



DeFi

Decentralized Finance

by Ben McMillan and Andrew Swan

DeFi: An Introduction to Ethereum + Smart Contracts

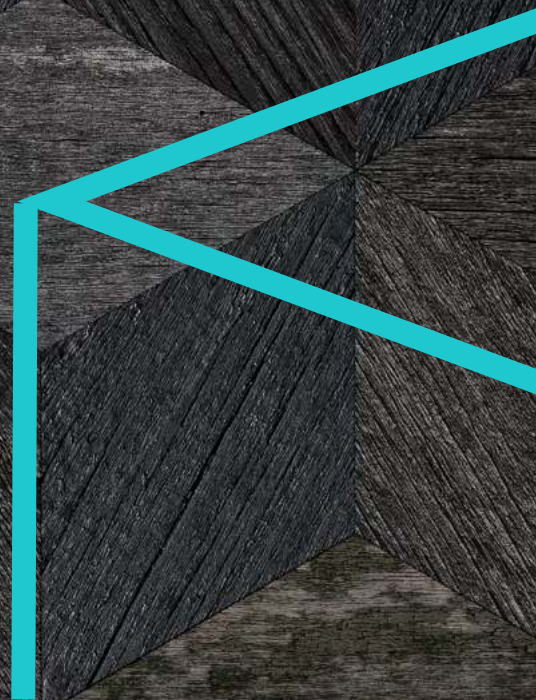
IDX Insights Presents:

An Introduction To Ethereum and Smart Contracts

A resource for wealth managers, institutions, and investors
to help navigate Ethereum, smart contracts and Decentralized Finance

Part one of a two part series on Ethereum and smart contracts

By Ben McMillan and Andrew Swan



An Introduction to Ethereum and Smart Contracts

Part One of a Two Part Series

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I. Introduction

As digital assets become mainstream, the second largest cryptocurrency (by market capitalization) has generated major discussions at wealth management offices across the United States. Historically, Bitcoin has attracted most of the attention in the digital assets' ecosystem, however, investors are starting to increase their knowledge and participation in Ethereum as the number of decentralized applications (“DApps”) built on the Ethereum blockchain continues to rise.

Some of the key questions that consistently arise for Advisors and their clients are:

- What exactly is Ethereum and how is it different from Bitcoin?
- What is decentralized finance or “DeFi”, and how is it linked to Ethereum?
- How and why should it fit into investment portfolios?

This paper is designed to answer these questions and to provide greater insights on the existence of Ethereum.

