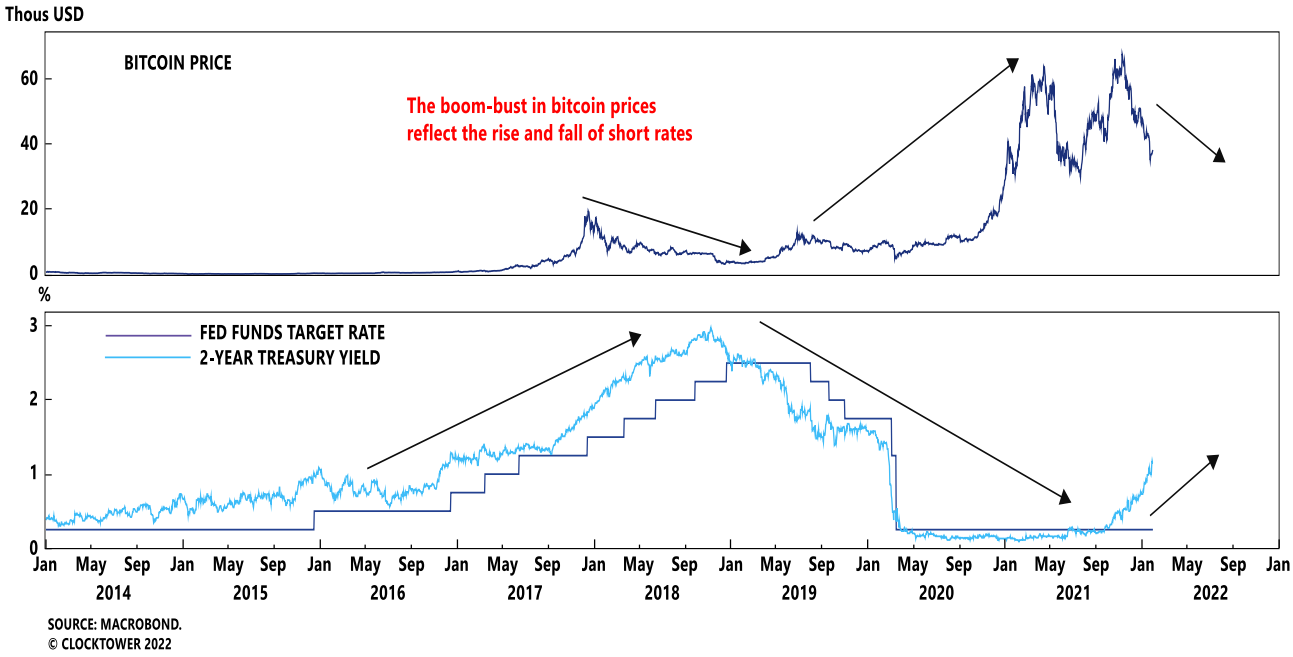
Digital Assets Primer

Clocktower Group's Strategy Team posited in its May report that the monumental ascent of Bitcoin – and cryptocurrencies more broadly - has been largely driven by macro factors, such as the abandonment of monetary/fiscal orthodoxy, increased wealth inequality, inter-generational angst, the gamification of financial markets, and a degradation of trust in centralized institutions.[1] In the last year, crypto has firmly entrenched itself as the high beta, risk asset of a new generation of investors. In the "Digital Asset" ecosystem – a catchall term to describe the broad spectrum of cryptographic tokens – Millennial and Gen Z investors have found an escape from the sovereign monetary system, a disruptive technology with the potential to disintermediate powerful incumbents, close-knit digital communities bootstrapped by memes and, of course, hyper-volatile assets with asymmetric growth potential. What lures the marginal entrant to the space varies. In the grip of a manic bull market, "number-go-up" economics is sufficient for most. The imminent reversion to fiscal and monetary orthodoxy may soon challenge many of these popular narratives (Chart 1). But crypto has progressed in recent years, and is no longer the sole domain of speculators, cyber criminals, libertarians, and "crypto bros."

CHART 1| Can Crypto Transcend its Macro Fate?

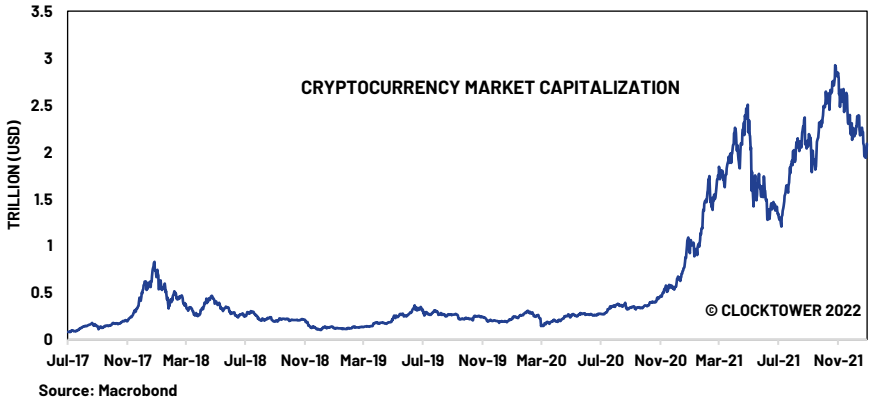


[1] Please see Clocktower Group *All Along the Clocktower*, "Bitcoin Is This Generation's Rock & Roll," dated May 2021, Volume II, available on request.

Crypto's Growth Is Driven by Increased Utility and Investment Diversity

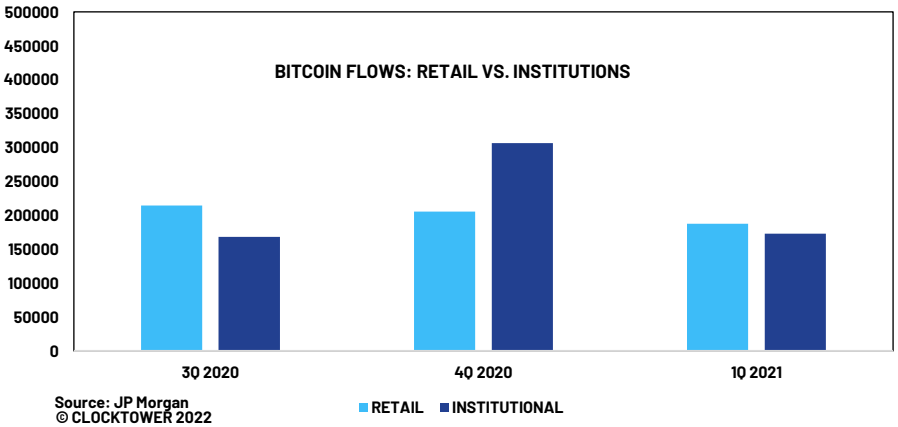
It is simple to dismiss the enthusiasm for Web 3.0[2], NFTs, DeFi, and the Metaverse as the logical byproduct of a generational mania, aroused by easy money and speculative fervor. But this would miss the forest for the trees. Crypto has matured from its previous bull run ('16-'18). The market capitalization of the crypto space has ballooned to ~$2 trillion in relative short order (Chart 2). Institutional flows have begun to supplant retail, led by hedge funds, VCs, pensions, sovereign wealth funds, endowments, corporates, and family offices (Chart 3 and 4).

CHART 2 | A 10x Increase in Total Market Cap in Two Years...



Source: Macrobond

CHART 3 | ...Has Garnered Interest From Institutions



Source: JP Morgan
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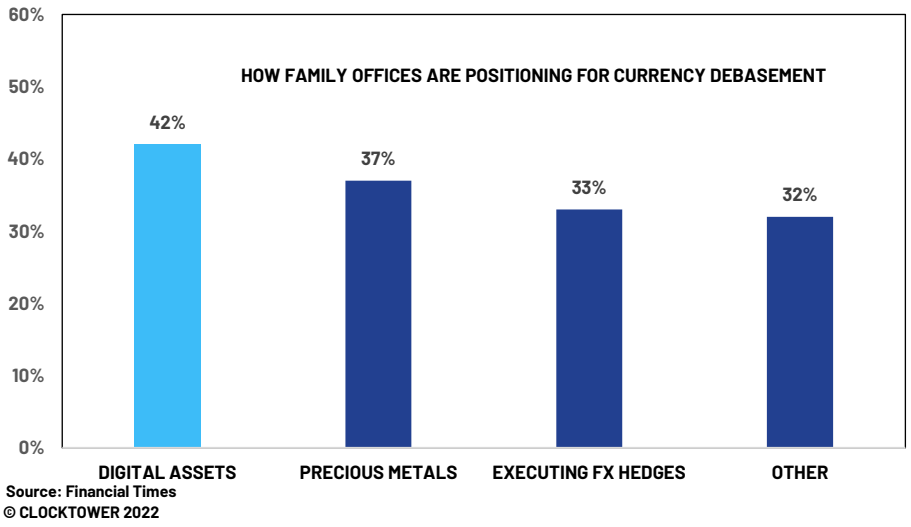
[2] "Web 3.0" refers to an alternate version of the Internet characterized by blockchain-based protocols, with consumer-facing applications built on top. Web 3.0 advocates theorize a future version of the Internet with more equitable ownership and increased governance rights for users, compared to "web 2.0," i.e. the current status quo where Big Tech companies charge high take rates and own user data/content. "Web 3.0" is sometimes referred to as the "creator economy," as it theoretically allows for the ownership, monetization, and transferability of digital IP/content, and improved privacy/data protection online.

