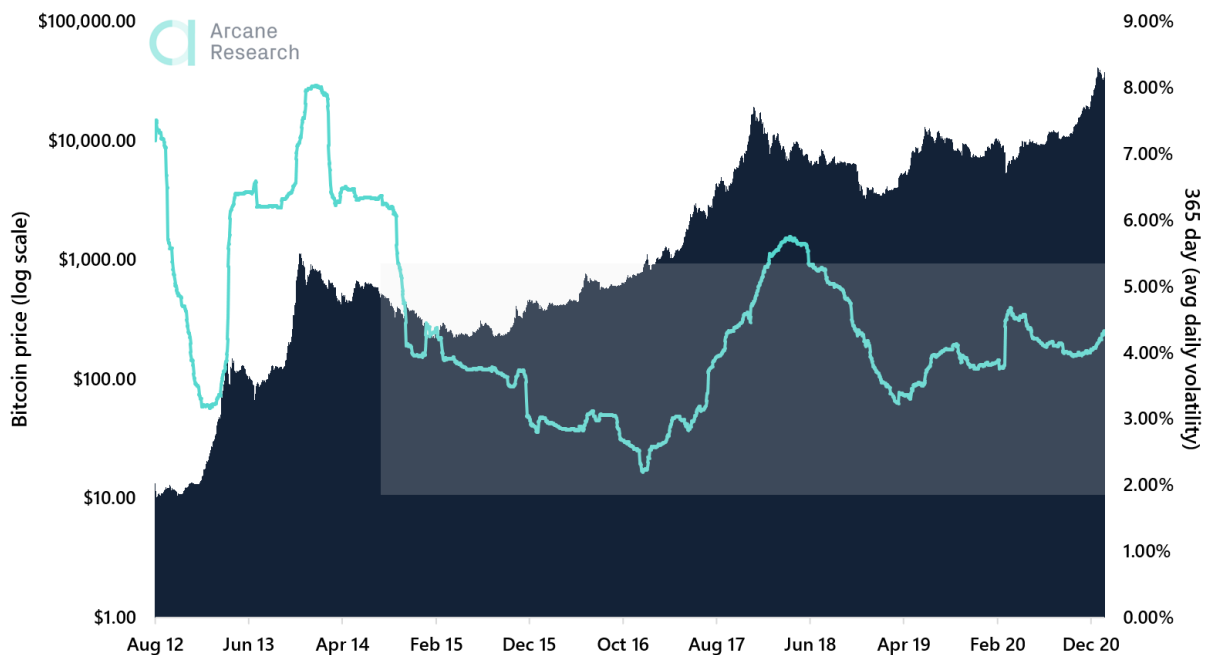
For large institutions to become comfortable with offering bitcoin backed lending products at a large scale, bitcoin would need to grow far beyond its current market cap, and the regulatory framework surrounding borrowing and lending of crypto must be improved.

In addition, despite the lack of counterparty risk, using bitcoin as loan collateral still imposes some risks, namely surrounding volatility.

As illustrated in the chart below, the average 365 days daily volatility in bitcoin has fluctuated between 2.5% to 6% ever since February 2015, making bitcoin less suitable as a large-scale collateral instrument in the near future.

The fact that bitcoin's volatility has remained high over the past few years amid BTC's surging rise in market capitalization suggests that there will take time for bitcoin's volatility to decline substantially. For the volatility to decline, BTC would need to reach its full potential in terms of adoption, flattening the S-curve.

Figure 38: Bitstamp BTC Price vs. 365-Day Average Volatility



Source: Bitstamp

Blockchain-based repo market

There are currently some interesting experimentation going on in the repo market, driven by JP Morgan trying to utilize the JPM Coin to implement blockchain based repo-transfers, seeking to improve the overall efficiency of the market.

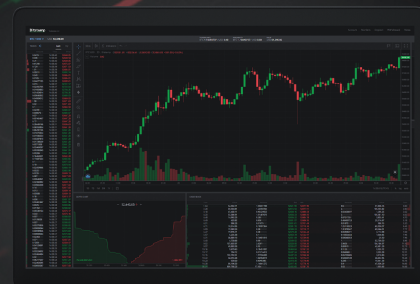
If these services become efficient and adopted at a larger scale, more institutions could find themselves being more positively oriented

towards digital assets in general, and its utility in transferring value.