II. Bitcoin vs. Ethereum: What are the Differences?

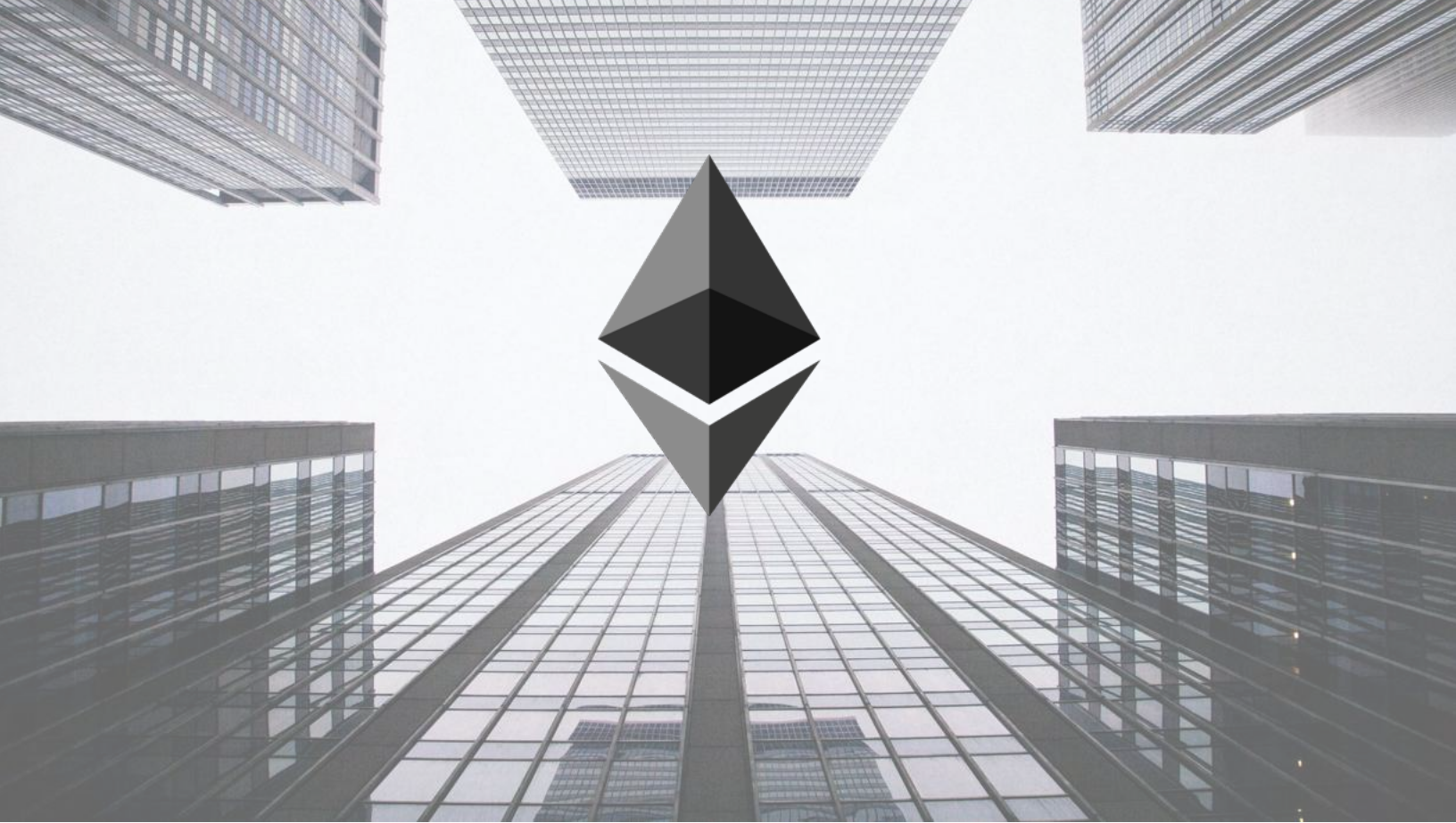
While the two digital asset titans sit #1 and #2 in terms of market capitalization, they really could not be more different in their primary usage and utility. While neither is governed nor distributed by a non-decentralized authority like a Central Bank, that is generally where their similarities begin and end. Below is a summarized explanation between the two digital assets.

- Bitcoin was created to be a store of value and peer-to-peer currency. It was purposefully designed to be global, portable, and measurable via mining scarcity.
- Ethereum was created as an operating system to power smart contracts, along a limitless blockchain set of transaction ledgers. There are infinite applications for Ethereum layer transactions to disrupt, enhance and expand B2B and B2C payments/investment/verification infrastructures. We are rapidly seeing start-up decentralized applications, or dApps, being built on top of the Ethereum blockchain, much like iPhone applications are built by companies to reside in the Apple Store via iOS as the operating system backbone.

"Bitcoin was created to be a store of value and peer-to-peer currency. Ethereum, an operating system to power smart contracts and applications."



ethereum



III. Bitcoin: The Beginning of the "DeFi" Idea

Bitcoin was a revolutionary idea when it launched in 2009. The cryptocurrency presented a decentralized "digital money" that could be transacted in a largely 'trustless and permission-less' manner. Starting with the presentation of a cryptographically secured public ledger (blockchain) to record transactions, the bitcoin white paper officially started the era of cryptocurrencies.