CHART 4 | Digital Assets Are Eating Into Gold's Market Share



Source: Financial Times
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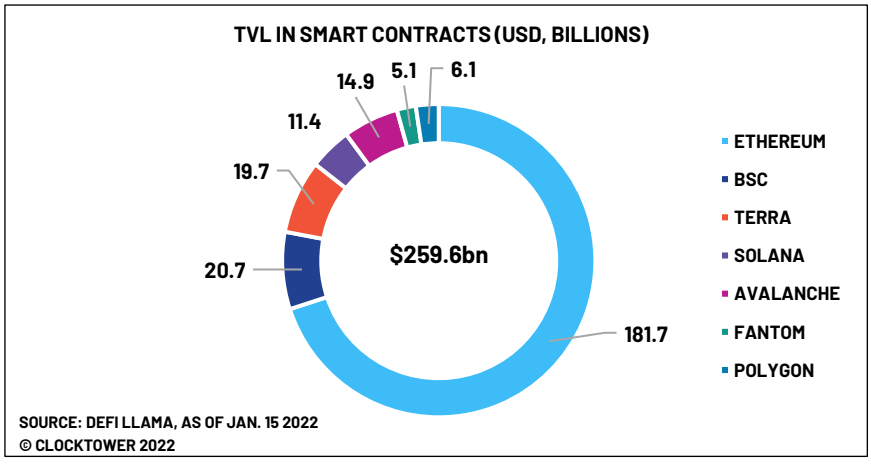
The institutionalization of crypto has been enabled by the expansion of the investable universe of high quality, cryptographic assets. Programmable blockchains like Ethereum – and faster 'layer 1'[3] competitors like Solana, Avalanche, and Terra - have given rise to consumer-facing, decentralized applications (DApps). Decentralized Finance (DeFi) protocols – primarily exchanges (spot and derivative), price oracles, and lending/borrowing protocols - on major layer 1 blockchains have over $250 billion 'locked' into smart contracts (Chart 5). DeFi users - measured by unique wallets that have transacted on DeFi protocols – are increasing at an exponential rate, albeit are still low in relative terms (Chart 6).

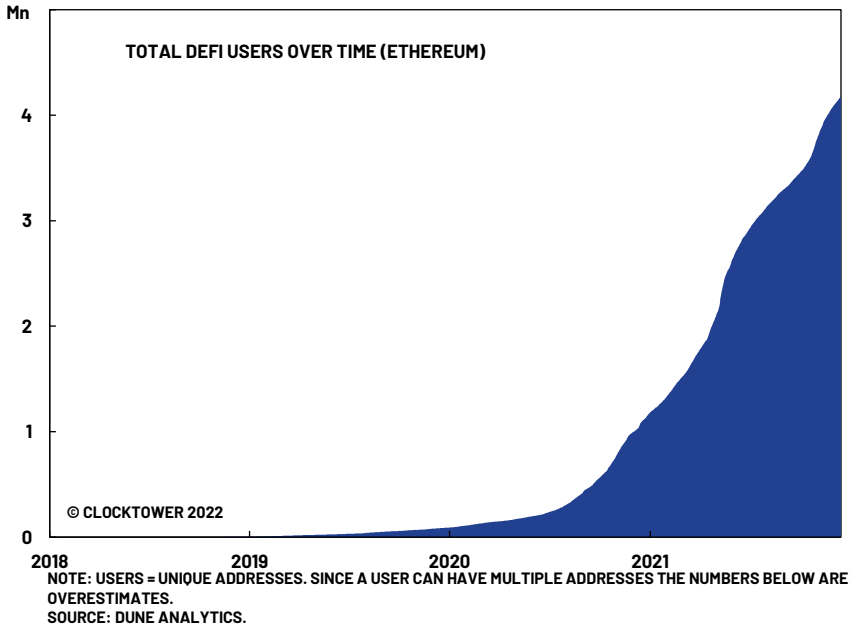
CHART 5 | Capital Has Flooded Into DeFi To Earn Tokens and Capture Yields



SOURCE: DEFI LLAMA, AS OF JAN. 15 2022
© CLOCKTOWER 2022

[3] "Layer 1" refers to the underlying blockchain architecture, on top of which scaling, cross-chain/interoperability solutions, and applications are deployed. Bitcoin, Ethereum, Solana, Avalanche, and Terra are all examples of Layer 1s.

CHART 6 | Total Usage is Miniscule but Growing



NOTE: USERS = UNIQUE ADDRESSES. SINCE A USER CAN HAVE MULTIPLE ADDRESSES THE NUMBERS BELOW ARE OVERESTIMATES.
SOURCE: DUNE ANALYTICS.

The market for NFTs – encompassing digital art/collectibles, virtual land, in-game items, music royalties, and real-world property/IP – has exploded into the mainstream, with $41 billion in Ethereum-based NFTs trading hands in 2021.[4] Stablecoins – fiat or crypto-backed tokens - have enhanced the utility of blockchain-based applications, removing the 'currency' risk from peer-to-peer value transfer, cross-border payments/remittances, and lending/borrowing (Chart 7 and 8). The stablecoin market grew by 388% in 2021. According to a survey from Visa, almost a quarter of small businesses in nine countries around the world plan to accept digital currencies as a form of payment in 2022.[5] Given the frequent bouts of volatility in crypto assets, stablecoins will likely facilitate most of the value transfer across blockchain-based payment rails. The Ethereum network settled $11.6 trillion in transaction volume in 2021, surpassing the visa network ($10.4 trillion).[6] Bitcoin settled $1.4 trillion, surpassing the PayPal network, with a majority of payments occurring on Bitcoin's low-cost, high-speed layer 2 lightening network.[7]

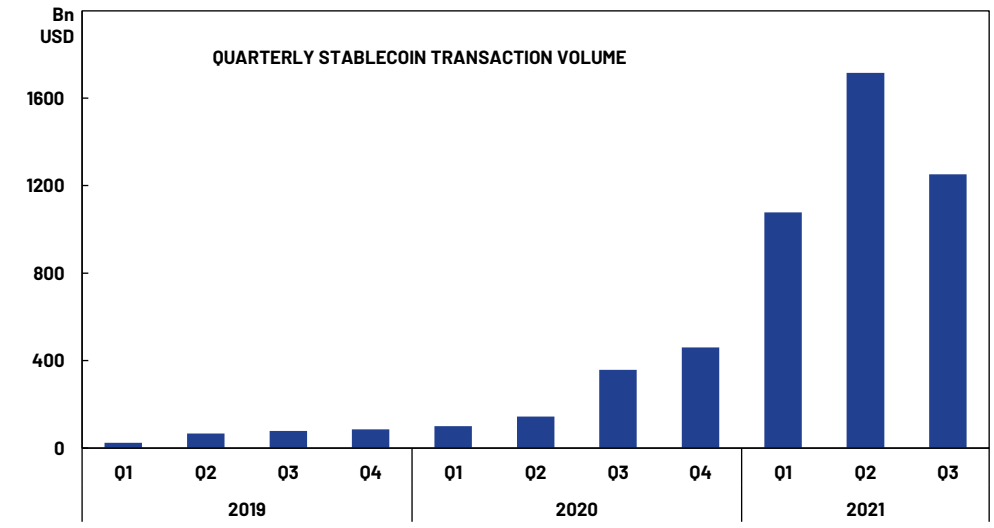
[4] Based on data from blockchain analytics firm, Chainalysis Inc. Small transactions under $10k represented more than 75% of the market. Digital collectibles, art, profile picture (PFPs), and gaming items made up most of the sales. Figure includes secondary sales, which often embed a royalty into the smart contract that programmatically pays a portion of the transaction value to the original issuer of the NFT. This allows artists to earn recurring income on their NFT projects.

[5] Please see *Visa*, "Visa Global Back to Business Study – 2022 SMB Outlook" dated January 12, 2022, available on www.usa.visa.com. The survey conducted by Visa of 2,250 small business owners across nine countries including the United States, Brazil, Singapore and Canada suggests cryptocurrencies – primarily stablecoins - may be starting to go mainstream as a means of payment.

[6] Please see *Josh Stark*, "The Year in Ethereum 2021" dated January 16, 2022, available on www.stark.mirror.xyz.

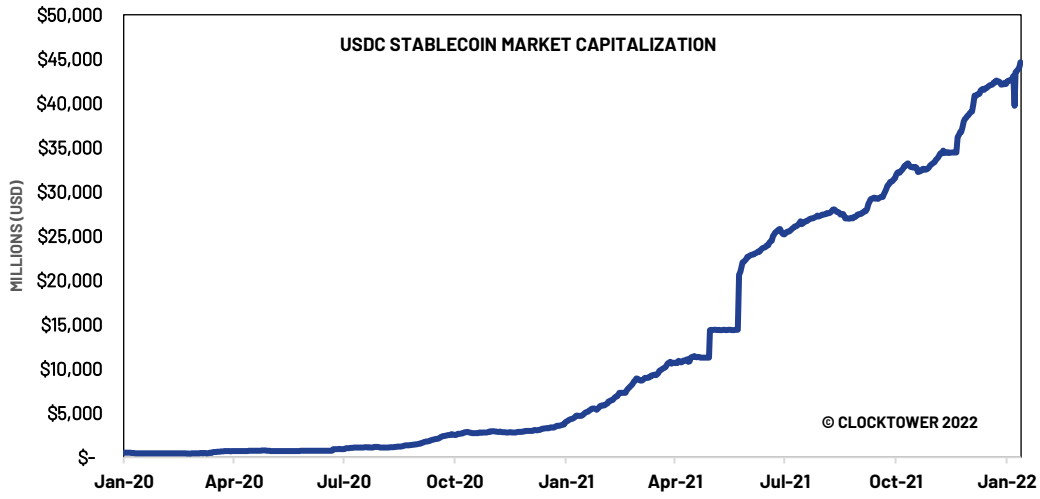
[7] "Layer 2" or "L2" infrastructure refers to scaling and cross-chain, interoperability solutions built atop Layer 1 blockchains. L2s aim to resolve low transaction throughout and high transaction fees on L1s, while utilizing the security features of the underlying L1. Examples of L2s include Bitcoin's lightening network and various projects on Ethereum (i.e. Polygon, Arbitrum).

