Ethereum's ambition is great: the foundational protocol that pivots the global economy to decentralization. It is the future of finance.

# Ethereum: Future Of Finance

Ethereum is the engine quietly driving the decentralization of the global economy. Developers are embarking on foundational upgrades that will allow Ethereum to fulfill its promise. The rise of its native currency will be driven by ether's collateral value, deepening its reserve-asset appeal to the decentralized financial ecosystem. The future has just begun.

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# Introduction

Ethereum aims to expand upon the central tenets of the Bitcoin protocol – using the blockchain technology as a tool for ensuring a data consensus in a distributed system. Ethereum offers a programming language where users can create contracts through code for broader use. The most immediately obvious application is digital assets that represent financial agreements. Complexity can be easily managed through smart contracts designed to codify governance.

Bitcoin is boring. It is boring by design. And the boring nature is its beauty. What the Bitcoin protocol achieved is nothing short of remarkable. Hundreds of thousands of transactions are occurring daily with an average value of more than one hundred thousand dollars per transaction and at fees of less than one hundred dollars per transaction. Nobody is in charge. Just the math.

The creators of Ethereum judged the Bitcoin protocol as having structural limitations making multi-stage contracting more challenging. Just as the deepening in the store-of-value network is defining Bitcoin, developer involvement in Ethereum will be the ultimate arbiter for its protocol. Of the 3,000 active monthly developers in digital protocols, 2,400 are linked to Ethereum. It is winning.

How does one value the network currency, ether? Ether is a currency, a bond, a consumable, a gateway to financial innovation, a super-computer. The problem with flexibility is that the network currency to the Ethereum protocol can be a lot of different things, with incredibly different implications. Users did not have to use ether to employ the Ethereum protocol prior to recent upgrades. Cryptocists are hunting for a unifying theory of value.

The value is the network.

It must be the network.

Without the network, there is nothing to value. And we know how to value nothing. A network by itself is not enough to have value.

Ethereum is building network value around scalable solutions to an age-old problem – financial intermediation. It happens to be a segment of the global economy that is overwhelmed with frictions and redundancy, making it ripe for disruptive innovation. Ether (ETH) is the base collateral that will be used to help cut out the middleman. Its value can rise multitudes to realize its potential.

The risks are material. When you want to be all things, you run the risk of being nothing. The protocol is undergoing rapid change. It is like changing a tire of a racecar while traveling at full speed – easier to do in zero-gravity than sea-level. The community has been forgiving to Ethereum's limitations, expecting great rewards as its future potential is realized.

Owning ether is a down-payment to participation in the future of finance.

# What is Ethereum?

Ethereum is a decentralized computing platform built on a public blockchain. It is a radical departure from how we have organized the digital economy to date. The current state of the internet has companies validate the history of digital information that users provide. The control of that information rests within those centralized service providers. The user does not decide the terms of their participation in the network – the centralized company does. Twitter can preclude your participation. Apple can sell your data.

Satoshi Nakamoto demonstrated that the state of a network can be secured and transferred through a public blockchain mechanism. Participation is open to all, and you can leave the network whenever you like. The Ethereum Virtual Machine (EVM) is the computing machine behind the Ethereum blockchain, able to run decentralized applications through an open platform. It is the root of enthusiasm of a user-controlled internet, Web 3.0, a lofty ambition. The goal is to deliver on user applications that are a substantial improvement to current centralized experiences.

The infrastructure around the EVM delivers a platform for applications that are familiar to all. Figure 1 illustrates the waterfall progress from the initial 'state layer' that was introduced by Bitcoin to broader tools. These applications will include financial services. A set of assets can be made available on the blockchain – through tokenization – and through contracts established that run on the Ethereum blockchain through the EVM. Those smart contracts rest idle, ready to execute on the duties embedded in their programs. This is what the new technology has the capacity to deliver with a lot less friction than centralized systems.

Figure 1 – The Waterfall of Web 3.0, Ethereum at the Pinnacle
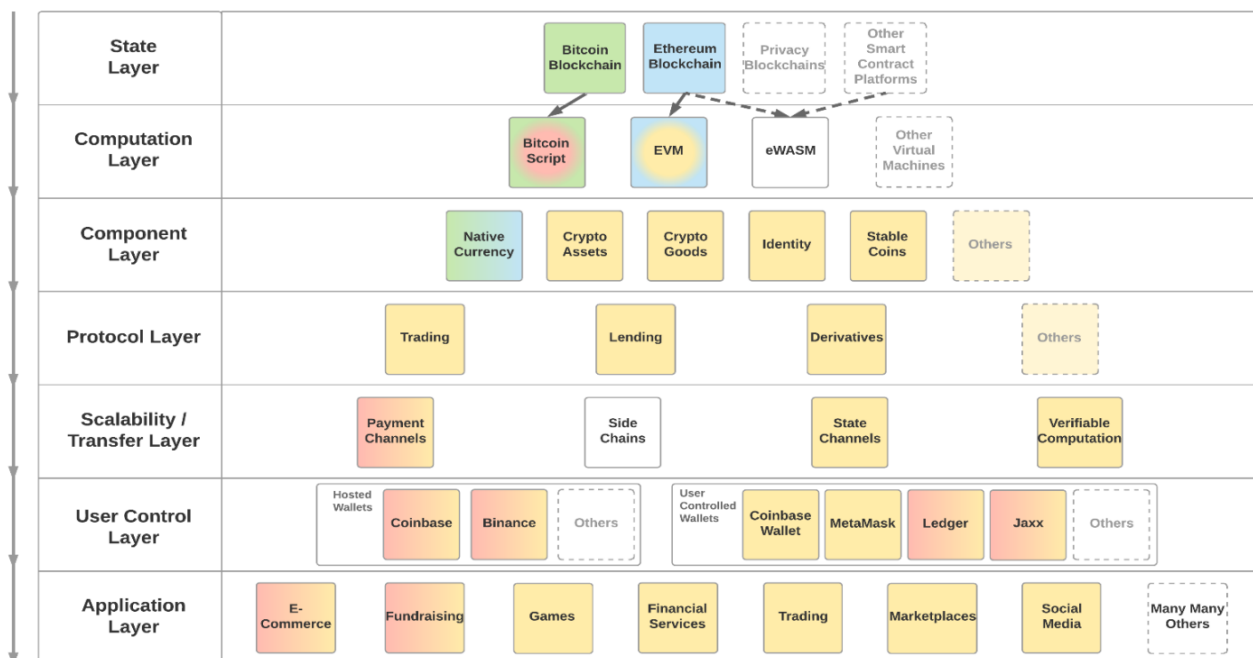


