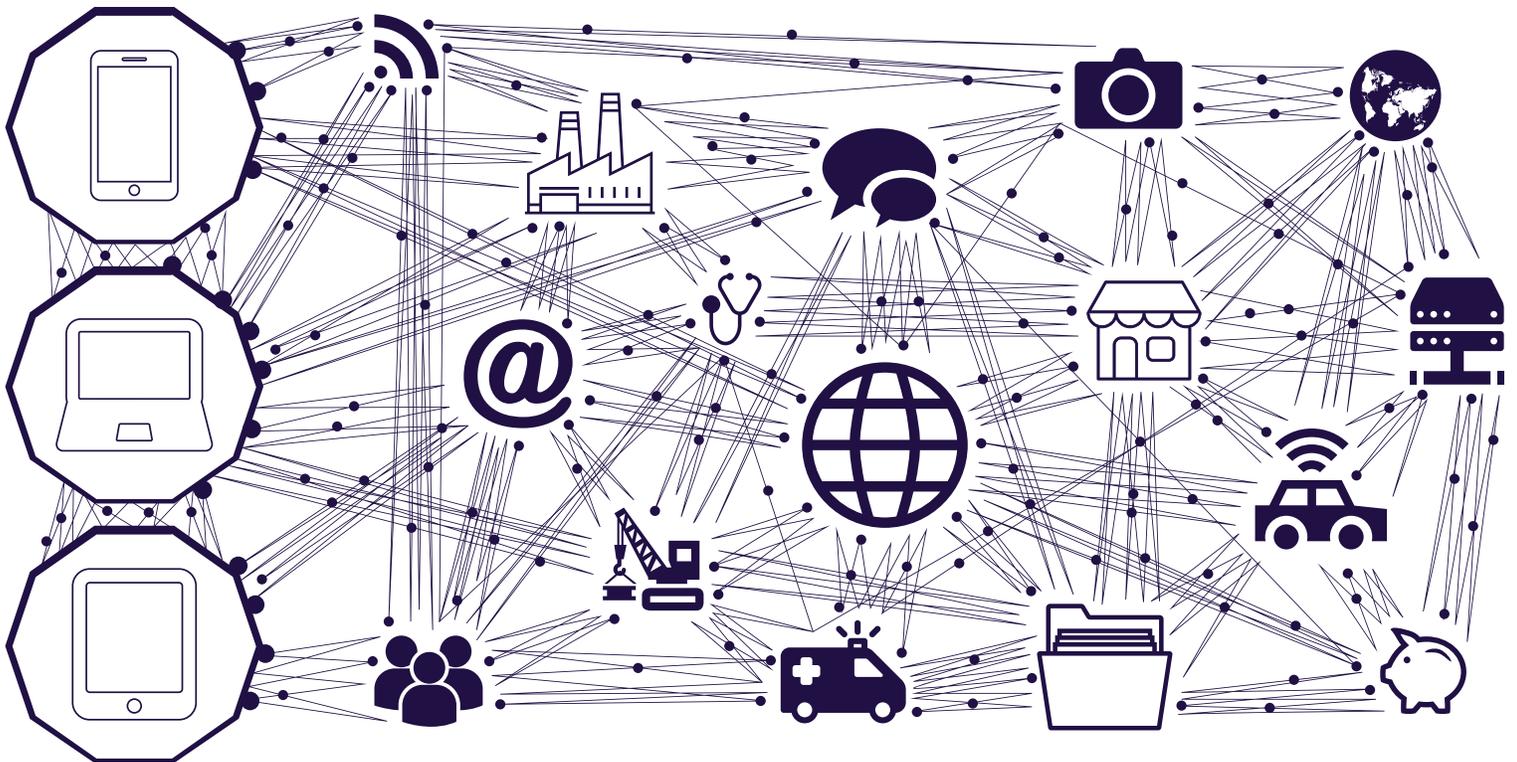


# Into the Ether with **Ethereum Classic**

The Store-of-Value Commodity to Power the Internet of Things.





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Matthew Beck, CFA | March 2017

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In this next wave of the digital revolution, digital currencies have emerged as what many believe to be the greatest innovation since the advent of the internet. For the first time in history, value can be sent anywhere in the world at the same speed as information in a secure and trustless way. However, digital currencies are more than just payment facilitators. They offer an alternative to the economic, political, and social systems run by a handful of large institutions. Powered by millions of peers within globally distributed networks, digital currencies are democratizing information and value in incredible new ways. We believe in a future of multiple digital assets, each with unique comparative advantages that enable them to play distinct roles in driving economic growth and in diversifying investment portfolios.

In light of this view, our team has been increasingly focused on the investment potential of Ethereum Classic and its associated digital token, ETC. Ethereum Classic is a next generation blockchain platform for a new internet infrastructure – one that can dramatically enhance the ways that information and value are shared in the digital economy, unlocking trillions of dollars in untapped economic surplus in the process.<sup>1</sup> Featuring a flexible and intuitive smart contract programming platform that is powered by ETC, we believe Ethereum Classic may one day be the substrate for a global, secure, and decentralized Internet of Things (IoT).