CHART 7 | Stablecoin Usage Exploded In 2021



NOTE: DATA AS OF SEPTEMBER 30, 2021. SOURCE: MESSARI, COINMETRICS.
© CLOCKTOWER 2021

CHART 8 | Regulated Stablecoins Have Gained Market Share



Source: Macrobond

The continual emergence of new investment themes in the digital asset space garners backlash from the broader investment community. Gut-wrenching volatility, 50%+ drawdowns, and rolling bubbles in digital asset sub-themes – from DeFi Summer ('20) to NFT Spring ('21) to 'Layer 1' Autumn ('21) to Metaverse Winter ('21) – heighten skepticism from critics. As the market pokes and prods for the present and future utility of digital assets, periodic bubbles and crashes are likely to persist. The

nascent state of the industry, coupled with freely traded, liquid assets means the volatility will likely remain a feature of the system.

Market Maturity Has Led to Segmentation

As the digital asset ecosystem expands, so too does the classification system for assets (Table 1). Bitcoin is no longer the implicit benchmark against which the purported utility of each token is measured. This is an important stride forward because Bitcoin is notoriously difficult to value, as it is essentially a zero-coupon asset of infinite duration. It is *also* a high beta, risk asset with an option-like payout profile, extreme volatility, and a low – and falling - correlation to traditional assets (Chart 9). Although realized volatility has subsided somewhat with the growth of Bitcoin's market capitalization, 70-80% annualized volatility remains a significant hurdle to overcome for a store of value asset (Chart 10).

TABLE 1| New Assets With Unique Characteristics

NON-FUNGIBLE TOKEN Unique, programmable tokens representing ownership of digital media (art, music royalties, content), IP, and tangible assets. Ex. Cryptopunks, BAYC	**GOVERNANCE/UTILITY TOKEN** Cryptographic tokens that represent quasi-equity (voting rights, cashflow, etc.) in blockchain-based protocols. Ex. UNI, MKR
STABLECOIN Fiat, crypto, or asset backed token used to send value on blockchain payment rails while minimizing volatility/currency risk. Ex. USDC, DAI	**CRYPTOCURRENCY** Cryptographic tokens used on top of a decentralized, global ledger (blockchain) as a medium of exchange and/or store of value. Ex. BTC, ETH

Like gold, most of Bitcoin's value resides in its *perceived utility* as a store of value and hedge against currency debasement. The Bitcoin monetary network – i.e. the blockchain infrastructure rather than the token itself - does not generate significant revenue from transaction volume, with a majority of fees accruing to the miners who secure the network - a feature of the Proof of Work consensus mechanism.[8] In the absence of significant cash flows, Bitcoin valuation frameworks are often indexed to gold's market cap (around ~$10 trillion) and are largely memetic, relying on an ever-expanding community of "Bit-lievers."

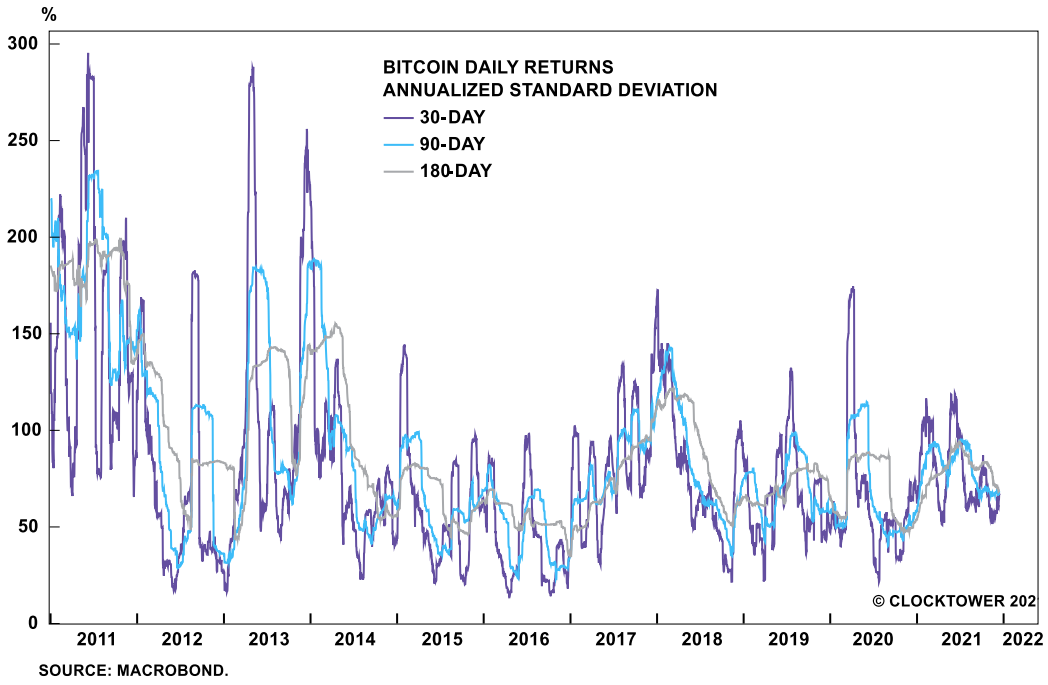
[8] Proof of Work (PoW) is the security/consensus mechanism used by the Bitcoin blockchain. In PoW, "miners" validate transactions submitted to the blockchain, earning a block reward of newly minted BTC for doing so. PoW relies on ever-increasing computational power (i.e. higher energy input) as miners compete for a diminishing block reward (the block reward is programmatically halved every four years).

CHART 9 | Bitcoin is Uncorrelated To Macro Assets Over the Medium to Long Term

	BTC	GC1	GLOBAL BONDS	SI1	US BONDS	COMM-ODITIES	CL1	HIS	TPX	RTY	CCMP	SX5E	UKX	SPX
BITCOIN	x													
GOLD	0.06	x												
GLOBAL BONDS	0.12	0.67	x											
SILVER	-0.05	0.80	0.51	x										
US BONDS	-0.05	0.41	0.74	0.35	x									
COMMODITIES	0.12	0.16	-0.06	0.18	-0.15	x								
OIL	0.12	0.17	0.08	0.24	-0.03	0.71	x							
HANG SENG	0.04	0.18	0.03	0.25	-0.15	0.35	0.31	x						
TOPIX	0.09	0.02	-0.08	0.12	-0.29	0.47	0.41	0.65	x					
RUSSELL 2000	0.01	-0.07	-0.14	0.02	-0.29	0.29	0.49	0.52	0.61	x				
NASDAQ	-0.02	-0.09	-0.12	0.04	-0.20	0.33	0.56	0.53	0.65	0.92	x			
EUROSTOXX 50	0.22	0.08	0.04	0.16	-0.28	0.37	0.51	0.63	0.64	0.68	0.69	x		
FTSE 100	0.16	0.04	-0.02	0.20	-0.29	0.30	0.45	0.68	0.70	0.71	0.71	0.89	x	
S&P 500	0.00	-0.14	-0.19	-0.03	-0.31	0.37	0.52	0.47	0.68	0.90	0.96	0.72	0.73	x
AVERAGE	**0.08**	**0.22**	**0.22**	**0.23**	**0.27**	**0.3**	**0.35**	**0.37**	**0.42**	**0.43**	**0.45**	**0.45**	**0.45**	**0.46**

SOURCE: PANTERA DIGITAL. Calculated using daily returns

CHART 10 | Realized and Implied Volatility Continues to Trend Downwards

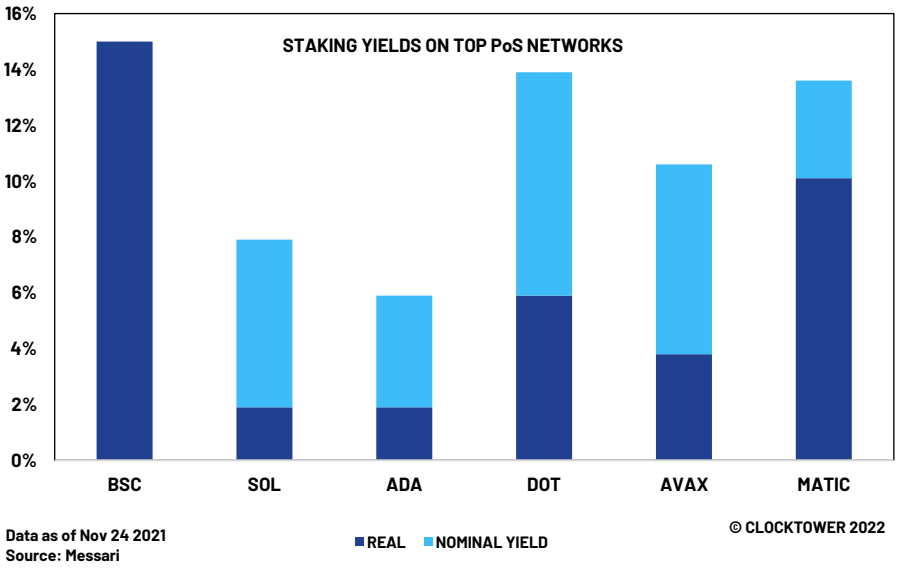


SOURCE: MACROBOND.

This differs greatly with layer 1 blockchains secured by the Proof of Stake (PoS) consensus mechanism. In PoS blockchains, miners are replaced by validators, who secure the network by staking the native token of the L1 into the protocol's validator software. In return for validating transactions - and securing the past and present state of the network - validators receive a yield on their staked assets, paid in the native token of the blockchain. Yields paid to validators vary based on demand for block space and the number of validators active on the network (**Chart 11).** Staking yields diminish as the number of validators increases. Yields on staked assets provide quasi-passive cash

flow for participants in the digital asset ecosystem, and partially contributed to the explosion in alternative L1s in 2021.