Bitcoin was specific in its objective: allow anonymous parties to transact securely with any counter-parties in the world - without requiring a centralized intermediary or authority.

To achieve this goal the decentralized blockchain serves as the consensus layer (middleman) in the record of transactions (bitcoins) among users. The technology was novel and the real-world implications are significant.

IV. Ethereum: The Beginning of a Wider Revolution

While Bitcoin was designed with a specific application of blockchain technology in mind (digital transactions), Ethereum was developed to unlock the full potential of the blockchain.

Like Bitcoin, Ethereum is a decentralized network run by thousands and thousands of computers across the internet, running Ethereum nodes (a program that assists in verifying transactions for a given blockchain). Due to the fact that operating a node requires costly computing power and electricity consumption, users are incentivized through in-kind payments of Ethereum for providing node services; essentially a unique and different form of community.

Importantly of note, while most Co-ops or community banks require deposits or contributions and are limited in finite participation, the Ethereum blockchain can grow exponentially through new and increased participation on the network.

V. What's So Smart About Smart Contracts??

Smart Contracts, Defined

The single largest difference between Bitcoin and Ethereum is the latter's use of smart contracts. Smart contracts are programs that can be deployed on the Ethereum blockchain that allow developers to build and deploy applications that run in a decentralized manner without concern for downtime or third-party interference. Ether (ETH), the unit of exchange on the Ethereum blockchain, is used to power these decentralized applications (DApps).

The addition of smart contracts makes Ethereum not only a decentralized ledger, but also an *operating system* that allows developers to build and deploy applications that can solve for specific use cases and challenges. This is where the 'smart' in smart contracts comes into play, by solving for the removal of inefficient and burdensome layers of authentication.

Smart contracts, simply stated, are computer codes created to reflect an agreement between two or more parties.

Because these contracts are self-executing, they do not require a third party to verify or document the exchange of value. Therefore, smart contracts allow for largely 'trustless' transactions: those occurring without a centralized authority, legal arbiter, or third-party verification agent.

Smart Contract Example: Buying Baseball Tickets

As an example let's look at purchasing tickets for a baseball game. Using an Ethereum smart contract, one could design built in rules, designed through computer code, such as: "if the game is rained out, the buyer automatically gets their money back". The smart contract could be connected to a weather app, and, if it rains on gameday, the money for the tickets would be automatically refunded to the purchaser. No middleman, like the baseball team's customer service department, need to intervene to issue the refund.

The above is one of thousands of examples of how a smart contract can enhance current digital transactions that do not execute on blockchains. Any transaction, no matter how complex, can be coded into a smart contract.

As the network continues to expand, one can envision the purchasing of property or life insurance on the blockchain. A relatively complicated transaction, involving layers of incumbents such as title companies and appraisers, all being ported to the blockchain for transparent and efficient execution.

The Decentralization of Arbiters and Middlemen

Considering the magnitude of this technological evolution, the question becomes: Which middlemen will be replaced first? Consensus leans towards banks and their legacy payment infrastructure. This underpins why VISA, Mastercard, Square and PayPal have aggressively positioned their business plans for the future of digital assets, while neoBanks and neoBrokerages such as Affirm, Chime, SOFI, etc are rising growing in terms of consumer engagement and deposits. There exists even larger examples of rapid adoption in global markets outside of the U.S., and today, the volume of transactions moving from 'traditional' infrastructure to DeFi infrastructure has grown from the billions (\$USD) to tens of billions (\$USD) in just the past year.

To build off the use cases for complicated transactions deployed on the blockchain, another example would be the purchase of a physical property (real estate). Traditionally there are multiple third parties involved - lawyers, escrow agents, title companies realtors, etc. - which makes the process slow, laborious, and expensive.

When real estate transactions are executed on the Ethereum blockchain via smart contracts, a piece of code would automatically transfer title and deed of property ownership to the buyer, and the funds to the seller once agreed upon terms and conditions were met.