As individuals and commercial enterprises begin to appreciate the ways that Ethereum Classic can radically improve the quality of our lives, ETC may become more valuable as a scarce commodity that powers this new digital economy. In this paper, we explore:

- The origins of Ethereum & Ethereum Classic
- The relative investability of ether classic (ETC) vs. ether (ETH)
- The investment opportunity that ETC presents as a store-of-value commodity that can power the IoT
- How a strategic allocation to ETC can improve the efficiency of investor portfolios

Throughout this paper, we will evaluate the investment opportunity presented by ETC using a similar framework to the one used for bitcoin in our previous study, *Bitcoin & the Rise of Digital Gold*.

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<sup>1</sup>Source: McKinsey Global Institute: The Internet of Things: Mapping the Value Beyond the Hype, June 2015.

# The Origins of Ethereum & Ethereum Classic

In late 2013, programmer and co-founder of Bitcoin Magazine, Vitalik Buterin, published a white paper detailing an innovative digital currency-powered technology platform known as Ethereum.<sup>2</sup> As an early adopter of bitcoin, Vitalik developed the view that a digital token and its associated blockchain could facilitate much more than just peer-to-peer electronic value transfer. In pursuit of this grander vision, he set out to create a computationally complete virtual ecosystem, featuring a global blockchain and “smart contract” programming platform. Both would be powered by a native digital asset, known as ether (ETH).

By integrating programming capabilities directly into the Ethereum protocol, developers all over the world would be able to design a new class of decentralized applications hosted on a public blockchain. Through the use of smart contracts, applications built on Ethereum could automate the transmission of information and value between one another under dynamic conditions, enabling tailored business models for the Internet of Things and Machine-Payable Web.<sup>3</sup> In many ways, Ethereum was designed to be the next iteration of operating systems like Apple iOS or Microsoft Windows, embedded with the enhanced capabilities of blockchain technology.

Ethereum was built on the same fundamental principles as Bitcoin; namely, that a blockchain protocol should be *decentralized* and its transaction ledger, *immutable*. To this day, many in the cryptocurrency community strongly believe that these principles are critical for the organic growth and economical sustainability of distributed blockchain systems.

On July 30<sup>th</sup>, 2015, less than two years after the original white paper was published, Vitalik and a non-profit foundation launched Ethereum.

## The DAO and the Death of Principles

With the promise of a more secure and scalable internet infrastructure came excitement around the novel applications and business models planned to be built on Ethereum. The one garnering the most attention was the now defunct decentralized autonomous organization, known as “The DAO.”

In April 2016, a blockchain and IoT solutions company known as Slock.it announced the launch of The DAO on Ethereum. The DAO was designed as a decentralized crowdfunding model, in which anyone could contribute ETH tokens to become a voting member and equity stakeholder in the organization. Members of The DAO could then make proposals about different projects to pursue and put them to a vote. By committing to profitable projects, members would be rewarded based on the terms of a smart contract and their proportional interest in The DAO.<sup>4</sup> As of May 27<sup>th</sup>, 2016, \$150 million, or approximately 14% of all ETH outstanding, was contributed to and invested in The DAO.<sup>5</sup>

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<sup>2</sup>Source: Wikipedia, Ethereum, January 6, 2017.

<sup>3</sup>The Machine-Payable Web is a component of the Internet of Things and a concept made possible through the technological innovations of digital-currency powered blockchains. In the Machine-Payable Web, machines can operate autonomously as economic agents, paying other machines for goods and services automatically based on computer code.

<sup>4</sup>Source: Slock.it, Decentralized Autonomous Organization to Automate Governance, Christoph Jentzsch.

<sup>5</sup>Source: The DAO (organization), Wikipedia, January 6, 2017.

On June 17<sup>th</sup>, 2016, an anonymous hacker used an exploit in The DAO smart contract code to syphon approximately \$60 million worth of tokens into a segregated account.<sup>6</sup> Upon the news of the breach, the price of ETH was quickly cut in half, as investors liquidated their holdings and members of the Ethereum community scrambled to determine a solution.

In the days that followed, several attempts were made to retrieve the stolen funds and secure the Ethereum network. However, it soon became apparent that direct interference with the protocol (i.e. a hard fork) might be necessary, sparking a heated debate within the Ethereum community. The argument for the hard fork was that it would create an entirely new version of the Ethereum blockchain, erasing any record of the theft, and restoring the stolen funds to their original owners. The counterargument was that it would be antithetical to the core principle of immutability, thus compromising a key driver of value for the entire system.

As the debate raged on, the decision over whether or not to fork the network was put to a vote and on July 15<sup>th</sup>, 2016, a hard fork specification was implemented by the Ethereum Foundation. It is worth noting that holders of less than 6% of the ETH in circulation voted on the matter over a narrow 12-day period, raising questions about whether the decision was truly democratic.<sup>7</sup> On July 20<sup>th</sup>, 2016, the Ethereum network completed the hard fork, and a new version of the blockchain, without recognition of the theft, was born.

Many believed that the original version of the Ethereum blockchain would dissipate entirely following the hard fork. However, it quickly became clear that there were participants who were committed to supporting its continuation for philosophical and economic reasons. On July 20<sup>th</sup>, 2016, the original Ethereum protocol was rebranded as Ethereum Classic, and its native token as ETC, preserving the untampered transaction history (including The DAO theft) and the foundational principles of decentralization and immutability.