CHART 11 | Proof of Stake Blockchains Distribute Tokens Through Staking Rewards



Data as of Nov 24 2021
Source: Messari

Decentralized applications with native tokens are the newest primitive in the digital asset taxonomy. DeFi, gaming, NFTs, and other Web 3 projects commonly distribute tokens to users of the protocol through an airdrop.[9] Token holders receive governance rights – i.e. the ability to propose and vote upon changes to the protocol – and frequently a 'dividend' from transaction fees generated by the protocol.[10] While shrouded in regulatory uncertainty[11] – and as such typically out of reach of most institutional investors – governance/utility tokens may be the most straightforward digital assets to fit into a conventional valuation framework. As an example, SushiSwap - a decentralized exchange protocol - charges users a 0.3% fee per transaction, with a portion of the fees accruing to holders of the SUSHI token. The Sushi protocol generated $450 million in transaction fees in 2021. The *value* of the SUSHI token can be thought of as the sum of expected future cash flows/dividends discounted at some *risk-free* rate.[12] As value investors can attest, asset valuation frameworks solely reliant on

[9] An airdrop is a distribution mechanism utilized by blockchain-based protocols that rewards prior users of protocols with tokens. As public ledgers, blockchains allow for targeted airdrops to specific wallets that have previously interacted with the protocol. Airdrops bootstrap network growth, incentivizing new users to use the protocol, in anticipation of a retroactive distribution of tokens. Airdrops also exist in a regulatory grey zone, bypassing violations relating to unregistered security offerings (ICOs).

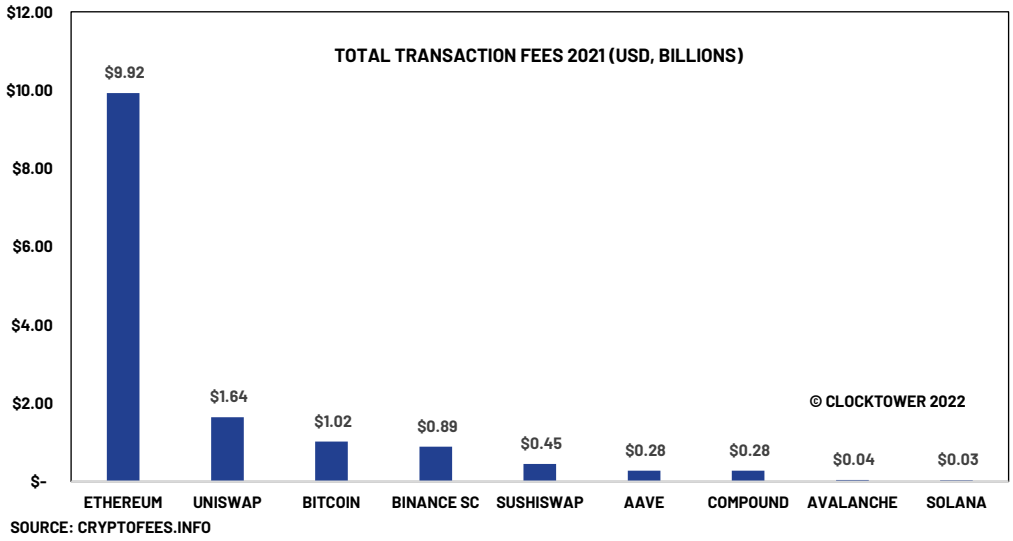
[10] Token holders submit and vote upon governance proposals, including the management of the protocol treasury (primarily comprised of the protocol's native token). Community-led treasury management and distributed governance form the bedrock of the Decentralized Autonomous Organization (DAO) model.

[11] The SEC has signaled on many occasions – without a formal ruling - that a majority of crypto assets, including DeFi tokens, resemble unregistered securities.

[12] Discount rates in digital asset valuation models vary from staking yields on major L1s to stablecoin lending rates (~4-8%), etc.

discounted future cash flows have poor predictive power for asset performance. That said, the rise of *productive* digital assets with embedded yield/cash-flows and meaningful growth potential is a remarkable evolution in a space historically reliant on ponzi-like growth economics (Chart 12). Conventional valuation frameworks applied to a new breed of positive-yielding digital assets have greased the flywheel of institutional adoption.

CHART 12 | Network Usage Generates Cash-Flow



The Institutionalization of Digital Assets

Venture capitalists and hedge funds remain the primary allocators of capital in the digital asset ecosystem. Direct ownership of digital assets by real money investors remains limited. Regulatory and counterparty risk, inadequate custodial solutions, information asymmetry, and severe volatility present significant impediments to adoption. As a result, most investors have favored allocations to external managers with the expertise and relationships to mitigate the operational, headline, and career risk often associated with investing into the digital assets space.

According to Crypto Fund Research, there were roughly 820 crypto-dedicated HFs and VCs as of Q2 2021 (Chart 13). Despite significant growth in the crypto asset management industry in the past 18 months (Chart 14), most crypto funds remain small, and noninstitutional (Chart 15).

CHART 13 | Venture Funds Retain the Highest Share of AUM

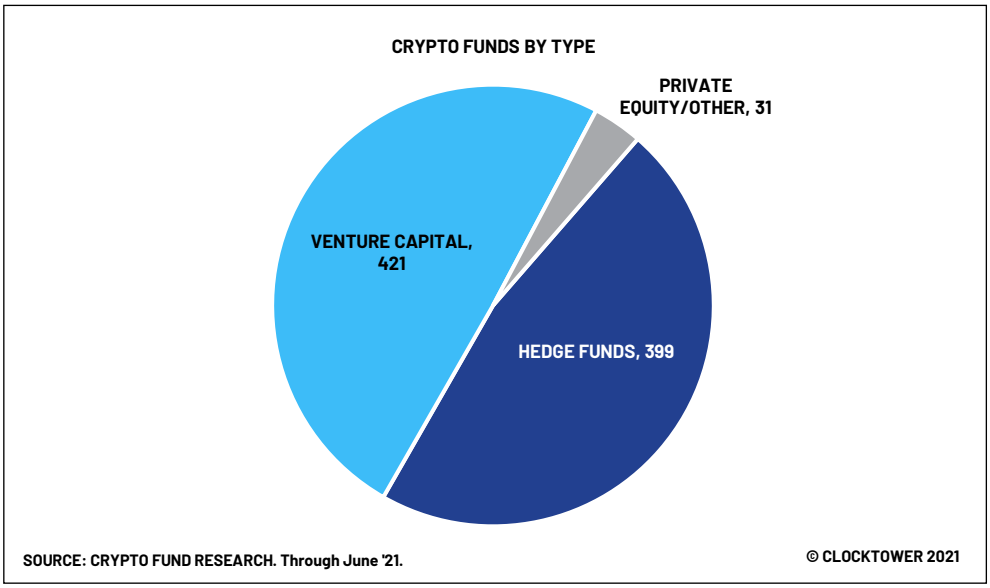


CHART 14 | Total AUM Tripled in 2020-2021...

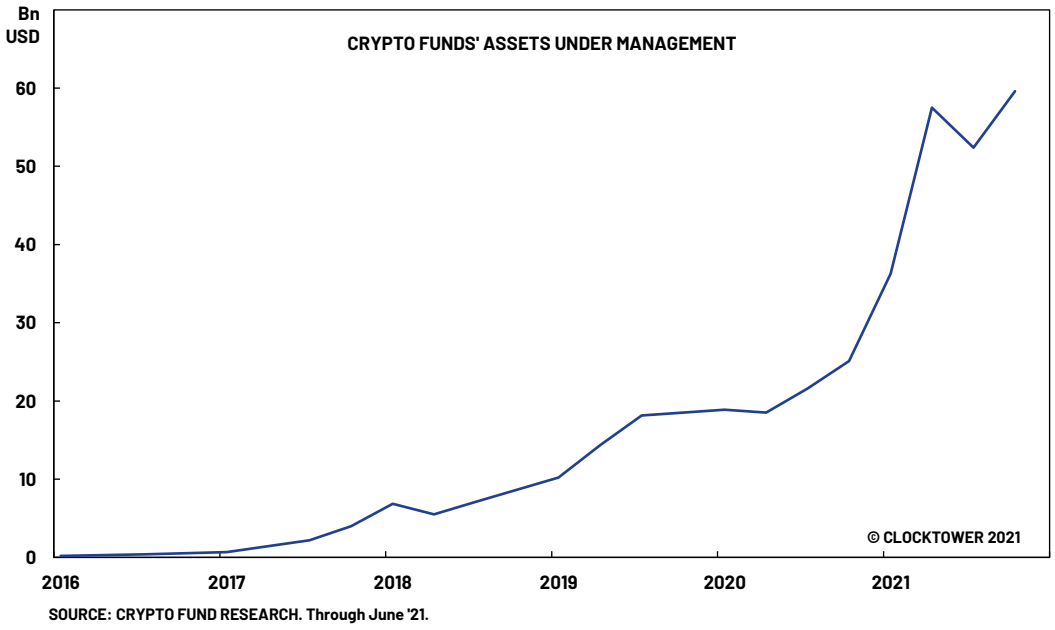
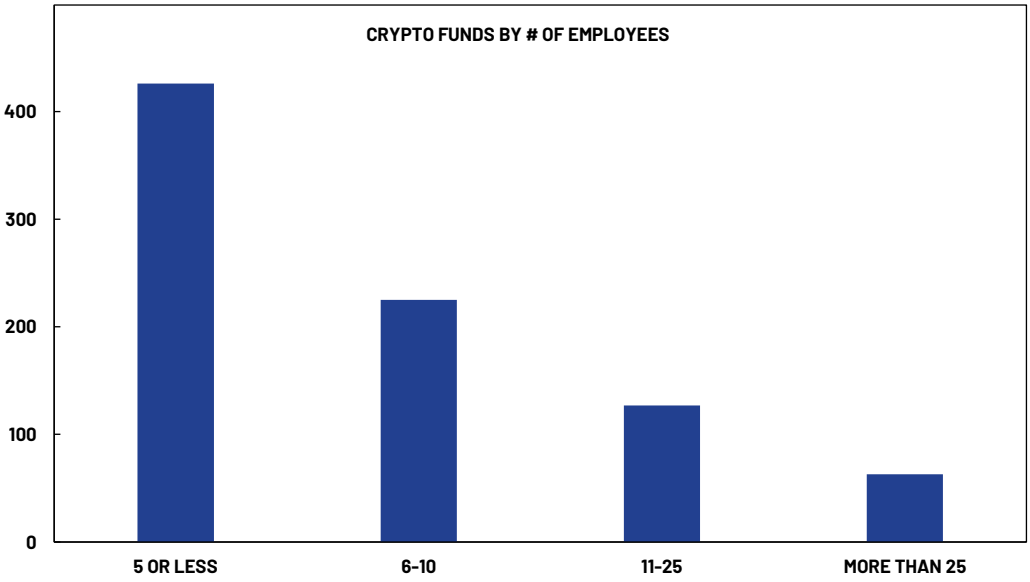