Source: Coinbase Blog. "Understanding Web3 — A User Controlled Internet". April 2018.

With great ambition comes greater scrutiny. The Ethereum protocol was incomplete at creation; there were always planned improvements. Not surprisingly, there is also healthy debate on whether the improvements can and will work. Two are most important.

The first is the Ethereum Improvement Proposal (EIP) 1559, implemented in August 2021. This is aimed at providing more price predictability to users validating transactions. Ethereum transactions were previously mined in blocks created roughly every 15 seconds. Priority of transaction validation was given to the highest bidder. Miners benefitted disproportionately at the expense of users and EIP-1559 brings more balance. Ethereum transaction fees will migrate to an algorithm that provides more predictable, equitable costs that will benefit users and the overall ecosystem.

The second is Beacon Chain. The goal of 'ETH2.0' is to increase transaction capacity. Allowing separate blockchains (shard chains) to interact with the main ledger would see transaction throughput rise from the current 15 per second to tens of thousands. The initial phase began December 2020, and the timing of Mainnet merging to a shard on the Beacon Chain is expected by the first quarter of 2022.

These adjustments were planned long ago. EIP1559 was tabled in 2018, for instance, and actively discussed in public developer meetings. Miners benefiting from the surge in revenue naturally do not like it. Thus, time is of the essence as miners could leave Ethereum behind and raise security risks. The network will decide and so far, the network is giving a definitive "thumbs up."

# Who Is Using Ethereum?

With the expansion of the ecosystem has come a sharp rise in transaction settlement. In the month of September, 1.2 million transactions settled daily on the Ethereum protocol, translating to nearly $2 trillion annualized. It is a healthy reminder that the technology is not a computer science experiment. It is mechanism for delivering a service in a manner that greatly lessens frictions.

And it is working.

But what is it being used for? As with any new technology, it is led by risk-seekers aiming to capitalize on innovation and creativity. The start of any technology is raw. In the case of the Ethereum protocol, the activity is built around stablecoin, speculative trading activity and more recently lend-borrow mechanisms. Importantly, all these applications are borne organically from user consensus. Success and failure are decided by market forces. See a gap in the market? Build the solution and let users decide.

Stablecoin is the most powerful use-case to date. The stablecoin market is dominated by the US dollar, by choice not necessity. It is what the network decided. Stablecoin tokens are issued with the expressed purpose of maintaining the value of the stablecoin to one US dollar. The need for these USD-pegged tokens is to support collateral in the trading system. The trading system likes a stable unit of collateral so that portfolio risks center on the leveraged positions being taken, not changes in collateral values. Makes sense.

For the vast majority of the stablecoin universe, the unit-value to the US dollar is accomplished by holding dollar reserves against the tokens being created. Within the crypto ecosystem, stablecoin is collateralized with crypto currencies where reserves adjust mathematically to maintain confidence in the ability to redeem the stablecoin for one US dollar. The volatility "problem" often flippantly referenced in policy is solved by math and overcollateralization.

The stablecoin market capitalization is $125 billion and the largest stablecoin is $65 billion, having grown from less than $10 billion in the middle of 2020. The vast majority lives on the Ethereum protocol. Again, it is worth emphasizing that this is by user choice. The first stablecoin was written for the Bitcoin protocol and was not adopted. The collateral being locked in protocols on the Ethereum blockchain are dominated by ether.

Stablecoin would hardly seem to qualify as a 'killer app' that skeptics impatiently demand. After all, $125 billion even with rapid growth is modest by the standards of US dollar liquidity. US base money, monetary liabilities under the direct control of the Federal Reserve, is $6 trillion and growing by more than $100 billion per month with the combination of new currency demand and reserves created by asset purchases. But it is not the size of the stablecoin market that is impressive; it is the efficiency of its use. The $125 billion of assets is supporting an annualized $5 trillion of transaction volumes recorded on the blockchain. Including all exchange transactions, this rises by more than 10-times.

Not satisfied? Users of the Ethereum protocol are also moving into the mainstream. On April 27, 2021, the European Investment Bank (EIB) issued a 100-million-euro two-year digital bond, the first quasi-sovereign issuance on a public blockchain. It was the Ethereum blockchain. It was the first digitally native tokenization for both a bond and a euro. Investors turned a euro deposit into a central bank digital currency (CBDC) with the Banque de France and exchanged the CBDC for a bond token that resides in the investor digital wallet on the Ethereum protocol. The public blockchain is the registry for the ownership record.

That is trust in math.

It is the ultimate ode to Satoshi's vision. The property rights of the EIB investors are unassailable, transferable, and digital. What is a bond in this world? It is nothing more than a smart contract that codifies interest and principal payments to its owner. What is the role for intermediation? Limited at best. And therein lies the future. The Ethereum protocol was built to be useful – an obvious use is the decentralized services that removes intermediaries.