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<sup>6</sup>Source: CoinDesk: The DAO Attacked: Code Issue Leads, to \$60 Million Ether Theft, June 2017, Michael del Castillo. <http://www.coindesk.com/dao-attacked-code-issue-leads-60-million-ether-theft/>.

<sup>7</sup>Source: Why I'm short Ethereum (and long Bitcoin) – Part 1 of 2. October 5, 2016, Tuur Demeester. <https://medium.com/@tuurdemeester/why-im-short-ethereum-and-long-bitcoin-ae5b1c198fd#wsy0s9kie>.

# A Tale of Two Ethers

Today, there remain two versions of Ethereum, each with nearly identical potential real-world applications, but critical differences in their governance, economic, and development structures. We believe that Ethereum Classic and ETC offer a more attractive long-term investment opportunity versus Ethereum and ETH as a self-sustainable system with advantages along three dimensions.

## Protocol Governance

There is a growing base of quantitative and qualitative research evidencing a positive relationship between good governance and the long-term performance of traditional assets.<sup>8</sup> We believe this concept extends to digital currencies and is perhaps even more important in determining their investability.

In the world of digital currencies, the quality of a governance system can be assessed on its principles and design. Principles are important because they establish the collective values of participants and design is important because it ensures a structure that supports and protects those values.

By violating the principles of decentralization and immutability, the Ethereum Foundation has undermined the *trustless* nature of the Ethereum network, opening the door to entirely new risks associated with threats of interference. At the extreme end of the spectrum, there is a high degree of fat tail risk as any future intervention could cause participants to abandon ETH entirely. On the contrary, Ethereum Classic maintains principles that substantially mitigate these risks to preserve a trustless, open network.

From a design perspective, the distributed consensus mechanisms employed to validate transactions on each version of Ethereum will differ substantially going forward. The Ethereum Classic community is leaning towards sticking to a proven proof-of-work security model until it is decisively demonstrated that a better model is effective. With a proof-of-work model, transactions are confirmed using cryptographic algorithms that ensure tokens have not been double-spent. This is the same security model that underlies Bitcoin, the most successful global blockchain protocol.

On the contrary, the Ethereum Foundation intends to migrate Ethereum from proof-of-work to proof-of-stake in the foreseeable future. With a proof-of-stake model, select token holders are chosen and relied upon to verify transactions accurately. It is presupposed that they will do so because they have a “stake” in the system and would suffer the consequences of falsifying transactions. While this approach makes sense in theory, the devil is in the details. We are skeptical about the ability of the Ethereum Foundation’s proof-of-stake model, dubbed Casper, to replicate the security and scalability of tested proof-of-work models. We are content to wait until Casper demonstrates that it is self-sustainable before committing capital to ETH. Furthermore, we are concerned by the opacity of the transition roadmap, including the procedures for testing and vetting. Investors would be prudent to invest in digital asset models with a strong track-record, where the risks are better understood.

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<sup>8</sup>Source: MSCI: Can ESG Add Alpha? An Analysis of ESG Tilt and Momentum Strategies, June 2015, Zoltan Nagy et al.  
Source: Grant & Eisenhofer P.A: Does Corporate Governance Matter to Investment Returns? 2010, Jay Eisenhofer.

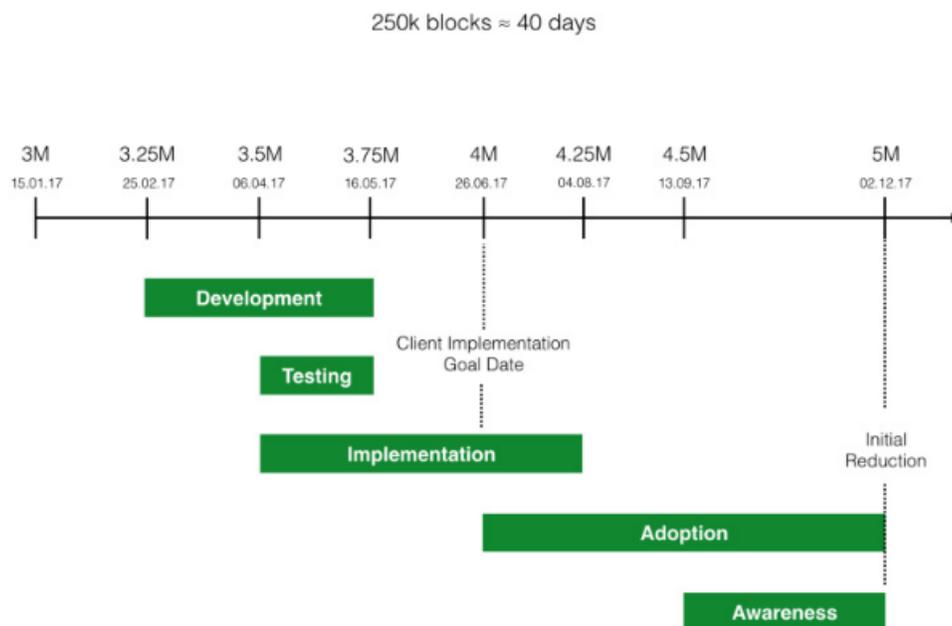
## Protocol Economics

Recognizing the need for a robust economic framework that balances the long-term interests of investors, developers, and business operators alike, key stakeholders in the Ethereum Classic community announced their commitment to implement a new monetary model on March 1<sup>st</sup>, 2017.<sup>9</sup>