CHART 15 | ... But Most Funds are Small and Non-institutional



SOURCE: CRYPTO FUND RESEARCH. Through June '21.
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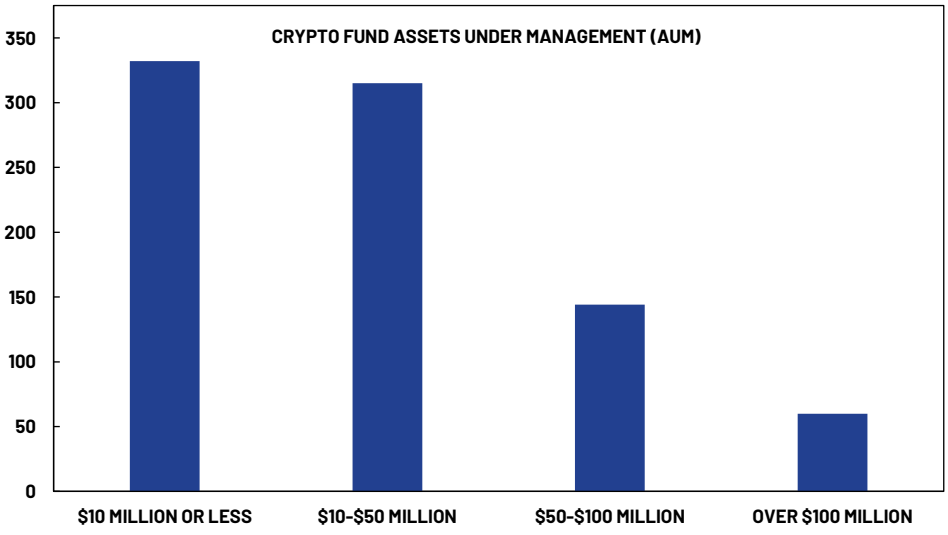
Additionally, AUM remains concentrated in the upper decile of crypto HFs and VCs (**Chart 16**). As such, a small number of crypto-native investment funds have disproportionately benefited from the explosive growth in the space.

CHART 16 | AUM is Highly Concentrated



SOURCE: CRYPTO FUND RESEARCH. Through June '21.
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Crypto Fund Taxonomy

The first wave of crypto asset management firms emerged during the 2016-2017 bull run. Many firms were led by first-time fund managers, well versed in the technical complexity of blockchains, but lacking in the areas of risk management and operational oversight. The subsequent 90%+ market collapse effectively cleansed the system of mismanaged, unspecialized funds. What emerged was a more institutionalized cohort of crypto funds, segmented by different characteristics. Crypto venture and hedge fund investment strategies can be subdivided into multiple buckets depending on the liquidity of the underlying assets (HF vs. VC), the directionality of the strategy (Long-only, long-biased, L/S, market neutral), and the discretionality of the investment managers (full-discretionary, systematic, semi-systematic). The taxonomy in **Chart 17,** produced by Galaxy Vision Hill, provides a helpful template for breaking down crypto HFs into distinct sub-strategies.

The maturation of crypto asset management has also brought increased participation from traditional HFs. According to a May 2021 report from PwC, around a fifth of non-crypto hedge funds are currently investing in digital assets (21%); with the average percentage of their total hedge fund AUM invested in digital assets around 3%. Our presumption is that a majority of these managers are trend-followers/CTAs, equity L/S, and discretionary macro portfolio managers that are restricted to solely trading BTC/ETH futures listed on the CME and/or various equity proxies. Several barriers impede more substantial allocations from traditional HFs, none more so than reputational and regulatory risk **(Chart 18)** The PwC report illustrated that 64% of respondents said that if the main barriers were to be removed/improved, they would likely accelerate their involvement in digital assets.[13]

Widespread conviction in the disruptive potential of digital assets is likely not the primary driver of interest. In 2021, the average crypto hedge fund returned 214%, based on HFRI's crypto fund index. Aside from the 2017 bull market, that represents the best performance for crypto hedge funds since HFRI began tracking crypto hedge fund performance in 2015. This compares to a 10.3% return for the HFRI Composite. Crypto hedge funds not only outperformed the wider hedge fund universe, but also outdid widely used crypto benchmarks. For example, Bitcoin returned 48.5% over the course of 2021 and the Bloomberg Galaxy Crypto Index posted a return of 153.5%.

Digital asset markets are largely retail-dominated, with liquidity fragmented across dozens of different trading venues. Reference indices used for pricing individual tokens differ from exchange to exchange. Tokens trade many to many - against hundreds of other tokens and dozens of sovereign currencies. Exchanges cater to different retail cohorts, with different geographical and regulatory barriers. Cross-exchange price discrepancies, coupled with a booming derivatives market, open orderbooks, and liquidity fragmentation creates significant opportunity for arbitrage. Spot to spot arbitrage, spot to delta-one, delta-one to delta-one, cross-exchange funding rate arbitrage, orderbook arbitrage, liquidity arbitrage, etc. Despite the abundant alpha opportunities, the

[13] Please see *PwC*, "Third Annual Global Crypto Hedge Fund Report 2021" dated May 16, 2021, available on www.pwc.com.

aggregate size of the alpha pie remains relatively small for traditional players. Most arbitrage-focused, quantitative crypto funds face capacity constraints in the $150-350 million AUM range. As such, until operational, legal, regulatory, accounting, and liquidity constraints are overcome, the exploitable inefficiencies in the digital asset ecosystem will likely remain dominated by crypto-native investors.

CHART 17 | A Taxonomy Of Digital Asset Investment Strategies

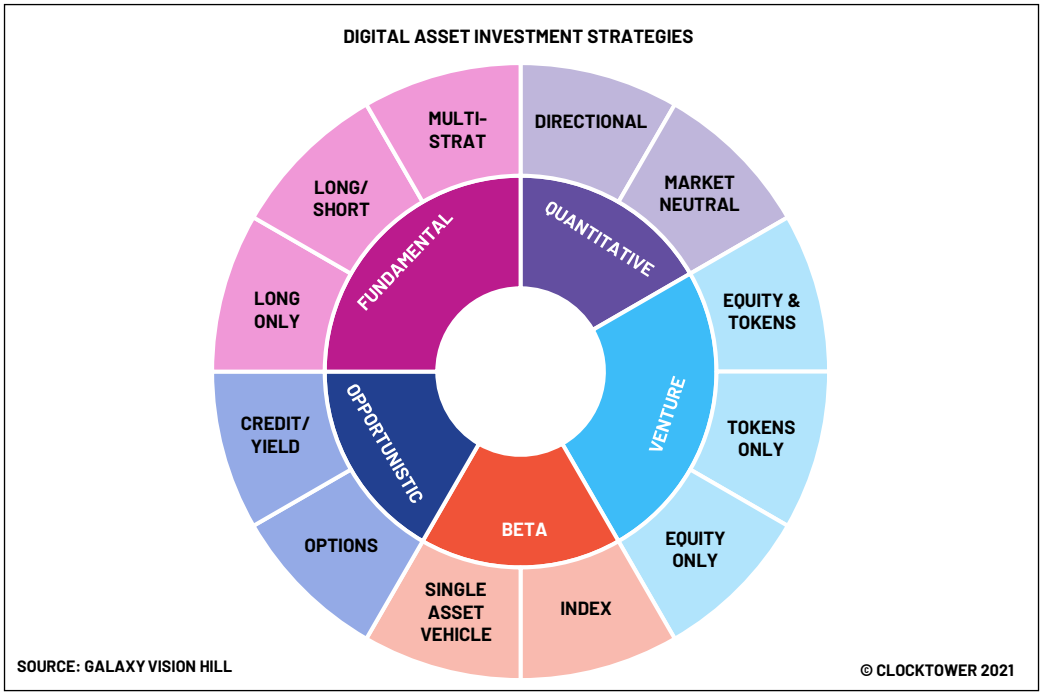
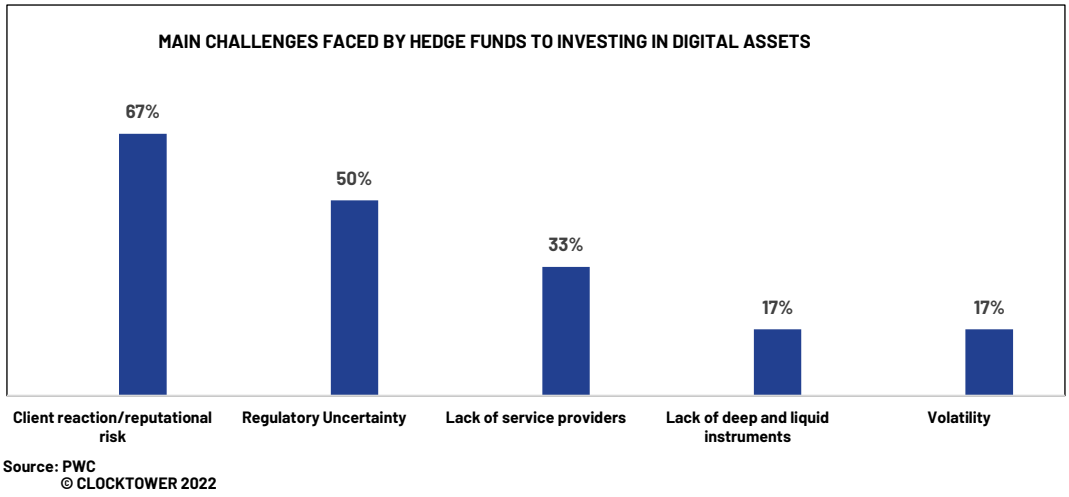