The legal implications of this transformative technology advancement and its implications for B2B markets is rapidly being studied - as a "reasonable man" standard or a fiduciary duty might remain a material component of many current and future transactions on the blockchain.

The Decentralization of Arbiters and Middlemen cont.

For the purposes of this study, this is particularly relevant to the purchase of equities and/or investment instruments, which could relate in some manner to exposure to Ethereum (ETH). More on this later.

The real-world applications of smart contracts are seemingly infinite. There is a massive opportunity to provide value to those in developing nations who do not enjoy the luxury of a reliable financial or legal system. One example: applying smart contracts to the insurance industry – Etherisc, a decentralized application built on Ethereum – is aiming to provide crop insurance to farmers in regions such as Kenya where there is little-to-no access to crop protection from drought or floods – events that are common for the region.

Moreover, one can envision many industrial and consumer advances brought forth to developing markets via decentralized finance, and this helps to explain the enthusiastic adoption of DeFi protocols mark-to-market. A merger of the mobile app banking systems with the growing Ethereum DeFi platforms is an exciting global prospect because it has the potential to springboard developing region's technology infrastructure decades into the future.

VI. The Rise of DeFi and Ethereum's Role.

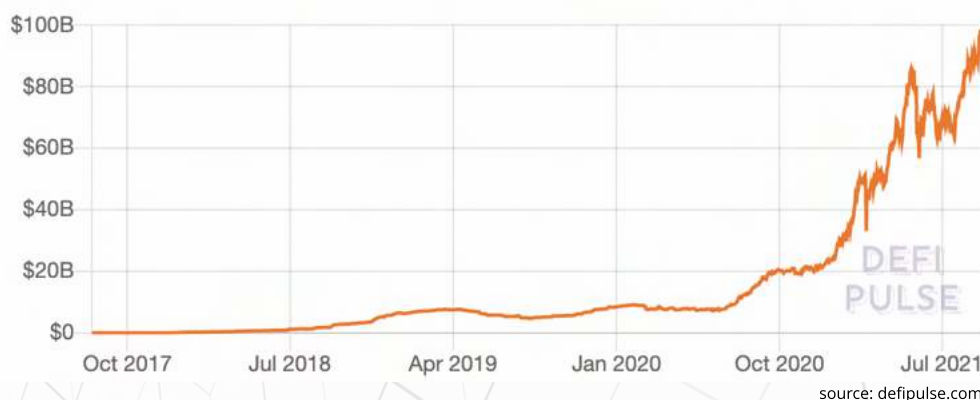
The growth in DeFi adoption has been relatively unmatched since the rise in adoption of the internet in the 1990's and early 2000's.

So just how far have we come in the past year?

Total Value Locked (USD) in DeFi

TVL (USD) | ETH | BTC

All | 1 Year | 90 Day | 30 Day



On 05/31/2020, the “total value locked” (TVL) in DeFi surpassed \$1 billion for the first time.

At time of this writing in Q3 of 2021, TVL in DeFi has surpassed \$95 billion, a staggering 550% growth in TVL in less than a year.

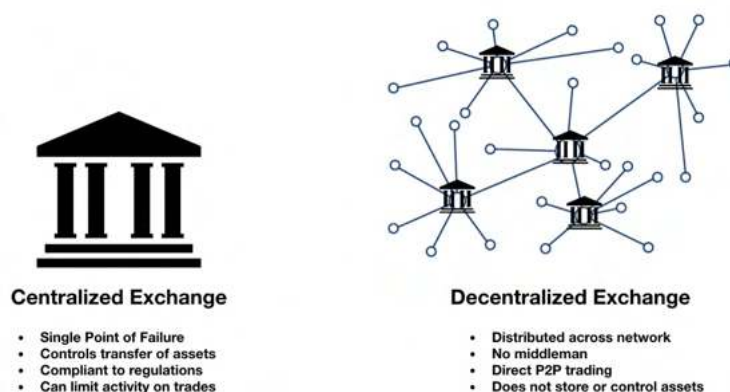
For quick context, Total Value Locked (TVL) is the sum of all deposits across all protocol(s). Those deposits can be a basket of tokens and assets, ranging from a token like Bitcoin to a stable coin like Tether (USDT). A traditional finance comparison might be Assets Under Management, as some of these protocols are not solely focused around borrowing and lending.