Similar to Bitcoin, the new policy was built on the fundamental economic principle that the value of an asset is a function of its utility and its scarcity. As such, it establishes a hard cap on the total ETC issuance. The current miner reward of 5 ETC per block will be reduced by 20% at block number 5 million, and another 20% every 5 million blocks thereafter. A block of transactions is confirmed on Ethereum Classic about every 15 seconds. Due to slight variations in the block reward rate, it is anticipated that the total supply of ETC will reach ~210 million and will never exceed 230 million.<sup>10</sup> It should be noted that as of March 2<sup>nd</sup>, 2017, approximately 3.3 million blocks have been mined, setting the total ETC outstanding at 89.3 million, and the overall market capitalization at \$120.9 million.

The roadmap for implementing the new and improved Ethereum Classic monetary model is set as follows:

### Ethereum Classic Monetary Policy Development Estimates<sup>11</sup>



We believe that the successful execution of these key milestones solidifies a sound economic framework that supports long-term investment in ETC.

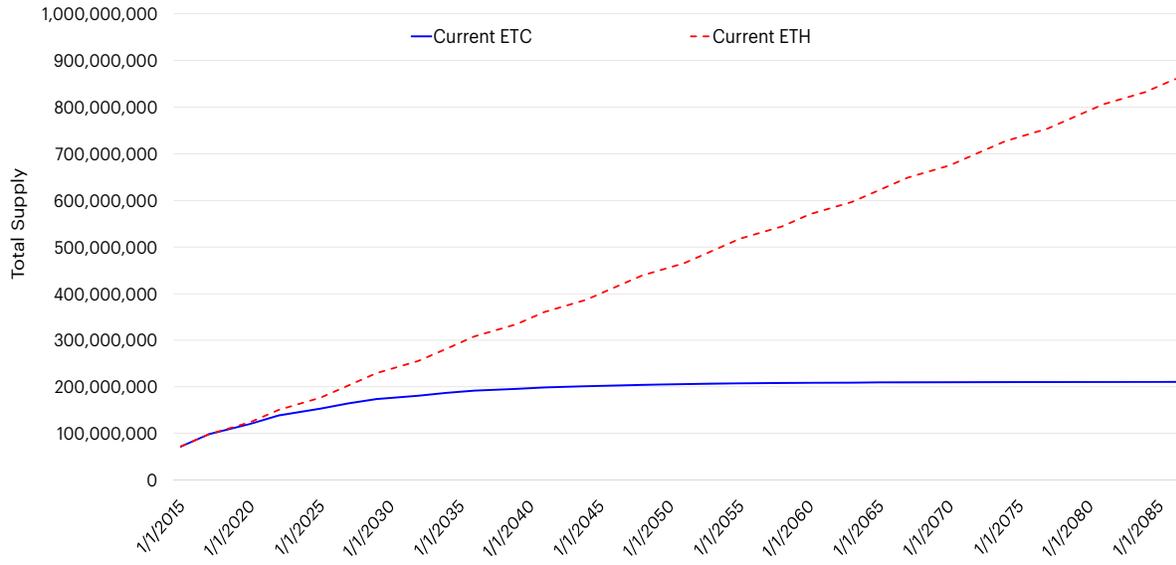
<sup>9</sup>Source: <https://iohk.io/blog/ethereum-classic/a-joint-statement-on-ethereum-classic-monetary-policy/>.

<sup>10</sup>See footnote 9.

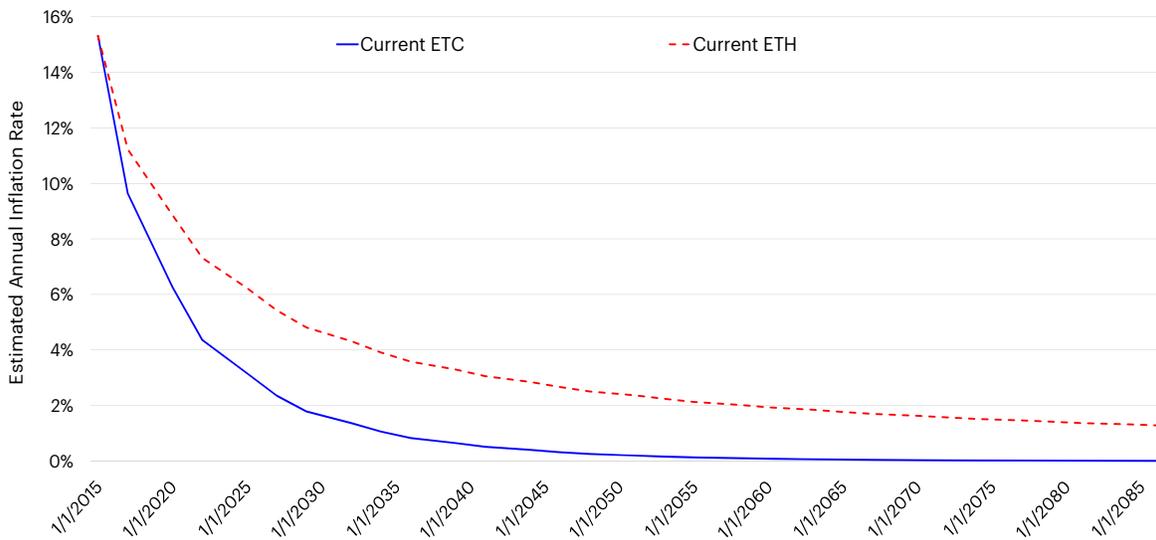
<sup>11</sup>See footnote 9.