CHART 18 | Hurdles Preclude Significant Participation From Traditional HFs



Beta/Passive Strategies

Beta strategies – i.e. single or multi-asset passive investment vehicles – are the simplest private fund offered by crypto HFs. Token-tracking funds – most commonly for Bitcoin and Ether – charge between 0.75-1% management fee on average, and effectively act as exchange traded funds, with daily liquidity and no performance fee. Passive funds remove the burden of purchasing tokens and managing custody, providing institutional investors a convenient means of gaining direct exposure to liquid tokens. Grayscale – a subsidiary of Digital Currency Group – is the largest provider of single token/index tracking funds, with over $60 billion in AUM at the end of 2021. Many, if not most, crypto hedge funds offer passive index-tracking funds, but as institutional grade custody solutions have improved, and the availability of exchange-traded products expands, investor interest in these products has waned.

Fundamental

Fundamental long-biased and L/S hedge funds invest in the liquid tokens of protocols and applications, managing risk by dynamically fluctuating net exposure, and through the use of derivatives.[14] Long-biased hedge funds take concentrated, thesis-driven positions in small and mid-cap liquid tokens, often staking and lending out assets to generate yield on core positions. These funds often employ technical experts to underwrite smart contract risk, as well as utilizing robust networks of blockchain developers and investors to maximize information asymmetry. The rise of decentralized autonomous organizations (DAOs) has also popularized activist strategies, allowing hedge funds to participate in protocol governance and treasury management.[15]

MultiCoin Capital – founded by Kyle Samani in 2017 – is one of the largest long-biased crypto hedge funds, with $4.3 billion in AUM, as of December 2021. MultiCoin's monumental, organic growth since inception is due in large part to early investments in Solana. Long-biased, crypto-native hedge funds like MultiCoin, Pantera Capital ($1.5 billion), Arca Digital (~$500 million)[16], and others offer investors the upside asymmetry of crypto VC, with the liquidity, and mark to market volatility, of an open-ended fund.

[14] Liquid derivatives markets are currently unavailable to US-domiciled funds. As a result, most US-based funds are domiciled in the Cayman Islands or BVI, which allows for access to unregulated, offshore exchanges with deeper derivative and option markets. Deribit is the most liquid exchange for BTC and ETH options, while Binance and FTX make up most of the spot/futures trading volume. BTC and ETH options are often used to delta hedge liquid token positions. Trading volumes for BTC and ETH options grew 443% in 2021, yet 95% of that volume remains on Deribit.

[15] Token holders' voting power is proportional to the share of tokens held. Hedge funds often exploit large positions to direct protocol treasuries to extract value for token holders.

[16] Pantera AUM for non-venture token investments as of Oct. 31, 2021. Arca AUM for Digital Asset Fund as of November 30, 2021.

Quantitative

Quantitative crypto managers employ algorithmic trading models across a blend of directional and market neutral sub-strategies. The four primary strategy buckets are: predictive strategies, liquidity provision strategies, arbitrage strategies and volatility strategies. Predictive strategies encompass statistical arbitrage, relative value, and momentum/trend following strategies. Predictive strategies benefit from the retail dominated nature of digital asset markets, which often leads to reflexive price movements over the short run, with more predictable movements over the medium term.

Liquidity provision refers to market-making/low-latency trading, orderbook depth arbitrage[17], and option selling. High frequency trading in crypto markets relies less on colocation than traditional HFTs, as most crypto exchanges use AWS instead of centralized data centers. Rather than ensuring minimum latency in data transmission, crypto HFT firms dynamically shift collateral from exchange to exchange, capturing cross-exchange discrepancies in bid/ask spreads. Arbitrage-oriented trading strategies exploit recurring spreads/mispricings, using strategies such as cross-exchange arbitrage, triangular arbitrage, cash/futures basis, funding rate trades on perpetual swaps, etc.[18]

Volatility-focused strategies typically harvest irregularities in implied volatility surfaces. High demand for out-of-the-money calls from speculators, occasionally financed through the sale of deep out-of-the-money puts, results in a persistent call skew, and relatively cheap downside volatility. Large holders of digital assets, Bitcoin miners, and lenders use derivatives for hedging, often agnostic to implied volatility levels. Option trading is facilitated by OTC trading desks and on a few offshore exchanges, most notably Deribit.

Most systematic crypto hedge funds employ a multi-strategy approach, fluctuating exposure across different sub-strategies depending on market conditions. BlockTower, Nickel Digital, Hyperion Decimus, Dunamis and Ikigai are some of the largest crypto quant funds, with PMs that adapted traditional quant trading strategies to digital asset markets.

[17] Orderbook depth arbitrage is the practice of using public orderbook data feeds - as is standard on most crypto trading venues - to buy through certain price levels on less liquid exchanges to then sell at the next highest price level, capturing a spread.

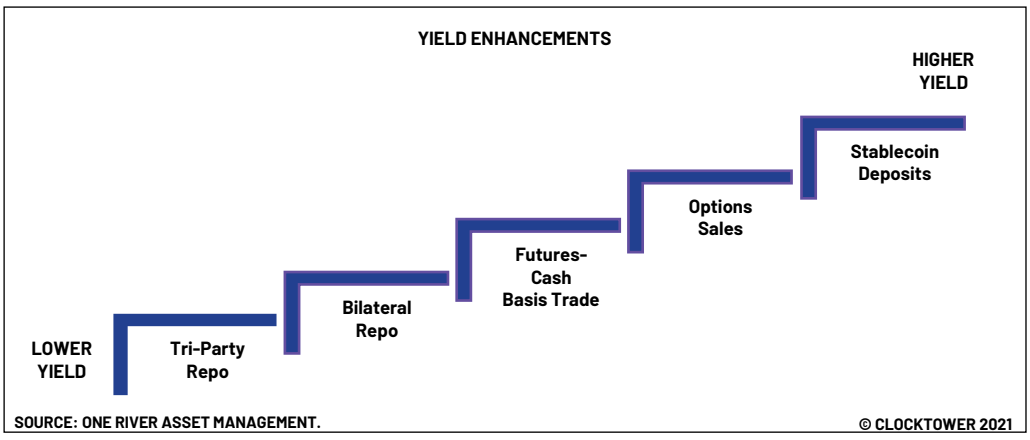
[18] Perpetual swaps are a type of derivative contract native to crypto markets, that track the value of an underlying asset without a settlement or expiration date. This is accomplished through the use of a "funding rate." This mechanism balances the buyer and seller demand for the perpetual swap so that its price falls in line with the underlying asset to keep the perpetual swap tethered to the price of the underlying asset, without requiring transfer/custody of the underlying.

Opportunistic/Yield-focused

Yield-focused crypto hedge funds comprise a growing share of new launches, providing an on-ramp for institutions into digital assets, while mitigating much of the volatility/directional risk. Yields are generated in a variety of ways, with varying risk parameters **(Chart 19).** Most yield strategies are market neutral, aiming to generate consistent USD-yields while mitigating price, counterparty, and smart contract/protocol risk. This group of managers can be further subdivided into three sub-strategies: DeFi-focused strategies, CeFi-focused strategies, and a multi-strategy blend. DeFi-focused strategies generate returns from yield farming/liquidity mining, earning transaction fees from liquidity pools on decentralized exchanges, and through airdrops/L1 staking rewards.[19] CeFi (Centralized Finance) strategies generate yield in two primary ways: lending out USD/stablecoins to various market participants and harvesting the cash-futures basis in the futures curves of several tokens, on various exchanges.

Extreme leverage and a lack of dollar funding/regulated banking services creates consistent demand for US Dollars and dollar-backed stablecoins, with annualized borrowing yields ranging from 2-30%, depending on the stablecoin issuer, the collateralization ratio, and the quality of the borrower. High quality borrowers with excess digital asset collateral and demand for dollars can expect to pay ~6-8% interest on a 100-150% collateralized loan. Several firms are in the process of launching opportunistic funds to capture the opportunity. For example, One River's Digital Income strategy will hold no crypto assets - including stablecoins – and will target 7-10% gross p.a. with an expected $3-5 billion in total strategy capacity.

CHART 19 | Yield Strategies Across the Risk Spectrum



[19] Yield farming is the process of staking (locking up) assets into smart contracts on DeFi protocols, and earning the native token of the protocol as a yield, in proportion to the amount of tokens staked. DeFi projects pay out tokens to users from the protocol's treasury as a means of bootstrapping network growth. This dilutes the free float of the token, often weighing on the token's value. DeFi funds hedge out price risk by shorting the token on centralized exchanges with liquid, perpetual swap contracts. This allows them to earn the spread between the yield farming APY and the cost of shorting via perpetual swaps (these two yields are rarely in line given market inefficiency).