Ethereum offers a platform to bring users and providers of capital closer together. It started with nerds and cowboys. But the ecosystem is rapidly migrating to traditional finance to include services that are relatable to a broader audience, including banking, asset management and insurance. It has only just begun.

# What Is Ether And Why Does It Have Value?

Even though ether is the native currency of a rapidly expanding protocol, the debate about ether's value rages on. What is ether worth? It is a more complicated question than it seems. The transaction value of ether is negligible. But demand for ether is far broader. In the fiat world, we follow the money. Here, we follow a day in the life of ether.

Settlement inside of the Ethereum protocol requires ether. The Ethereum protocol is powered by gas, units that are measured in one-billionth of an eth (the power of divisibility). Prior to EIP-1559, the minimum cost for validating a transaction was 21,000 gas. The amount of gas used in transactions was limited to 15 million per block. But the price was not constrained. Users competed for mining attention through price. Individually, you were free to prioritize your transactions by paying more in gas.

Figure 2 – ETH1 Running at Full Capacity, Urgency to Upgrades
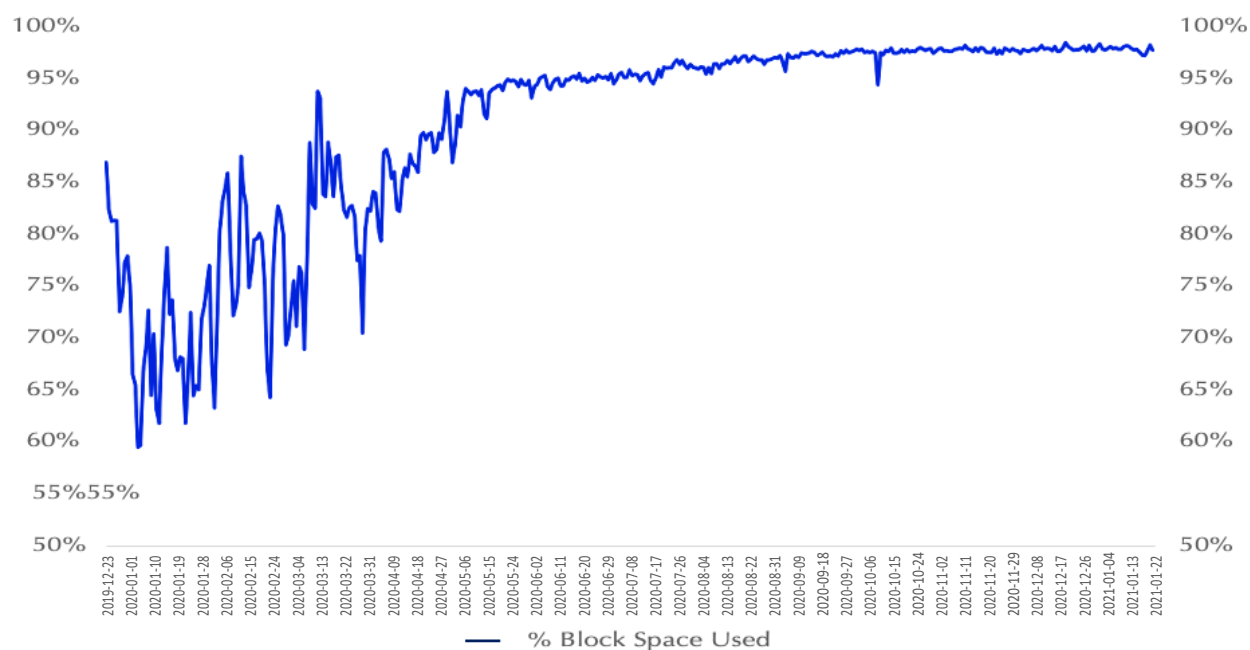


*Source: CoinMetrics Ethereum Gas Report, March 22, 2021.*

Transactions were running at 250-300 per block. This is a much higher throughput than Bitcoin, reinforcing a different use-case. The protocol was operating near full capacity for the past year, with nearly 100% maximum gas used to confirm transactions in each block (Figure 2). In turn, prices for confirming transactions were higher with more volatility and a fat right tail. Miners benefited at the expense of users, which motivated the upgrade to EIP-1559 and the Beacon Chain.

Against this backdrop, transactional demand for ether is now easy to illustrate. It took very little ether to power the protocol; it follows that there would be little value from transactional demand.

The math here is simple. At maximum capacity and current prices, it took only 1 (one) ether of gas to fuel transaction volumes for each block. That translated to 2.4 million ether to run the system per year. The Ethereum protocol averaged an annualized 600 million transactions at an average of 2 ether per transaction for 1.2 billion in ether volumes. At 2.4 million ether to run the system, that means the ether could cycle more than 500-times each year. (There are plenty of nuances that do not lessen the illustration, the theoretical velocity is clearly much higher.)

Ether is useful. Ether supply at 117 million greatly outstrips its transactional demand. It is a devaluing asset. Buyer beware. Variants of this math have been used to argue against the value of ether and other crypto currencies. The theoretical velocity is high so there is no point (or value) in holding it.

But ether was held despite this challenging math. And upgrades will only enhance its network value.