On the contrary, Ethereum does not incorporate a cap on the overall supply of ETH. To highlight this difference, below we compare the estimated supply and inflation rates for ETC and ETH based on their existing emission models. While there is no guarantee that the ETH supply model will remain the same in the future, estimates purport that in 30 years there could be twice as many ETH as ETC outstanding.<sup>12</sup> As a result, ETH would need to generate a substantially higher rate of return to justify a valuation at parity with ETC.

ETC & ETH Estimated Total Supply<sup>13</sup>



ETC & ETH Estimated Annual Inflation Rates<sup>14</sup>



<sup>12</sup>Source: Overview of ETC Monetary Policy Proposal, December 13, 2016, London, Matthew Mazur, Architect of ECIP1017.

<sup>13</sup>See footnote 12.

<sup>14</sup>See footnote 12.

Although the aforementioned suggests that ETC may be significantly undervalued relative to ETH, there are some risks that are worth noting:

First, we'd highlight two large holders of ETC; one which has sold the lion's share of their tokens, and another which still owns a significant amount. The Ethereum Foundation has liquidated 90% of their ETC holdings, tokens which they automatically received when the protocol forked.<sup>15</sup> While they have completed a majority of their ETC sales, the remaining 10% could still impact the overall market. Furthermore, the DAO hacker still holds approximately 3.36 million ETC (roughly 4% of all ETC in circulation) in a wallet address that is identifiable on the blockchain.<sup>16</sup> It is important for investors to remember that large blocks of ETC could be sold at any time, potentially placing downward pressure on the ETC price.

Second, despite the fact that the previous charts show the current supply and inflation rates for ETC and ETH, questions remain as to how the ETH supply model will be impacted by the implementation of Casper. In various posts on Reddit, Vitalik has stated that the incentives designed to lure stakeholders towards Casper will result in a systematic slowing of ETH issuance, beginning as early as the second half of 2017.<sup>17</sup> However, given that a concentrated group of developers and contributors (including the Ethereum Foundation) purchased 72 million of the 89.4 million ETH outstanding during the 2014 pre-sale, any slowing of ETH's supply rate could raise significant concerns about centralization.<sup>18</sup> This is even more alarming in the context of a proof-of-stake version of the protocol, where large stakeholders can have tremendous influence, potentially at the expense of other network participants.

## Protocol Development

There is no doubt that talented minds are working on both projects: Vitalik Buterin and the Ethereum Foundation are driving forward the roadmap for Ethereum, while IOHK, the ETCDEV Team, and other independent community members are leading the way for Ethereum Classic. You can learn more about the individuals supporting Ethereum Classic development at:

<https://iohk.io/team/>

<https://www.etcdevteam.com/>

Yet a major difference between the two projects can be seen in the structure supporting protocol development. Although Ethereum claims to be a decentralized platform, it is centrally funded by the Ethereum Foundation. The development funding (and consequently the innovation roadmap) is largely directed by a single entity and a few individuals. Within the Ethereum Classic community exists a counter-ideology; that a completely decentralized environment allows for abundant possibilities that would otherwise be hindered under the direction of a single organization. Many believe that the Ethereum Foundation's strategy will lead Ethereum to suffer the same consequences as early instances of the internet, where walled gardens created by the likes of AOL, CompuServe and MSN were ultimately superseded by the open internet structure that exists today. Whether or not this is an accurate analogy remains to be seen.

<sup>15</sup>Source: Cointelegraph: Ethereum Foundation Has Sold 90 Percent of ETC in Last 6 Months, January 10, 2017, Joseph Young. <https://cointelegraph.com/news/ethereum-foundation-has-sold-90-percent-of-etc-in-the-last-6-months>.

<sup>16</sup>Source: GasTracker.io: <https://gastracker.io/addr/0x5e8f0e63e7614c47079a41ad4c37be7def06df5a>, March 2, 2017.

<sup>17</sup>Source: [https://np.reddit.com/r/ethereum/comments/5izcf5/lets\\_talk\\_about\\_the\\_projected\\_coin\\_supply\\_over/dbc66rd/](https://np.reddit.com/r/ethereum/comments/5izcf5/lets_talk_about_the_projected_coin_supply_over/dbc66rd/)

<sup>18</sup>Source: CoinDesk: What Investors Should Know Before Trading Ether, May 8, 2016, Charles Bovaird. <http://www.coindesk.com/what-to-know-trading-ethereum/>.