The long-term effects of market participants becoming more positively oriented towards digital assets could be that bitcoin collateralized repurchase agreements becomes a reality.

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6 Appendix: Details on collateral assets

Government bonds and cash-based securities alike are the most important part of a well-functioning collateral market today. However, the increasing reuse of these collaterals makes them far from risk-free. It shows the financial markets' potential instability and that it is more fragile than many would like to admit.

As already mentioned, government bonds and U.S. Securities are the leading forms of collateral in financial markets. The repo market is gigantic, and these overnight cash loans from large financial institutions are collateralized with bonds or other low-risk assets.

However, certain systemic issues are necessary to consider. We saw clear evidence of how fragile the system can be in September 2019, when the US's repo market experienced some historical spikes in overnight repo rates. As explained in detail by the [Financial Times](#), the overnight repo rate spiked over 10%, a very uncommon event. This led to the New York Fed intervening in the repo market for the first time since the financial crisis by injecting cash in an attempt to unblock the system.

What happened?

Someone needed cash badly and was willing to pay a high cost to obtain it. As seen in the chart below, overnight repo rates have been close to zero (0.1%) since March, when we experienced

significant interest rate cuts. The spike in late 2019 is what we're going to look closer at now.

When repo rates increase, it is expected that banks or other financial institutions would withdraw excess cash held at the Fed and lend it into the repo market to take advantage of the high rates. This did not happen. So why weren't these institutions willing to do this and get paid exceptionally well compared to an average day?

We have already described the current reuse of collateral in the repo market. The IMF has estimated that the same collateral was reused 2.2 times in 2018, often US Treasury securities. These US Treasuries are supposedly risk-free, but it's more complicated than that.

As Caitlin Long [highlights](#), these assets are not risk-free because of the potential for the US defaulting on its debt obligations but because of the collateral reuse. This is also called "re-hypothecation."

Figure 39: U.S. Overnight Repo Rates*



Source: NewYorkFed

*Treasury Repo Reference Rate: Broad General Collateral Rate (BGCR)

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The banks know this. There is no transparent overview of the financial system as a whole, and we don't know exactly how much of the US Treasuries collateral is double or triple counted. So while each institution can appear solvent on paper, based on their positions in US Treasuries to fulfill capital and liquidity requirements, the financial system as a whole is not solvent.

Caitlin Long uses an interesting analogy:

"It's akin to musical chairs—no one knows how many players will be without a chair until the music stops. Every player knows there aren't enough chairs. Everyone knows someone will eventually lose."

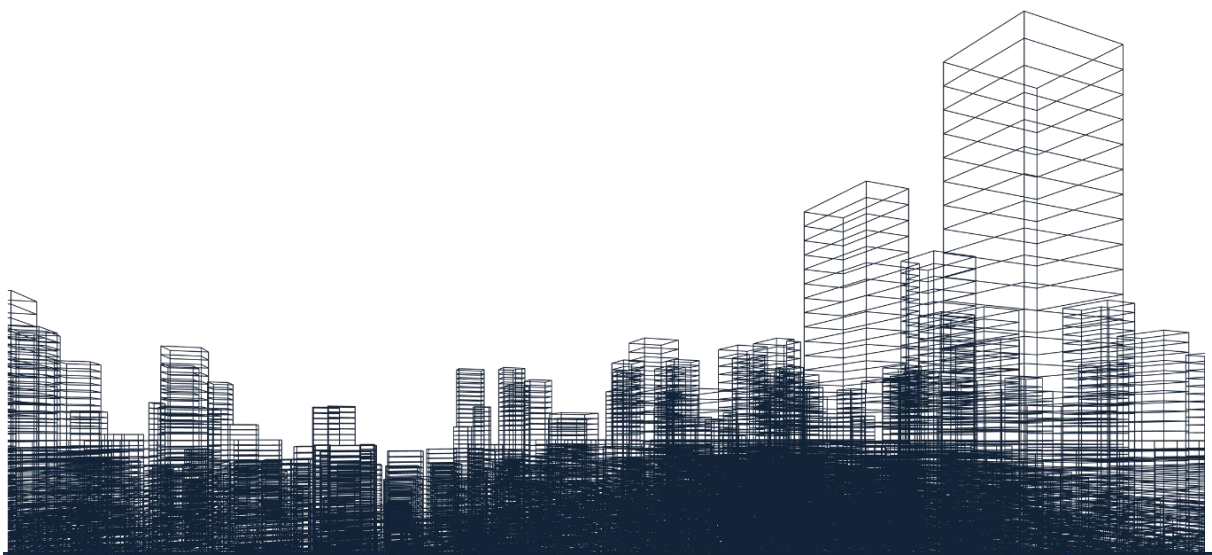
This gives us a better understanding of why the repo market experiences these extreme events. Banks are unwilling to take these bets, which look like risk-free arbitrage when the repo rate spikes. This is not something regulators speak about or admit, although Long found this quote from the former CFTC Chairman Chris Giancarlo:

"At the heart of the financial crisis, perhaps the most critical element was the lack of visibility into the counterparty credit exposure of one major financial institution to another. Probably the most glaring omission that needed to be addressed was that lack of visibility, and here we are in 2016 and we still don't have it."

The IMF economist Dr. Manmohan Singh has published several pieces on the problem of re-using collateral, the implications of collateral-chains. He has shown that the reuse rate has climbed again over the past years. He has been recommending for years that regulators' financial stability assessments of big banks be adjusted to take into account *"pledged collateral, or the associated reuse of such assets."*

While government bonds and cash-based securities alike are an integral part of a well-functioning collateral market today, this illustrates the financial markets' potential instability.

So, what's the alternative collateral?



6.2 What's the alternative collateral?

The alternative could be hard, real assets: like gold, bitcoin, and even real estate. Assets without counterparty risk could see increased attention in a world of aggressive monetary and fiscal expansion. Bitcoin's unique properties make it optimal as collateral and a clear candidate to challenge the current collateral forms.

The table below compares bitcoin, gold, and real estate and grades them based on the attributes of good collateral, which was defined at the beginning of this report. Firstly, we'll look at these assets' liquidity and then discuss the safety attributes. Also, we'll touch upon the storage capability of these assets.

Table 2: Attributes of a Good Collateral

Attributes of a good collateral	Bitcoin	Gold	Real Estate
Liquidity (60%)	9.2	6.8	2.8
Market Liquidity	8	8	3
Easy to Value	10	7	3
Transferability	10	4	1
Low Deadweight Cost	8	8	3
Verifiability	10	7	4
Safety (40%)	6.0	8.0	7.0
Volatility	4	7	8
Store of Value	7	8	8
Anti-Cyclical	7	9	5
Total Weighted Score	7.92	7.28	4.48

Source: Fulgur Ventures, Arcane Research

As seen from the table above, bitcoin's unique properties make it optimal collateral. Although bitcoin has a lower safety score than gold and real estate, this will improve as the asset matures. Bitcoin's high liquidity score is key in becoming a leading collateral asset, which is elaborated on in detail below. This is mostly a summary of [Fulgur Ventures' estimates](#), with some adjustments.

Liquidity

Bitcoin comes out on top in liquidity, with nearly a full score, ending up with **9.2**. Real estate ended up with a low score of **2.8** in this section, while gold ended up slightly behind bitcoin with **6.8**.

Market Liquidity

As mentioned in section 1 of this report, a liquid market has a minimal spread between the bid and the ask price, making large orders possible without slippage and loss for the seller. According to Fulgur, it is possible to sell \$1M bitcoin OTC with a spread between 0.1% and 0.2%, which is pretty good. According to [BullionVault](#), the same seems to be true for gold, which has the same spread range. However, the spread is much higher in the housing market, and [Winkler et al.](#) estimate that the average spread for residential housing is approximately 5%.

Bitcoin is still a young asset, but we disagree with Fulgur and give bitcoin the same score as gold, **7**, while real estate ends up with a **3** due to its much higher spread.

Easy to value

Bitcoin is traded 24/7, all year around, so its price is always updated. Hence, we deem bitcoin very easy to value and gives it a top score of **10**. On the other hand, gold is only available for trading during the week and hence challenging to value almost 30% of the week (2 out of 7 days). Still, gold gets a **7** from us here, as the gold market price is highly efficient during the week and not hard to value. Real estate gets another low score here, ending up with another score of **3**. There is usually a limited number of buyers for a house, and there is no effective price-setting mechanism on top to get a valuation quickly. This can take weeks.