Figure 3 – Transactional ETH Demand Stable, Investors Dominate
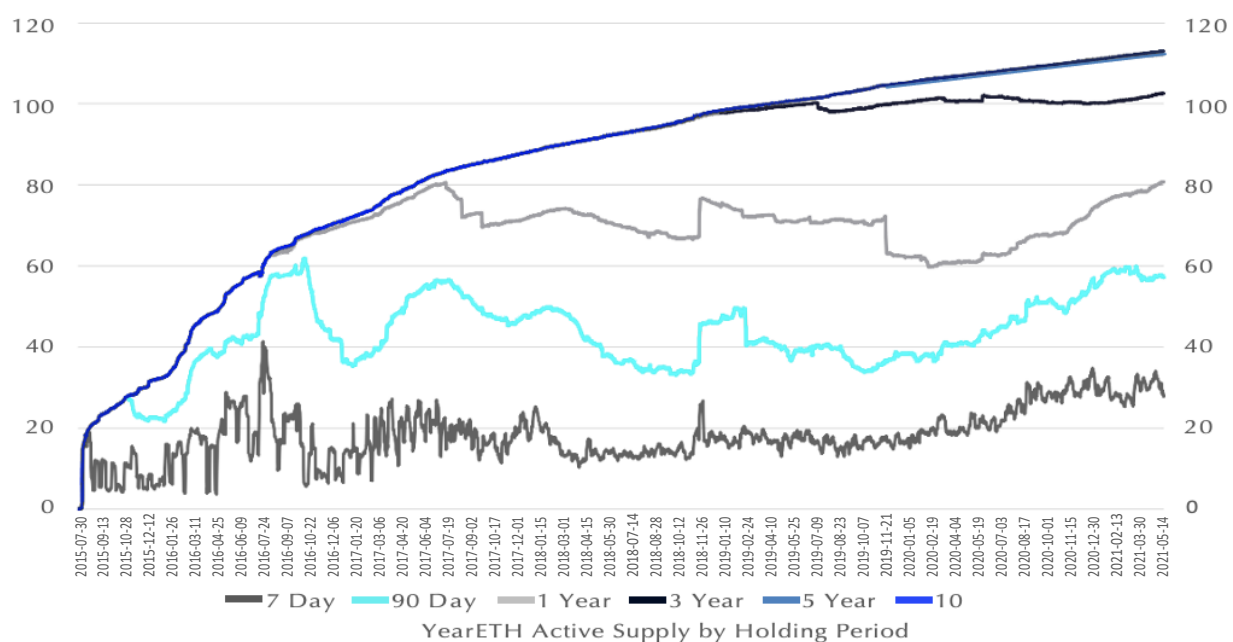


*Source: CoinMetrics. One River Calculations.*

Figure 3 illustrates the periodicity of holdings. It demonstrates the breadth of demand for ether. The high velocity activity – holdings inside of seven days – is roughly 25% of the total. That was enough ether to power the network for 1.2 days at its maximum capacity and current price of gas. This was the working capital demand for ether. But longer-term holdings are also on the rise. More than 50% of holdings are beyond a three-month horizon and 30% is longer than one year. This is investor demand. Naturally, investor demand can include excess speculative demand. But it is not unique to ether.

The simple patterns between ether and its network are too strong to ignore and reinforce patterns of investor deepening. Figure 4 (next page) illustrates the network effect through the most rudimentary form – the number of active addresses against its exchange value. There is a strong, positive relationship between the number of users and the value of eth that is durable over different cycles. Do not forget – this network now includes conventional investors in European Investment Bank bonds. There is enormous growth potential.

Let's take a step back to remember the economics behind high velocity monetary assets (reader warning – pillow time). For a given money supply, a rise in velocity means there is less demand for money as users try to shed their money holdings more quickly. This is most evident in hyperinflation when the value of money erodes so fast that if you cannot rid yourself of the paper in short order it becomes worthless. Wheelbarrows of valueless money on streets follow. There is a propensity to see high velocity monetary assets as ones with rapid devaluation properties.

Not so fast!

Figure 4 – Network Effects of Ether Similar to Bitcoin
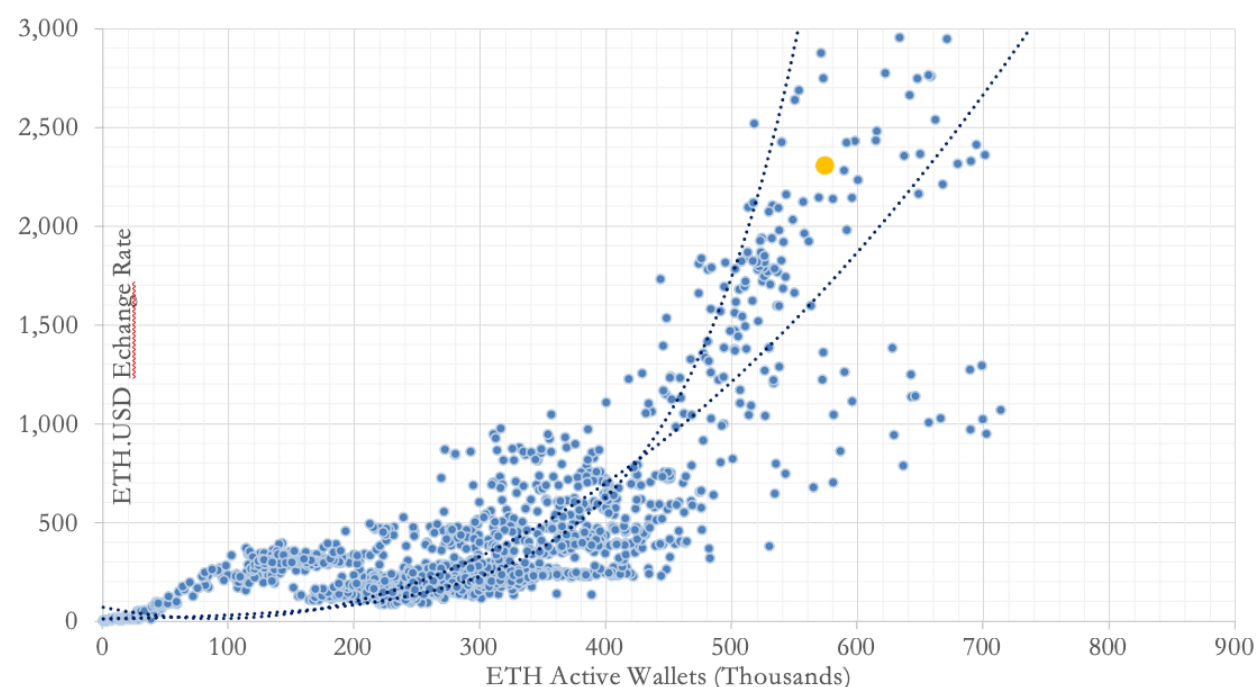