Our team’s conviction in ETC is further bolstered by superior transparency in the development roadmap for Ethereum Classic. Charles Hoskinson, CEO of IOHK and co-founder and former CEO of the Ethereum Project, continues to actively contribute to the roadmap’s transparency through a variety of communication mediums including Slack, Reddit, Twitter, and the “Let’s Talk ETC” podcast.<sup>19</sup> The Grothendieck Team, hired by IOHK, conducts weekly standups to discuss their progress towards building a new and improved client to support Ethereum Classic.<sup>20</sup> The ETCDEV Team is working on new implementations of the monetary model, a flexible software developer kit that can be used to build applications on the Ethereum Classic blockchain, and performance and reliability improvements to the Ethereum Virtual Machine.<sup>21</sup> The complete development roadmap for both the Grothendieck Team and the ETCDEV Team can be found at:

<https://iohk.io/projects/ethereum-classic/#devupdates>  
<https://www.etcdevteam.com/roadmap.html>

The most important difference though, is that there is a clear appreciation by the Ethereum Classic developers that digital currencies are critical to the long-term sustainability of their associated blockchains. Further, they recognize that a digital token’s lasting value is justified by the trustless nature of its protocol. On the contrary, the Ethereum community’s philosophy centers on the idea that they will both build and break the technology to further their mission of accelerating the use of “decentralized” protocols and tools, without regard for the digital assets that underlie them. While it is a noble endeavor, we think this approach makes ETH less attractive from an investment perspective.

It is our view that the market is underappreciating important differences in governance, economics, and development between these two protocols. As long-term strategic investors in the digital currency ecosystem, we believe that the network effect can substantially shift from Ethereum to Ethereum Classic as more investors, miners, and developers fully appreciate these differences.

## The Investment Opportunity for ETC

We’ve identified two possible drivers of alpha for Ethereum Classic and ETC. First, ETC possesses store-of-value properties similar to precious metals and bitcoin, giving it credence as an inflation hedge over long-term investment horizons. Second, as the digital token that runs Ethereum Classic smart contracts, ETC can become the scarce commodity that powers a universally-scalable Internet of Things. Throughout this section, we’ll outline the rationale supporting each of these fundamental drivers and evaluate the market opportunity across both dimensions.

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<sup>19</sup>Source: Let’s talk ETC! (Ethereum Classic) – Episode 8 – Conversation with Charles Hoskinson. <https://www.youtube.com/watch?v=Jb4Yil6oYVY>.

<sup>20</sup>Source: <https://iohk.io/projects/ethereum-classic/#devupdates>

<sup>21</sup>Source: <https://www.etcdevteam.com/roadmap.html>

## A Digital Store-of-Value

There are certain core properties that are essential to the investability of an asset as a store-of-value, be it physical or digital. Gold, silver, platinum, bitcoin and now ETC share the following characteristics that we believe are key to the success and sustainability of store-of-value assets:

- **Scarcity:** ETC is a scarce asset. It is estimated that the supply will level off near 210 million tokens by the year 2070 with a capped maximum of 230 million tokens that can ever enter circulation. This is an explicit design element of the Ethereum Classic protocol.<sup>22</sup> As of March 2<sup>nd</sup>, 2017, there were approximately 89.3 million ETC floating in the market.<sup>23</sup>
- **Divisibility:** Digital currencies represent some of the most divisible forms of payment available in the world. The smallest possible unit of ETC, a “wei,” represents 0.000000000000000001 of a single token. ETC can be displayed out to eighteen decimal places, creating one quintillion units within each.
- **Portability:** ETC can be sent across borders electronically and clear almost instantly, making it an alternative to bitcoin and far more portable than precious metals or fiat currency.
- **Fungibility:** One unit of ETC represents the same exact value as another unit of equal size.
- **Verifiability:** ETC are unique cryptographic tokens that are directly verifiable on the Ethereum Classic blockchain, in real-time, from anywhere in the world.
- **Recognizability:** ETC is gaining broader recognition as a transactional token with perceived utility, with thousands of transactions now taking place on a daily basis.<sup>24</sup>

Furthermore, the protocol underlying a digital currency must also possess additional properties to qualify its token as a store-of-value:

- **Decentralization:** Ethereum Classic operates as a decentralized network. In principle, decentralized networks are more secure and stable than centralized or concentrated-control networks, since there is no single point of failure. Internet protocols like email and http are examples of widely-used decentralized networks.
- **Immutability:** Ethereum Classic maintains an immutable global blockchain, preventing any possibility of fraud, censorship, or unjust interference by any actor.
- **Adaptability:** The open-source nature of the Ethereum Classic protocol allows for continuous adaptation and improvement. Adaptability is essential to the future viability of any technology.

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<sup>22</sup>See footnote 12.