Venture Capital

According to Dove Metrics, crypto VC funds raised $18.8 billion in 103 funding rounds in 2021 (Table 2). A vast majority of new capital entering the digital asset space has flowed into crypto VCs and crossover funds. These funds are typically structured with significant lockups (7-10 year term) and have the ability to invest in equity, liquid tokens, and SAFTs.[20] Investors have favored private investments in crypto over liquid investments/hedge fund structures for two primary reasons: higher return potential and less mark-to-market risk. According to data from VisionTrack, of the 49 new funds raised in 2021, 43% of them were first time funds and 41% were existing funds raising new vintages. The average fund size was ~$300 million, a 2x increase over the average fund size in 2020. Somewhat surprisingly, with an average deployment period of 0-2 years, and a 3-5 year investment horizon, 62% of managers that raised funds in 2020 raised new vintages in 2021. Of the ~$700 billion in venture capital invested into startups of all stages in 2021, roughly 4.7% ($30 billion) was directed to blockchain/crypto startups in ~1300 funding rounds (Chart 20).

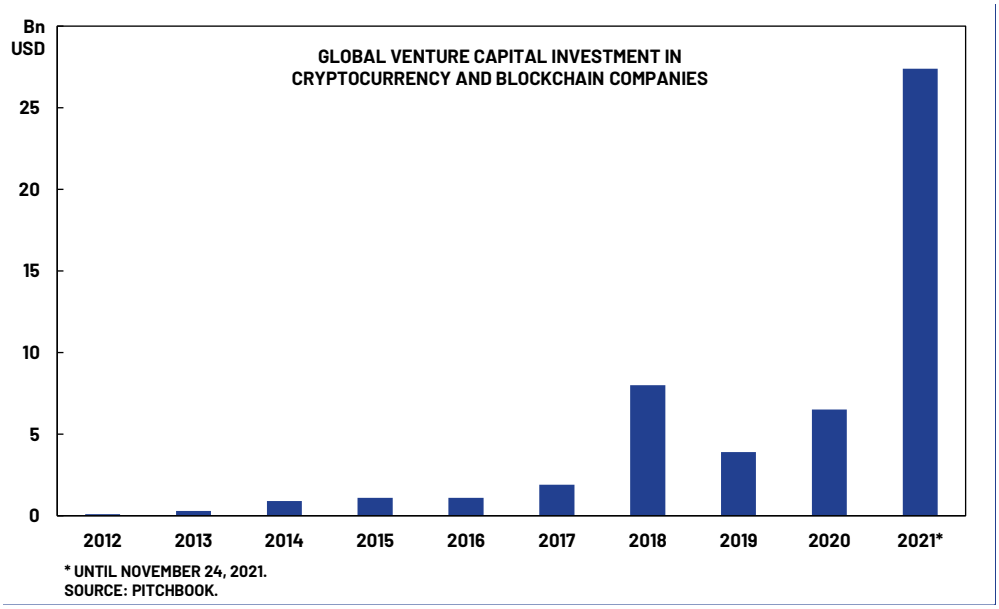
TABLE 2 | The Crypto VC Winners of 2021

Investor	Date Closed	Size
Paradigm	November 15	$2.5bn
Andreessen Horowitz	June 24	$2.2bn
Hivemend Capital	November 29	$1.5bn
10T Holdings	September 8	$750m
Pantera Capital	November 23	$600m
Initialized Capital	December 14	$530m
Borderless Capital	December 1	$500m
Jump Capital	September 14	$350m
Jolt Capital	September 6	$320m
Blockchain Capital	April 14	$300m

Source: PITCHBOOK

[20] SAFT – Simple Agreement for Future Tokens - is the investment contract used to convey ownership of a company/protocol in tokens prior to the development of the tokens.

CHART 20 | The Explosion of Digital Asset Startups



Centralized exchanges were the largest recipient of venture funding - FTX, Bullish Global - followed by centralized lending and custody platforms - BlockFi, Celsius, NYDIG, Anchorage (Chart 21 and 22). Overall, Centralized Finance (CeFi)/Infrastructure – encompassing exchanges, custodians, lending platforms, payments, scaling, interoperability, L1s, etc. - raised ~$23 billion. Web3, DeFi, NFTs, and gaming startups raised ~$7.5 billion in 850 funding rounds.

CHART 21 | Financial Plumbing Dominated Flows

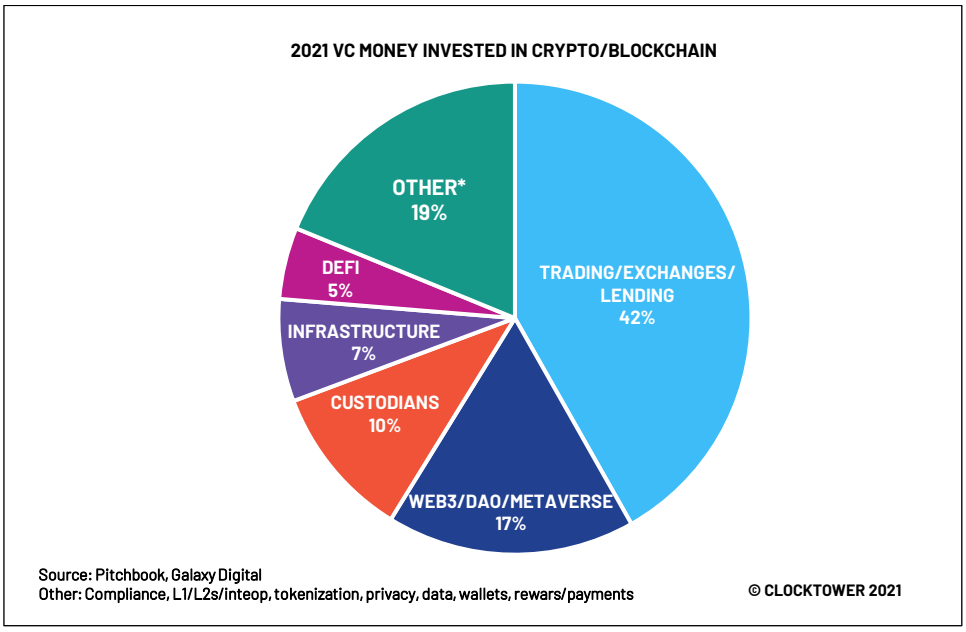
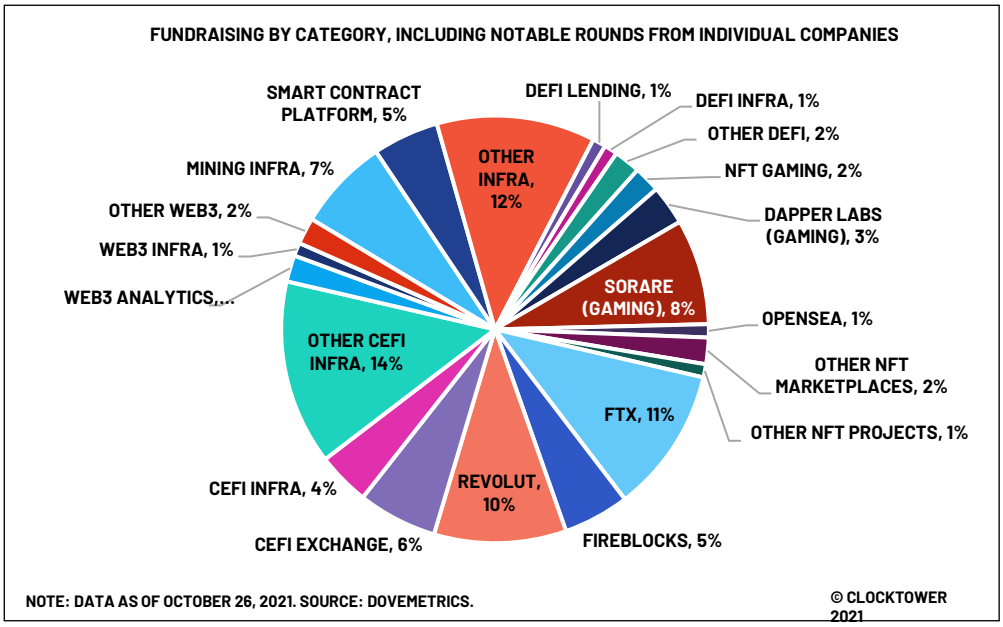


CHART 22 | FTX Raised ~3% of Total VC Capital in 2021



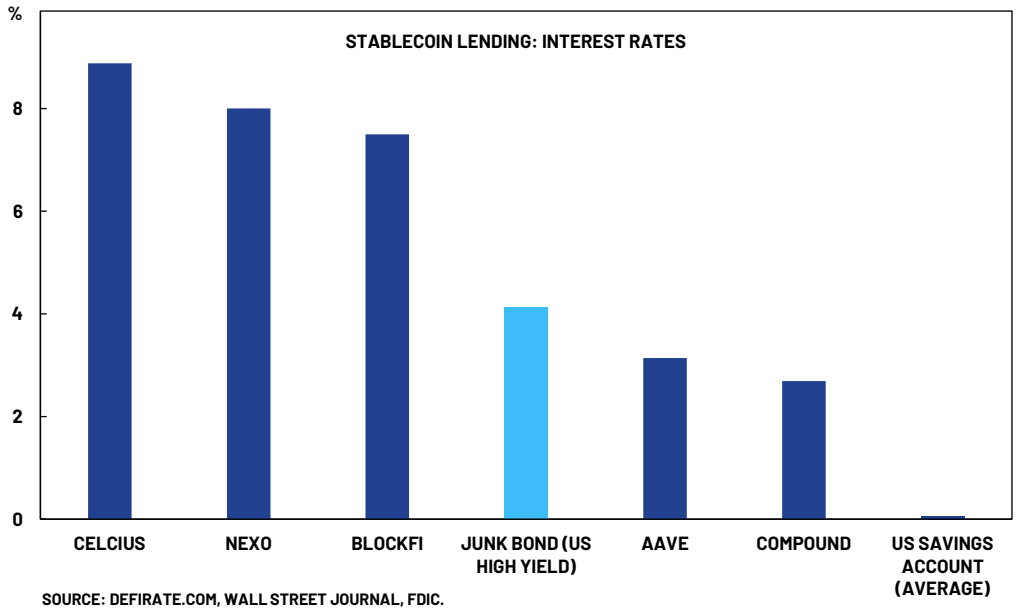
The growth in VC funding to exchanges, lending platforms, and custodians mirrors the explosive growth in each of these segments. Exchanges reported ~$14 trillion in trading volume for 2021, a ~700% increase from 2020.[21] Decentralized exchanges (DEXs) grew volumes by 860% from 2020, facilitating $1 trillion in trading volume. Institutional custody firms such as NYDIG, Anchorage, Fireblocks, and Copper have become the on-ramp for traditional financial institutions looking to enter the space, and/or expand their digital asset offerings.[22] Despite pushback from regulators, centralized lending platforms like Celsius and BlockFi have grown their retail and institutional product offerings, allowing a wide swath of users to earn interest on their digital assets and take out collateralized loans (Chart 23).[23]