The Rise of DeFi and Ethereum's Role cont.

Currently, the majority of DeFi applications have been built on the Ethereum blockchain, making it the largest decentralized smart contract platform. The greater the adoption, the more perceived trust and competence, which has given Ethereum a commanding lead in the smart contract race. This is no small advantage, given that the scale, size, developer support, and network effects all play an influential role in the future adoption of the network(s).

Most of the current DeFi protocols are aimed at facilitating an exchange of digital assets. Due to the nature of these protocols being governed by a pre-determined code (via smart contracts), they eliminate much of the “middleman” function. As a result, it’s common for lenders on these protocols to be able to earn yields orders of magnitude higher than traditional financial channels. It has also become a quicker and more efficient means of loaning collateral .

However, the DeFi ecosystem carries new and at times unforeseeable risks: smart contracts rely on code, and therefore are vulnerable to coding errors, hacking, and by nature as a ‘do it yourself’ transaction, simple human error. For this reason, many of the oldest protocols are generally regarded as the safest since they’ve been “battle tested” with billions of dollars over a longer period of time.



Source: <https://medium.com/the-capital/the-state-of-decentralized-exchanges-dex-658659d3a502>

Within the DeFi ecosystem of applications, the decentralized exchanges (DEX) were the first to explode in terms of usage. Protocols such as Uniswap, Bancor, and Balancer provide users an ability to exchange a variety of cryptocurrencies outside of traditional centralized exchanges. One characteristic of these DEXs is that there is no central entity providing liquidity. Liquidity on DEX platforms is provided by the users.

Users can elect to deposit their tokens into liquidity pools on a decentralized exchange in exchange for nominal fees. Fees are generated each time someone uses the liquidity pool, and those fees are often distributed, pro-rata, to the liquidity providers. The incentives for liquidity providers on decentralized exchanges can be significant. It is not uncommon to see annual percentage rates (APR) over 30-40% for some liquidity pools.

It is important to note that DeFi products are not limited only to crypto native assets: the capabilities extend far beyond just borrowing and lending. Synthetix, which is built on the Ethereum blockchain, allows users to gain exposure to more traditional financial products such as stocks and bonds. Users can trade tokenized versions of stocks, allowing investors to exposure to stocks such as Apple or Tesla without a brokerage account.

The Rise of DeFi and Ethereum's Role cont.

As most DeFi protocols are built on Ethereum, they require the native token (ETH) to perform transactions. This is structurally bullish for the price of ETH the token; as more and more users enter the DeFi space and interact with these protocols, they will need to buy ETH as a means to participate. Just as the Apple and Android networks grew rapidly in strength and scale with applications built on their operating systems, the network effect of Ethereum should continue to grow.

Demand for ETH as an investment (securitized and otherwise) provides a strong mid-term bull thesis, and in many contexts, is not a replacement for exposure to BTC, but instead as an additive as another fundamental "growth story" within the digital assets ecosystem.

"As most DeFi protocols are built on Ethereum, they require the native token ETH to perform transactions. This is structurally bullish for the price of ETH the token"



ethereum

Because of Ethereum's decentralized nature, Ethereum stakeholders must decide which advances are needed for the long-term success and growth of the blockchain itself. However, a large caveat: The Open Source Coding and Cryptocurrency Investment communities are not known as keen advocates for centralized decision making.

Thus, one of the central paradoxes of Ethereum:

Higher use rates lead to greater demand for standardized protocols.