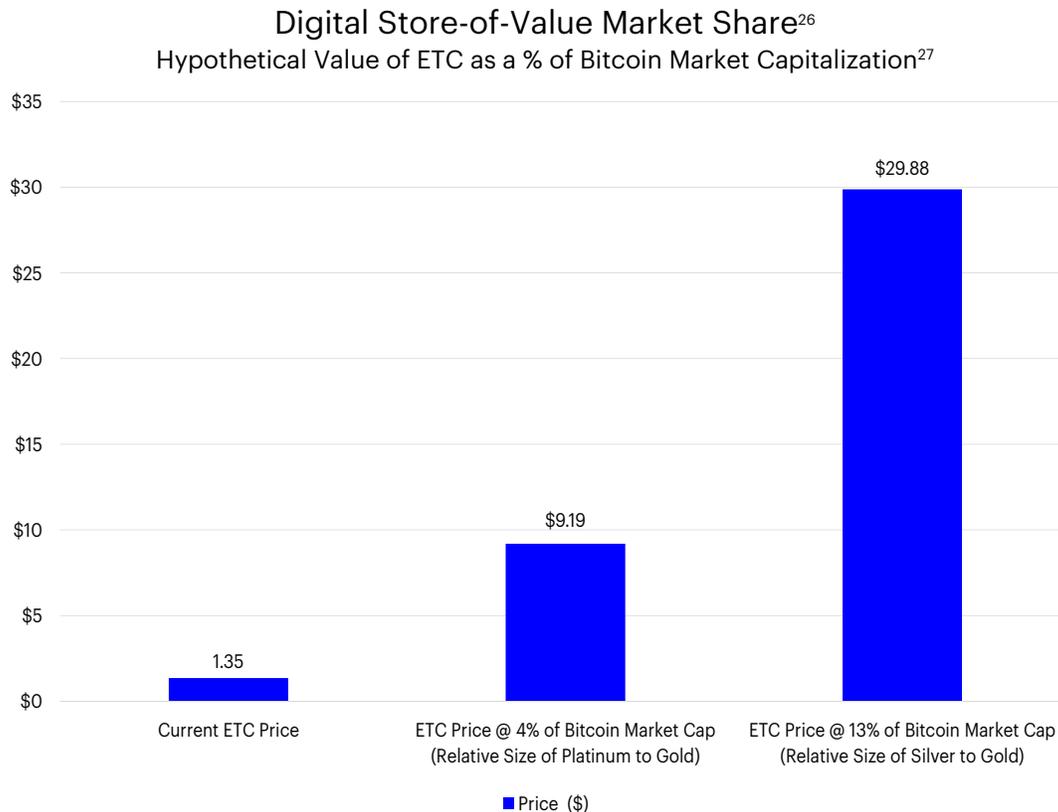
<sup>23</sup>Source: CoinMarketCap.com

<sup>24</sup>Source: ETCChain.com

## The Store-of-Value Market Opportunity for ETC

While many investors already view bitcoin as digital gold, we view ETC as digital silver or platinum. Our rationale for this is twofold. First, in the same way that silver and platinum have store-of-value properties and general industrial application in the physical economy, we see ETC as an asset with store-of-value properties and broad industrial application in the digital economy. Second, just as investing in silver and platinum, in addition to gold, can diversify a precious metals allocation, we believe that investing in a select mix of digital currencies, including ETC, can produce similar benefits and increase risk-adjusted returns.

As a result, we assess the investment opportunity for ETC as a store-of-value asset through a market share framework, based on observations of the precious metals market. According to BlackRock, as of December 30<sup>th</sup>, 2016 there was approximately \$72 billion invested in physically-backed gold exchange-traded products (ETPs), \$9 billion invested in silver ETPs, and \$3 billion invested in other precious metal ETPs, a category largely comprised of platinum.<sup>25</sup> By extrapolating from the share that various precious metals maintain in the physical store-of-value market, we imagine that ETC can capture a comparable portion of the digital store-of-value market. In the following chart, we look at how the price of ETC could change if its market capitalization relative to bitcoin were to grow to the same size as silver and platinum relative to gold.



<sup>25</sup>Source: BlackRock: Global ETP Landscape, December 30, 2016.

<sup>26</sup>Source: Blockchain.info, TradeBlock, Etherscan.io. Based on a bitcoin market capitalization of \$20.5B and an ETC supply of 89.3M as of March 2, 2017.

<sup>27</sup>THE FUTURE ETC PRICES SHOWN ARE PURELY HYPOTHETICAL AND SPECIFICALLY ASSUME THAT ETC PRICES WILL INCREASE. The financial projections set forth herein are subject to great uncertainty. There can be no assurance that the projected hypothetical prices will be achieved. Actual future prices will depend on numerous factors, including the future liquidity of ETC, all of which may differ from the assumptions on which the hypothetical prices contained herein are based. NO REPRESENTATION IS BEING MADE THAT ANY RESULTS WILL OR ARE LIKELY TO ACHIEVE PRICES SIMILAR TO THOSE SHOWN.