The theory of exchange was built for a closed system that imagined transactional demand for money (the inverse of its velocity is the demand for money). That was the only role for money. The concept was actively applied by monetarists to control for inflation. Central banks estimated money's velocity and set the growth of future money supply to target future nominal GDP growth. Germany employed it. The ECB still provides targets for the money supply consistent with 2% inflation. The US used monetary targeting in 1979 to justify higher rates. And the frameworks were abandoned.

The recent period of quantitative easing is an illustration. US monetary base is up more than 6-times since 2007. Six-times! The theory of exchange warned of inflation. The rise in the money supply was not demand driven, and

according to this theory, this would cause more money to chase the same amount of productive capacity in the economy.

What happened? The money supply was largely absorbed by a rise in demand, force-fed to the banking system. The velocity of money cratered 80% over that period. Money circulated less. No hyperinflation. The lesson? Money demand is complicated. The velocity in one period for one purpose does not have any forward bearing for a future use case.

It begs the question. Why hold ether if its native purpose is to only run a protocol and you do not need much to do so? Because it is the currency that runs the protocol! And 'ETH2.0' changes everything as we will discuss next. Ether is poised to be the risk-free benchmark of the digital ecosystem.

# Eth2.0 Changes Everything – A Bond Replacement Emerges

Forget what you learned about ether. The Beacon Chain changes everything.

The Beacon Chain will run on proof-of-stake, a more centralized and less energy-intensive mechanism for validating transactions. A staking of 32 ether is required to be a node in the network that validates transactions. A node is 'called upon' by algorithmic design to validate a transaction and receives an ether return on the stake for its participation.

The yield associated with staking is illustrated in Figure 5. Intuitively, as more ether is staked for validating transactions, the yield earned declines as nodes are called upon less frequently. The illustration has an unmistakable resemblance to a bond. Yes, ether is being transformed into the risk-free benchmark of the digital ecosystem.

To get the Beacon Chain started required a total of 554,000 ether deposits. This bears resemblance to any other deposit agreement. The deposit generates a yield dependent on two variables: the available capital opportunities for institutions, and the terms of the deposit. In the case of the Beacon Chain, the deposit capital is the mechanism for the safe verification of transactions and diversified storage of the ledger documenting ownership.

The network is pointing strongly in the direction of a successful migration to the Beacon Chain. Deposits on the Beacon Chain are more than 14-times the minimum. This is an incredibly positive signal to the developer community – the network support is unequivocal. The timing and success of the integration will be critical to the value of ether in the period ahead.

Figure 5 – ETH2 Yield-Staking Relationship: It's a Bond
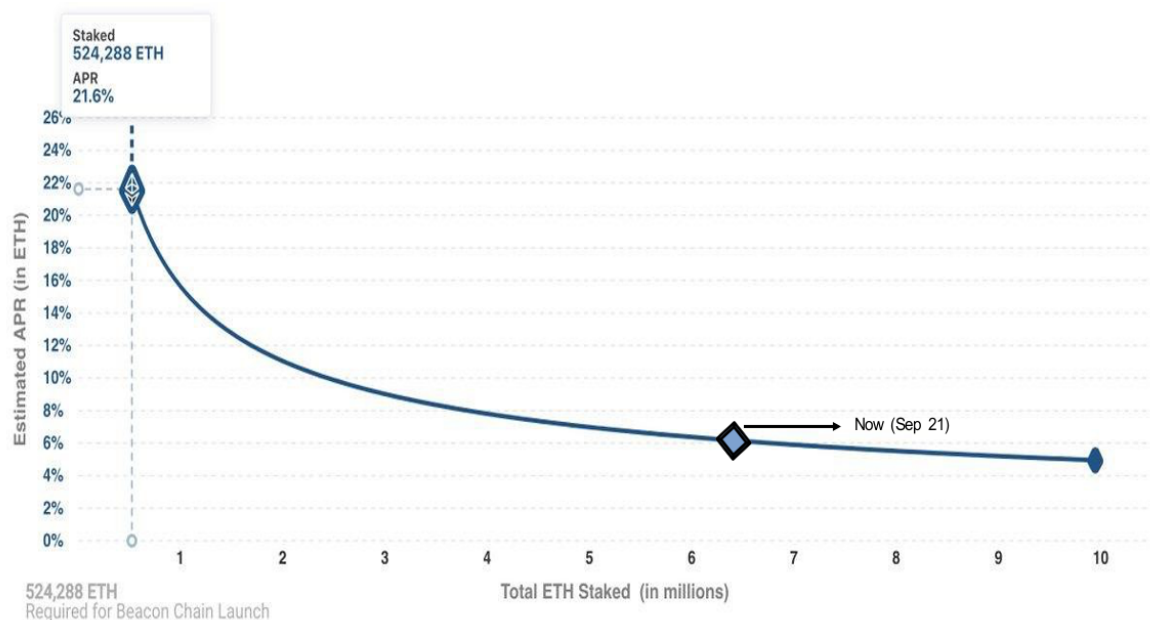


Source: Stani Kulechov

The ETH-flow from staking can be judged as a perpetual bond. A rise in the confidence of the network and the value of holding ether as the base collateral of the ecosystem leads to a virtuous cycle of lesser supply and declining yields. Yields are currently trading 5.25% with nearly 8 million ether staked. This is close to 5-year peso bond yields in Mexico for broader market context. At 20 million ether staked to the network – 17% of total supply – yields decline to 4%. A decline in yields to 2% would increase the bond value by three-times from current levels and with deposits of more than 40% of ether supply.