The benefits of decentralized protocols are numerous; however, expediency around governance is not one of them. It has taken some time for stakeholders to reach consensus, but finally, as of summer 2021, the first of these improvements known as "Ethereum Improvement Protocol 1559" has taken place. EIP 1559 was highly anticipated as the first major upgrade to the network aimed at mitigating congestion.

VII. The Long-Term Bull Case for Ethereum

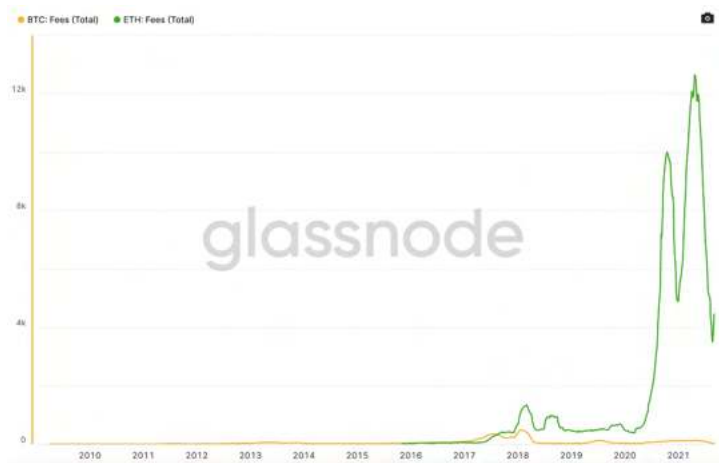
Although Bitcoin was the first cryptocurrency to gain adoption from the mainstream retail investing community, an increasing number of wealth managers, financial advisors, and institutional investors are beginning to see Ethereum as a comparable, if not superior long-term investment.

Many DeFi practitioners deem Ethereum to be analogous with owning both the layer network provider as well as the predominant channel of consumption. Although Bitcoin has a 5-year head start, the smart contract functionality of the Ethereum blockchain has driven the number of active Ethereum addresses exponentially. The number of active Ethereum wallets is gradually catching up to the number of active Bitcoin wallets, as seen below.

BTC vs ETH: Active Addresses



BTC vs ETH: Fees Generated



Perhaps an even more significant indication of the increasing utility of Ethereum is the total fees generated on the network (as compared to Bitcoin).

Additionally, the number of "whale" investors, money managers, and institutions migrating to Ethereum has exceeded Bitcoin in 2021.



Source: <https://www.nasdaq.com/articles/ethereum-may-be-the-backbone-of-the-future-financial-system-2021-04-30>

VII. What's Next for Ethereum?

Ethereum's stakeholder community has two major challenges:

1. Fees are expensive, making it costly for users to participate in DeFi.
2. Congestion of the network; This is the result of a substantial number of participants competing to complete transactions, resulting in higher fees, especially as more complex transactions flood the network.

An important first step toward resolution was the recent community decision to improve the Ethereum Protocol – an initiative referred to as EIP 1559. This 'decentralized' community decision effectively serves to align the coding community with investment stakeholders.

A second step will arrive with Ethereum 2.0. This will essentially govern the infrastructure rules for switching from a Proof-of-Work consensus to Proof-of Stake consensus.

In this scenario, validators, not miners, will secure the Ethereum network. The more ETH that is 'staked' (32 is the minimum per user to become a proof of stake validator), the more secure the network becomes.

The chart below indicates the growing number of 'validators' as against the price of ETH:



This transition to Proof of Stake also means it will become easier for users to participate in the network. With Bitcoin and Proof of Work, an interested party needs to set up a mining rig in order to be a validator and earn BTC. With ETH Proof of Stake, a user only needs to run the software and deposit their 32 ETH to earn fees in the form of ETH.

A further bullish indicator is that 'proof of stake' positions do not require the energy load of 'mining'. This 'ESG' component will add to Ethereum's appeal, in both the retail and institutional worlds.