[21] Please see *CoinDesk*, "CoinDesk 2021 Annual Crypto Review," dated January 6, 2022, available on www.coindesk.com

[22] Institutional custodians provide an array of services to clients including: "hot" and "cold" storage solutions, trading/execution, yield enhancement on deposits, research, etc. Trading-oriented custodians – I.e. Copper and Fireblocks – allow clients – i.e. hedge funds - to trade a wide variety of assets on dozens of exchanges while shielding the client from counterparty risk.

[23] Centralized lending platforms have been criticized by federal/state regulators for issuing unregistered securities in the form of interest-bearing savings accounts. Coinbase's planned release of its lending product was postponed in September following pushback from the SEC. Lending platforms lend out client assets (stablecoins and cryptocurrencies) at variable yields to market makers, institutional investors, and crypto companies. Lending platforms also generate yield from staking L1 assets and providing liquidity to DeFi protocols. In many ways, CeFi lending platforms resemble crypto hedge funds, providing liquidity to market participants to generate yield for clients.

CHART 23 | Institutional and Retail Borrow/Lending Platforms



SOURCE: DEFIRATE.COM, WALL STREET JOURNAL, FDIC.
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Several large exchanges - including Coinbase, Binance, and FTX – have launched venture subsidiaries with funding from the exchanges' own balance sheets. Coinbase Ventures – the investment arm of Coinbase – made over 100 investments in 2021, in deals valued at ~$4 billion.[24] FTX recently launched a $2 billion fund, investing primarily into the Solana ecosystem, after raising $1.32 billion in two funding rounds in 2021.[25] These investment subsidiaries spin the crypto flywheel, recycling cash-flows generated from trading activity back into the ecosystem. Other VC firms have launched multi-billion ecosystem-focused funds to build out the DApp offerings on Avalanche (Three Arrows Capital, Dragonfly Capital, Polychain Capital), Algorand (Borderless Capital), Terra (ParaFi, CoinFund), and other L1s. These ecosystem funds provide funding to applications/protocols that build and deploy DApps to particular layer 1 blockchains. Many traditional VCs have raised specialty digital asset funds and/or are deploying capital from their flagship funds. Sequoia, Tiger Global, and Coatue made twenty-one, fourteen, and ten investments respectively into digital asset companies in 2021. This compares to ten, two, and four investments made in total from 2016-2020, respectively.[26]

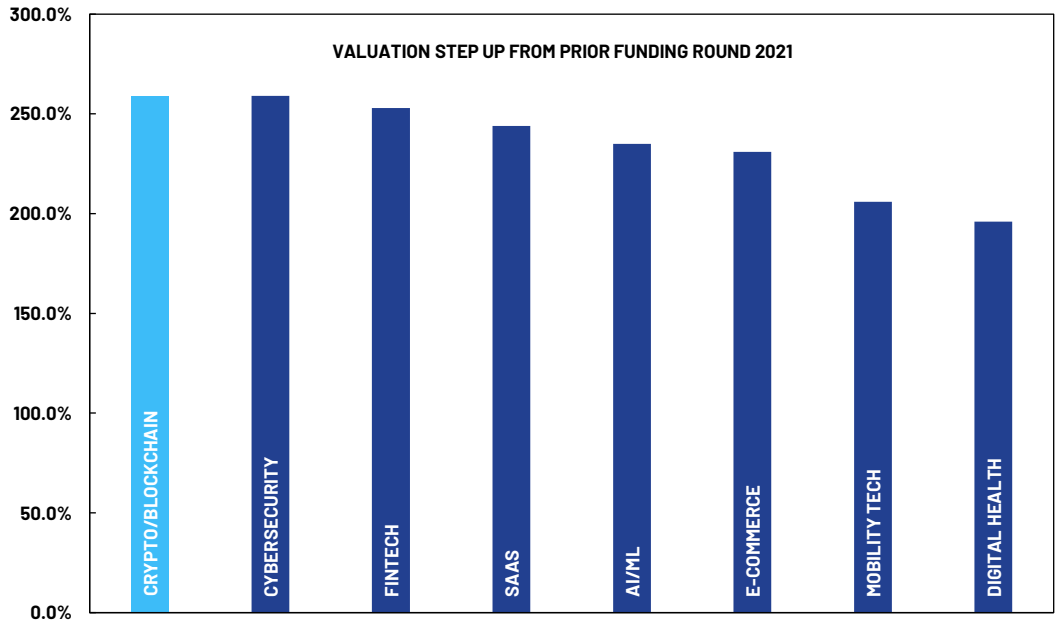
[24] Please see *Crunchbase*, "Here's How Coinbase Ventures Bets On The Growing Ecosystem," dated December 17, 2021, available on news.crunchbase.com

[25] Please see *CoinDesk*, "CoinDesk 2021 Annual Crypto Review," dated January 6, 2022, available on www.coindesk.com

[26] Please see *Crunchbase*, "Once Dubious, Traditional VC Firms Lead More Of The Charge In Crypto Deals," dated October 22, 2021, available on news.crunchbase.com

The flood of capital from crypto-native VCs, traditional VCs, and exchange-backed venture arms has led to substantial valuation step-ups for digital asset startups in 2021 (**Chart 24).** According to Dove Metrics, notwithstanding the ~$30 billion in funding for digital asset companies in 2021, a further ~$20 billion in dry powder remains stocked in VC coffers, awaiting deployment in the years to come. The commonly held perception of crypto – as a closed system rife with toxicity, tribalism, and speculation – is slowly giving way to a new vision, consisting of consumer-facing, blockchain-based applications, with ownership/governance coordinated via tokens.

CHART 26 | Valuations Have Richened as VCs Rapidly Deploy Capital



NOTE: DATA AS OF NOVEMBER 12, 2021. SOURCE: PITCHBOOK.
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Final Thoughts

At the time of writing,[27] the market cap of digital assets is in freefall, shedding $1.5 trillion in less than two months. Bitcoin has plunged ~50% from all-time highs, Ethereum -60%, and many L1s and DApps between -75-90%. Block congestion during the crash worsened network latency and increased transaction costs. Several alternate layer 1 blockchains experienced technical failures, preventing users from providing collateral to DeFi protocols, leading to massive, forced liquidations. Bitcoin's correlation to equities has risen in recent months, shedding value alongside risk assets. Correlations between L1s, L2s, and DApps still converge in risk-off events, providing little to no diversification. Amid a market-wide rout, it's difficult to view the *current version* of digital assets as anything more than high beta, hyper-speculative risk assets.

More than $4 billion worth of crypto assets were stolen from centralized exchanges, lending platforms, and smart contract protocols in 2021.[28] Global policy makers and regulators continue to take an adversarial stance towards the digital asset ecosystem. Punitive regulation – potentially stymying innovation – remains a dark, lingering shadow. Regulatory clarity eludes most facets of the burgeoning industry. UI/UX on DApps, crypto games, and other web 3.0 applications massively lags the experience of centralized competitors, weighing on widespread adoption. Countless impediments stand in the way of a full, societal embrace of the web 3.0 future.

Importantly, these barriers do not delegitimize the genuine innovation, and overall investment case, in digital assets. For alpha-oriented investors, the digital asset ecosystem presents a playground of inefficiencies. The hyper-fragmentation of information and liquidity, the variety of trading venues and instruments, and the face melting volatility creates an ever-evolving opportunity set for fundamental and algorithmic traders.

The vision of web 3.0 – a user-owned, decentralized version of the internet – will continue to attract capital from long-term, growth investors. Maturation will lead to further market segmentation, resulting in new investment narratives and themes. Certain segments will surely fall in and out of favor along the way. And the market will continue to experience prolonged, painful downcycles. But *things are different now.*[29] Institutional capital is arriving quickly and unlikely to leave, nor is the high-quality investment, tech, and developer talent that has made the transition in recent years.

The current iteration of digital assets looks a lot like a messy web of polarization, upheld by tedious narratives – "decentralized web"… "self-sovereign money"… "digital gold." Many critics claim digital assets are simply a, "solution in search of a problem."[30] At the same time, digital assets look a lot like

[27] As of January 31, 2022.

[28] Please see *Crystal Blockchain*, "Crypto & DeFi Hacks and Scams Report" dated December 20, 2021, available on www.crystalblockchain.com.

[29] An even scarier four-word phrase?

[30] *"[insert cryptocurrency] solves this."*

an emergent asset class, with the potential to disrupt nearly every segment of the economy and digital, daily life. Path dependency matters for investors, and the gamut of possible forward paths is expansive. Predicting which network, token, or use-case – if any – wins out is a lofty task. At this critical juncture in the development path, we'd be hard-pressed to pick winners and losers. This applies to both specific tokens and particular use cases. In our view, the far safer bet to take is on the endurance and continued evolution of digital assets. Whichever path the development of digital assets takes, one thing is for certain: a bumpy road lies ahead.

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