The investment value of ether centers on its value as core collateral for the expansion of digital finance. There are three key elements to investor value.

First, ether as a currency is migrating quickly to austerity and transparency in future supply owing to the EIP1559 upgrade. The base fee for executing a transaction on the ethereum protocol is retired or 'burned. The future supply cap in ether is capped close to today's 117 million (Figure 6).

Second, the rising network of decentralized finance (DeFi) has led to an increase in locked ether capital. This accounts for nearly 10% of ether's supply, or more than 30% evaluating DeFi more broadly as of September 2021. The network is defining ether as one of the strongest base units of collateral.

Third, ether is positioned as the risk-free benchmark in the digital ecosystem. For this to be successful, investors must regard ether as a strong store of value. The absence of inflation and the rise in DeFi network demand puts ether in a position to satisfy this need. Investors will not trade out of ether when reducing risk; they will stake it.

Figure 6 – Ether Supply Constrained in Protocol Upgrades
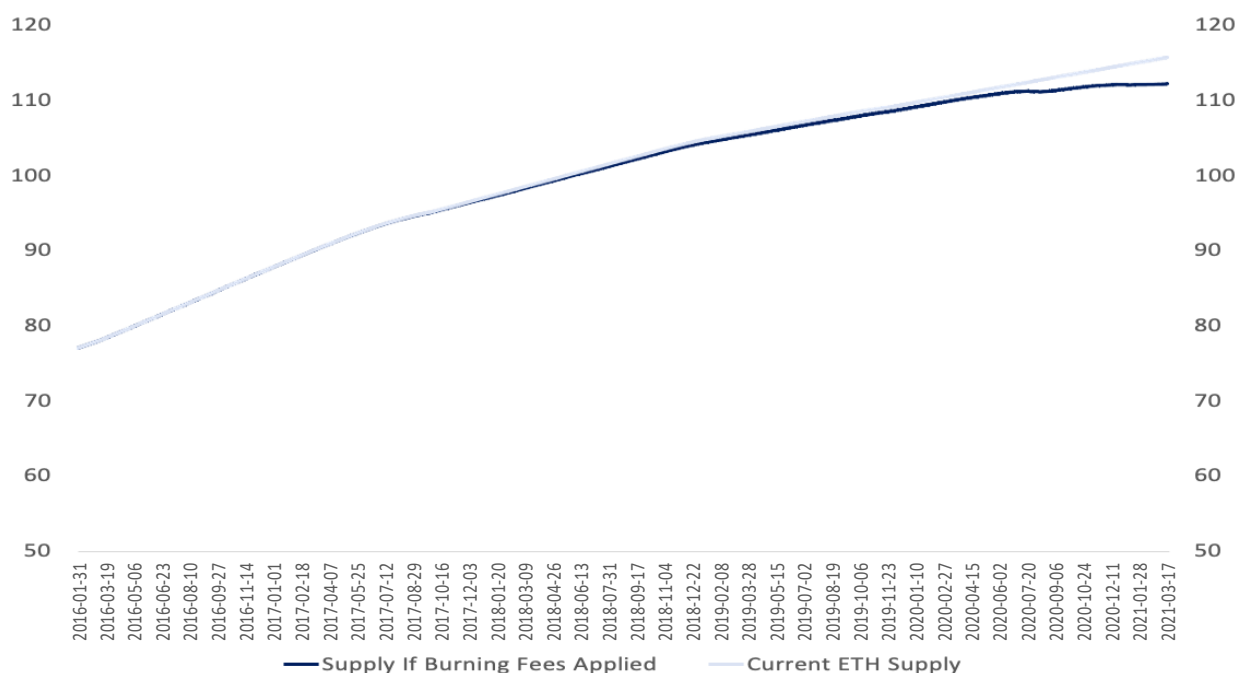


*Source: CoinMetrics.*

# So What...Is The Future Value Of Ether?

Hal Finney's first musings on the valuation of bitcoin at its initiation has stood the test of time. He imagined the outer limit of bitcoin's dollar value as the totality of financial wealth divided by the supply of bitcoin. This would be justified if bitcoin were the dominant world store of value. Since then, various supply-demand articulations have followed, including standard technology models of network effects. All valid. Hal Finney provided the North Star to longer-term value.

Bitcoin currently plays the role of gold in the digital ecosystem, a consensus opinion. Investors looking for capital protection see the inviting parallels to gold. And the assets are most valuable when macro policies are disconnected from orthodoxy as is now the case. Gold has roughly a $12 trillion market capitalization, and the price of Bitcoin will be around $575,000 when it supplants the role of gold. (Bitcoin collateral is far more efficient than gold, so there is additional technological upside.)

A consensus has not settled in Ethereum's benchmark. Its success hinges on the expansion of protocols into everyday tools, with financial applications most obvious. Ether is the base collateral of that growth, and its value is as the lowest-risk asset to the digital financial ecosystem. It is the reserve asset to the new ecosystem. Locking ether into other protocols generates a return on that capital.