VI. Prudent Exposure to Ethereum

Common Fiduciary Thoughts and Questions around Ethereum

As investors consider Ethereum's long-term value proposition, a number of questions surface:

1. *Where does ETH fit into client portfolios and asset allocation models?*
2. *How does a wealth manager or private investor go about getting exposure to the asset?*
3. *Is this a complement or supplement to Bitcoin?*
4. *Will the volatility of the asset class remain high, and if so, how does an investor plan for continued volatility?*

Options for ETH Exposure, and Possible Investment Scenarios

Akin to Bitcoin, there are currently several ways to gain investment exposure to ETH:

1. Buy on an exchange such as Coinbase and custody on your client's behalf
2. Accredited investors may enter into long-only trusts with ETH exposure
3. Derivative exposures via hedge funds, and/or other derivatives exposures from more traditional investment funds.
4. Risk-managed strategies, like the IDX Risk-Managed Ethereum Trusts or SMAs.

These avenues for investment in ETH are complicated, and in a rapid state of evolution:

Scenario 1:

Gain direct access to Ethereum by using a cryptocurrency exchange, the most popular of which is Coinbase. Though the initial process is rather simple, clients need custody services in addition to investment guidance. This can involve following a process such as generating and holding private keys, which creates challenges for most advisors or their clients.

Scenario 2:

Long-only trusts are another way for investors to gain exposure to Ethereum without having to buy or store Ethereum directly. These trusts are treated as exempted securities offerings (private placement). These investment exposures are exclusive to Accredited Investors, and carry similar "risks" and "lock up periods" that other alternative investments commonly carry.

Scenario 3:

Hedge Funds and other LP structures that participate in the derivatives/futures/options markets - where active portfolios take positions for/against Ethereum. This marketplace lacks in transparency and is quickly losing asset flows to more transparent and liquid offerings. While a number of major Wall Street complexes have begun to offer certain clients exposures to these funds, they are complicated to monitor, follow, and most importantly - attribute either Alpha or Beta to the Category.

Scenario 4:

The IDX Risk-Managed Ethereum Trust seeks to capture upside exposure to ETH, while mitigating the risk of large capital losses. As we know, historically, ETH has been prone to outsized volatility resulting in losses greater than 50%, which mathematically damages an investor's return potential. The goal of the IDX Risk-Managed Ethereum trust is to systematically participate in ETH when risk is "compensated", and avoid participation when risks materially outweigh return potential; this allows an investor to compound alongside the asset class with considerably lesser downside volatility.

VI. Conclusion

In a world of low interest rates, concerns around inflation and “money printing” as well as stretched valuations among traditional asset classes, it should come as no surprise that investors are starting to migrate towards digital assets. But it’s equally important to remember that the prospect for large returns doesn’t necessarily justify a cavalier attitude towards deploying investment dollars. The risk with digital assets demonstrates itself through large volatility events which are not likely to subside anytime soon. The prospect of explaining exogenous risk factors which can materialize into greater than 50% losses is simply not tenable for most financial advisors or their clients.

Therefore, IDX firmly believes it’s important to have a proper risk management strategy when it comes to deciding how much of your portfolio should seek exposure to digital assets. While each investor is unique in terms of their risk tolerance, the current consensus among capital allocations and advisors is that digital assets should be allocated to the “alternative” sleeve of a portfolio, with a 5-10% gross exposure to the asset class. We at IDX think a rules-based and risk-managed exposure to Ethereum should be a part of that allocation because we think blockchain technology will revolutionize the world similar to how the internet changed the world decades ago.

To learn more about our risk-managed digital asset solutions for investors, visit our website at idxdigitalassets.com.

At IDX, we firmly believe it is essential to deploy and follow a risk-managed strategy for all digital assets. Our heritage, process, and philosophy is available for your viewing on our website via our webinars and white papers on Smart Beta, Volatility, and Digital Investing.

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