Transferability

Another top score for bitcoin here, as it's easy and cheap to transfer, and the process is done in a few seconds. Responding to margin calls and topping up collateral is straightforward in bitcoin. On the other hand, we find gold: a heavy asset that needs to be physically transferred, a time-consuming and expensive experience. We have given gold a score of **4** here. Real estate **gets the lowest score possible**, as it's more or less impossible to transfer.

Low deadweight cost

Both gold and bitcoin are fungible assets, and we have followed Fulgur and given them both a score of **8**. Real estate gets another low score (**3**), as it comes with an excess burden as collateral.

Verifiability

Another home run for bitcoin, as the Bitcoin network's decentralized manner lets anyone with a full node verify the asset. This is also much cheaper than verifying both real estate and gold's authenticity. Real estate can have hidden flaws, and gold can be fake. 2020 gave us a [prime example](#) of how this can end, as 83 tons of counterfeit gold was used as collateral for loans of almost \$3 billion. One of China's largest gold jewelry manufacturers, Kingold Jewelry Inc, was behind the crime and had just used gilded copper alloy. Many bitcoiners joined the discussion when the story broke, and Tyler Winklevoss of Gemini noted:

"This is why bitcoin is gold 2.0. It's mathematically impossible to counterfeit."

Safety

While bitcoin is the king of liquidity, its weaknesses as collateral are easier to spot when it comes to safety. Bitcoin is still young and volatile, which is natural, but this section explains why this can keep many away from the asset when considering collateral. Both gold and real estate are more stable than bitcoin today and scores higher than the leading cryptocurrency on safety. Bitcoin ends up with an overall score of **6.0**, while gold and real estate get **8.0** and **7.0**, respectively.

Volatility

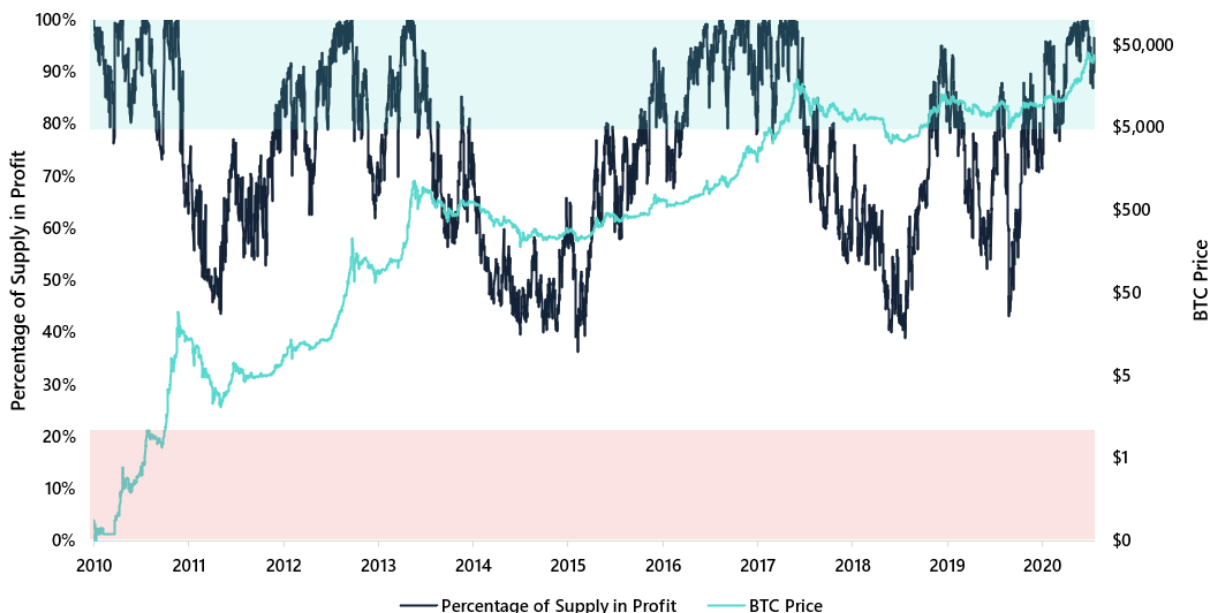
Obviously, we prefer that a collateral asset has low volatility and doesn't fluctuate in price. This will increase the risk for the lender significantly. Bitcoin has historically been very volatile compared to real estate and gold. Bitcoin is young and will, over time, see lower volatility, but for now, we have to give bitcoin a low score of **4** on volatility. Gold gets a score of **7** and real estate **8**.