Ether has no direct claim on that innovation. But it does clearly benefit from it. Investors will hold ether as collateral in the hunt for higher-returning investment opportunities. Those can be funded by ether collateral – the same ether being staked to maintain its real value. This reinforces ether's scarcity premium. It is in limited supply. And as more ether collateral is staked and/or locked in protocols tied to decentralized finance (DeFi), investors are more inclined to hold the asset for future value.

Changes to the Ethereum protocol come at a very interesting time. With equity, bond, and real asset valuations at secular highs, correlations across asset classes have risen sharply leaving few assets to perform the role of diversifier. Longer-term investors may also not like the volatility of digital assets during the transition to a new digital era of finance. The return from staking ether will adjust to compensate for such risk, a familiar risk decision to institutional investors.

What is Ethereum's market potential? The global bond market is one credible way to measure the upside of ether. After all, that is the baseline investment characteristic of the asset. The global bond market has a market capitalization of $130 trillion and it will become tokenized. Consider if Ethereum were to take a 10% share of the global fixed income market. With 117 million in ether supply, that puts the valuation of ETH at $110,000. The return potential is asymmetric. Such outsized return potential will also have higher volatility. But a high-return, high-volatility asset is not its destiny. Ether will be safety collateral in the digital ecosystem if the Ethereum protocol lives up to its ambition.

Can the Ethereum protocol rise to this potential? It is like putting a man on the moon. The objective can be declared knowing that the science underpins the possibility. Being possible and executing are very different things. To reach this potential, ether must be a desired reserve asset for the digitalization of finance, the currency of choice in the ecosystem.

Like any evolving financial system, broader forms of money and credit will emerge, through credit agreements. Actors in the digital financial system will migrate to the natural financial reserve asset, and the Web 3.0 scope is far broader than finance. A virtuous cycle of longer holdings, broader lend-borrow arrangements, and lower volatility would reinforce ether as core collateral with lesser-valued assets such as USD stablecoin used for higher turnover trading activities. Bitcoin is going to be sharing the stage with Ethereum.

# Institutional Staking Solution

Staking is not a spectator sport. We have built an institutional-grade staking solution for investors.

Today, ETH holders can "stake" their assets in bundles of 32 ETH, with each bundle creating a single validator. There is a daily limit to the creation of new nodes. It currently sits at 900 validators, or around 29k ETH. Validators are called upon randomly to provide computing power to perform network tasks before the Merge to the Beacon Chain and earn an ETH yield for doing so. But this yield does not include transaction fees that are being earned on the Mainnet chain. Early staking participants form a secure group of network validators that will be operating at full speed when the time comes to switch to proof-of-stake. The current gross yield of 5.25%, which declines formulaically as more ETH is staked, will rise to as high as 10% or more after the Merge (Figure 7).

Investors who wish to hold ETH as a long-term asset should consider the rewards and risks of staking now versus after the Merge. We view the balance to be favorable for staking now. All staked ETH is rendered illiquid before the Merge. A successful transition to proof-of-stake and the unlocking of staked ETH will be required to re-gain liquidity for staked ETH. For this tradeoff, ETH holders earn two rewards: first, they capture the pre-Merge yield of ~5% and, second, they will earn a high transaction fee yield shared among the small set of active validators when the Merge event occurs.