Store of value

Fulgur Ventures adds store of value as an attribute of good collateral. As already mentioned, some assets risk depreciating over time with the current monetary experiments we see from central banks worldwide. Both gold, real estate, and bitcoin are great store of value assets. Some may argue that bitcoin is a bad store of value due to its high volatility. However, as seen below, bitcoin has maintained its value over time, and 75% of all bitcoins have been in profit throughout its entire history.

The chart below shows the percentage of the BTC supply in profit. This is estimated by the price when the coin last moved and shows that bitcoin has been a great store of value for the majority of owners, which qualifies for a score of **7**. Real estate and gold have a much longer history than bitcoin, and as Fulgur highlights, the lindy effect tells us that those assets have a higher chance to remain a good store of value in the future. Hence, both assets get a score of **8**.

Figure 40: Bitcoin - Percentage of Supply in Profit



Source: Glassnode

Anti-cyclical

As discussed earlier in this report, investors want collateral assets that are non-correlated to the financial markets. Bitcoin gets a score of 7 here, as it historically has zero correlation with the stock market. You may ask why a non-correlated asset only receives a score of 7? Bitcoin has shown to be highly correlated with traditional markets when the fear is high and markets are plummeting. This was clear in

2020 when Covid-19 affected financial markets worldwide. Gold gets a higher score than bitcoin and ends up with a 9, as it is less affected by market turmoil and has been uncorrelated with traditional markets historically. Real estate gets a low score here (5), as recessions and negative economic shock also have affected housing prices and demand historically.

6.3 Comparison of collateral

To summarize this discussion on collateral assets, we have made a table that compares the different assets.

Table 3: Traits of Good Collateral - Comparison of Different Assets

Traits of good collateral	Bitcoin	Gold	Real Estate	Government Bonds / Treasuries
Liquid market	Moderate	Moderate	Low	High
Availability (24/7/365)	High	Moderate	Low	Moderate
Transferability	High	Low	Low	High
Verifiability	High	Moderate	Moderate	Moderate
Store of Value	High	High	High	Moderate
Low Volatility	Moderate	High	High	High
Anti-cyclical	High	High	Moderate	High
No Counterpart Risk	High	High	High	Moderate

Source: Arcane Research

6.4 Why bitcoin and not other cryptocurrencies?

The reader may wonder why we're not discussing other cryptocurrencies but only focus on bitcoin. There are a few important reasons:

The network

Firstly, the bitcoin blockchain is the most secure of all blockchains today. No other cryptocurrency can compete with the allocated resources worldwide to keep Bitcoin's network safe. Bitcoin hashrate is currently at 145.567 Ehash/s and shows the massive amount of computing power that is keeping the network alive. [Crypto51](#) highlights how much more it would cost to perform a 51% attack on bitcoin than on other cryptocurrencies. As seen, bitcoin is much more expensive to attack, and the website is intended to bring light to the risk of 51% attacks on smaller cryptocurrencies (although the numbers are pretty outdated). Another example is [this website](#), highlighting how many confirmations other cryptos would need to be equivalent to six bitcoin transactions and hence be secure.

The growing infrastructure

Not only is bitcoin the most secure cryptocurrency, but it also has the most prominent infrastructure behind it. Large, traditional players have entered the bitcoin industry over the past years. Mining is getting more decentralized as more companies are building out to contribute. Large financial institutions are building exchanges, platforms, and companies to facilitate bitcoin trading and make the asset more available for the world's largest investors.

Liquidity

With the maturing infrastructure and market, larger players are entering. More traditional market makers have entered bitcoin to provide liquidity, and bitcoin is the most traded cryptocurrency in the space with the lowest spreads on exchanges and highest daily trading volumes.

BTC vs. stablecoins

Stablecoins are also popular as collateral, mirroring cash collateral. However, when using stablecoins as collateral, the borrow will get exposure to counterparty risk. Stablecoins are issued by centralized actors, which can default. If a stablecoin loses its peg to the dollar for some reason, the consequences for the borrow could be disastrous. Bitcoin has no counterparty risk or any credit risk, making it a unique asset for collateral use.

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