Figure 7 – Staking Yields Pre- and Post-Merge
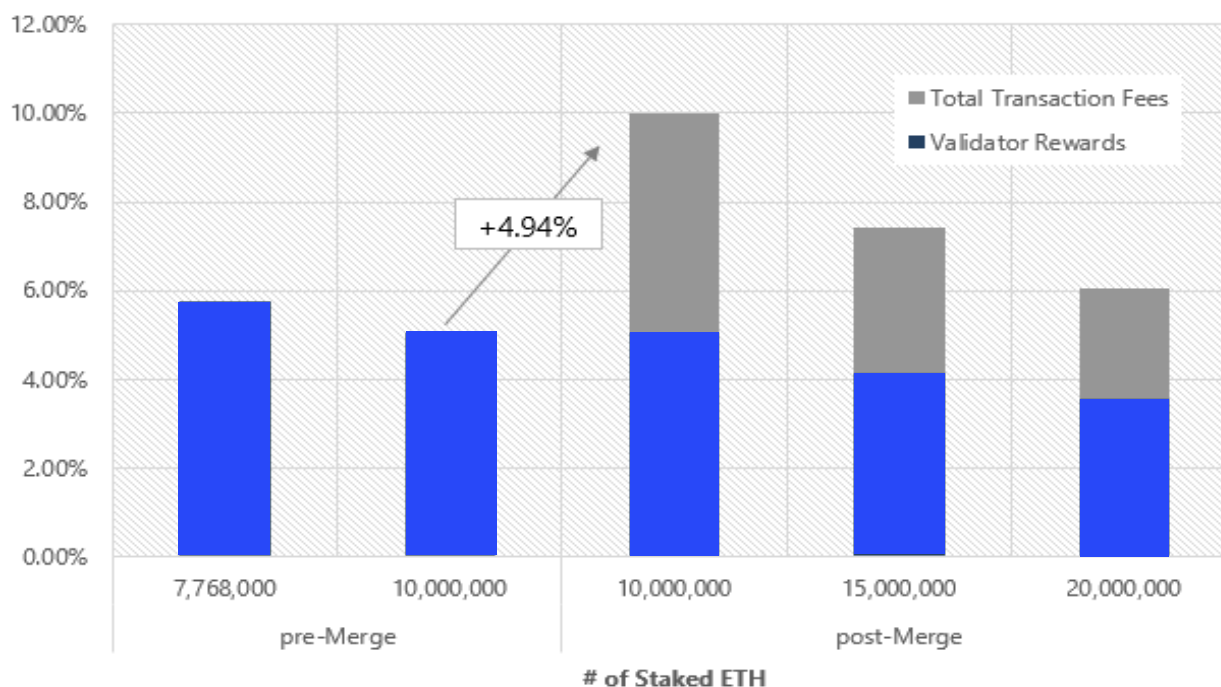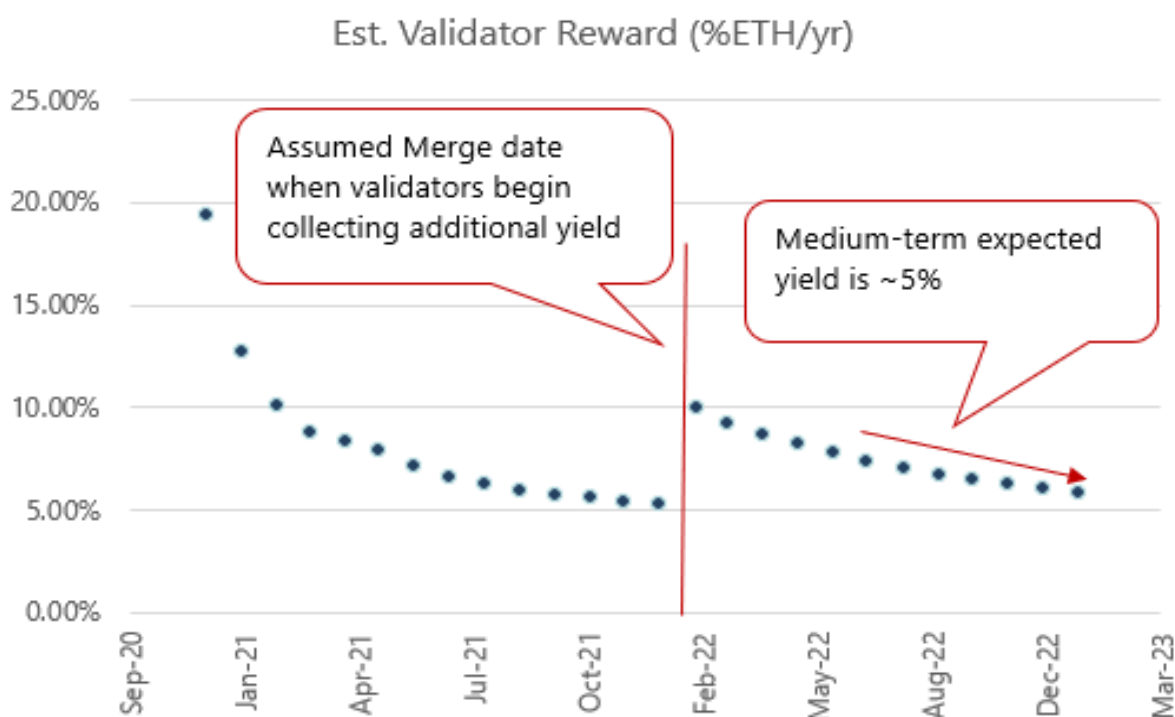


Source: One River Calculations.

The value of earning fees should not be underestimated.

Given a limit of 10 million total ETH staked pre-Merge and 900 new validators per day that can be staked, increasing staking demand after the Merge will lead to long lines for staking hopefuls. For example, it would take the network over a year to digest an additional 10% of all outstanding ETH that migrates to staking. Those waiting in the "validator queue" not only receive no yield, but they are also unable to withdraw their ETH.

Staking before the Merge ensures investors a privileged position as an early active validator, earning a yield denominated in ETH as the market slowly adjusts (Figure 8). Those who stake later will receive a diluted yield spread across a growing pool of validators. Additionally, those staked in advance of the Merge will have exit liquidity after the Merge event, so they will be able to withdraw from the proof-of-stake process over the course of a few days.

Staking risks come in three forms: yield reduction, principal impairment, and today, illiquidity. Yield reduction comes because of a validator being off-line when their computing power is needed. It takes roughly one day of 100% uptime to earn-back the losses from a day of downtime. Principal impairment comes in the form of algorithmic penalties called "slashing." If the network detects malicious behavior, it programmatically penalizes validators by reducing their principal. This is where institutional staking solutions are key. Liquidity risk is the simplest: if the Merge event is delayed, so too is liquidity for staked ETH. Naturally, like all digital assets, institutional-grade security for private keys is essential and selecting the right custodial partners is paramount.

Figure 8 – Timeline of Staking ETH Yields



*Source: One River Calculations.*

The network has embraced the Beacon Chain, and the Merge is the top priority of core developers. A timely transition is also critical to the security of the Ethereum protocol. We expect the Merge to occur in February 2022. Expected excess returns combined with short validator cues make it an opportune time to start staking now, ahead of the Merge.

## THAT'S ALL FOLKS

Vitalik and friends did the hard work. They left the perversion of profits – valuing the native currency to the Ethereum protocol – to us mortals.

The coming months will be critical for the future of Ethereum. A new mechanism for mining, a new methodology for running applications, and new financial rules for money transmitters all loom in the period ahead. The "ETH bond" trades like emerging market local debt, precisely to capture such risks.

The potential of Ethereum and the brilliance it is attracting is simply too great to ignore. Bitcoin is largely a static asset, and it serves its purpose beautifully. It is the Ethereum protocol that is leading the charge in dynamism.

With time, global leaders will recognize that the power of the public protocol is flattening various socioeconomic gaps. Access to all services, especially financial ones, will no longer require layers of frictions that amount to taxes on society.

And if you aren't blown away by all of this, you aren't doing it right.

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