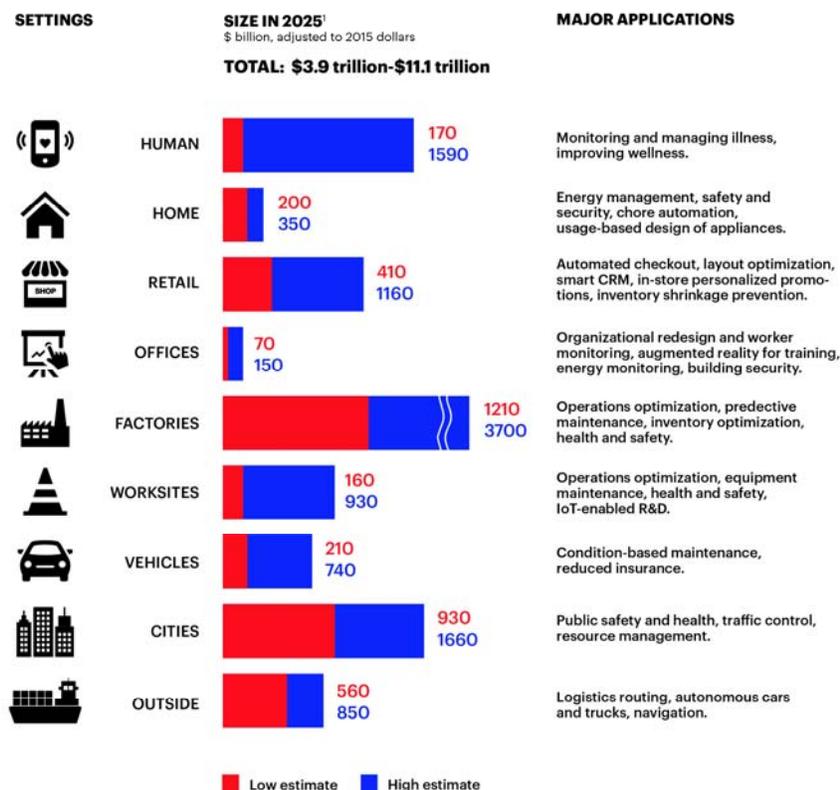
If the market capitalization of ETC were to grow to the same relative size of platinum to gold (4%), a single token could be worth more than \$9 – nearly 7X its March 2<sup>nd</sup>, 2017 market price. Moreover, if the market capitalization of ETC were to assume the same relative size of silver to gold (13%), a single token could be worth roughly \$30 – more than 22X its March 2<sup>nd</sup>, 2017 market price.<sup>28</sup>

## The Commodity that Powers the Internet of Things (IoT)

The Internet of Things is a concept used to describe an automated and interoperable, physical-digital world, in which every day items can be connected to the internet to share information and value with people and other devices. Simply put, the IoT translates into a more open, systematic, and efficient world, allowing people to use their time more productively.

There is tremendous investment opportunity in the IoT. McKinsey estimates the economic impact of a full-scale IoT to be between \$4 trillion and \$11 trillion per year by 2025.<sup>29</sup> They identify nine different settings where IoT technologies can be implemented to capture this value:

### Potential economic impact of IoT in 2025, including consumer surplus, is **\$3.9 trillion to \$11.1 trillion**.



<sup>1</sup> Includes sized applications only.  
NOTE: Numbers may not sum due to rounding

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<sup>28</sup>See footnote 27.

<sup>29</sup>Source: McKinsey Global Institute: The Internet of Things: Mapping the Value Beyond the Hype, June 2015.

<sup>30</sup>See footnote 29.

Today, there are numerous IoT technologies in development or in use. Companies including Amazon, IBM, AT&T, Bosch, Cisco, Dell, GE, and Google are all researching, investing in, and building their own IoT hardware and software solutions. While applications that streamline the transmission and synthesis of data are beginning to emerge, there are considerable concerns about data security and privacy, network interoperability, and the lack of incentives driving adoption of these solutions. According to Cisco, approximately 99% of physical objects with IoT potential are still unconnected.<sup>31</sup> We broadly attribute this to the absence of a common platform that resolves these issues.

We believe Ethereum Classic provides the greatest opportunity to achieve a global IoT, as a scalable technology platform with superior features along each of these dimensions:

## Data Security & Privacy

As a decentralized protocol with smart contracts, Ethereum Classic gives individuals and enterprises the ability to control, track, and monetize the distribution of proprietary data, intellectual property, and other digital content in a cryptographically secure environment. Furthermore, with an immutable global blockchain, Ethereum Classic is not subject to censorship, fraud, tampering, or unjustified interference by a central authority. Envision a world in which applications built on Ethereum Classic allow users to upload original music, photographs, writing or even personal medical records to an online portal. Using an intuitive smart contract interface, they could specify who can consume their content, how much it will cost, and how it can be redistributed, among other desirable parameters. This gives users an incredible new way to protect their digital content in the Internet Era.

## Interoperability

Ethereum Classic offers universal interoperability for applications and business models built on its network via the integration of smart contracts. Smart contracts can autonomously transmit information and value from machine-to-person (M2P) and machine-to-machine (M2M) without the need for human intervention, connecting seemingly independent devices. Cisco estimates that the Machine-Payable Web will account for roughly two-thirds of the value associated with IoT.<sup>32</sup> With this level of interoperability, we can imagine how Ethereum Classic could be used to optimize global supply chain logistics. Suppliers, manufacturers, wholesalers, and retailers could build fully interoperable M2M and M2P applications that streamline inventory management, transportation, distribution, accounting, and payment processes.

## Economic Incentives

Ethereum Classic possesses a borderless digital token with store-of-value properties that can incentivize participation to organically grow the IoT. This virtuous cycle can function as follows:

- 1) Speculative demand by investors over the economic potential that Ethereum Classic possesses can drive appreciation of ETC.
- 2) Miners validate transactions and support the speed and security of the network, in order to earn freshly minted ETC.
- 3) As the network becomes more secure, developers can build real-world applications on Ethereum Classic, attracted by a novel internet infrastructure that offers access to untapped revenue streams.

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<sup>31</sup>Source: Cisco: Embracing the Internet of Everything to Capture Your Share of \$14.4 Trillion, 2013, Bradley, Barbier, & Handler.

<sup>32</sup>See footnote 31.

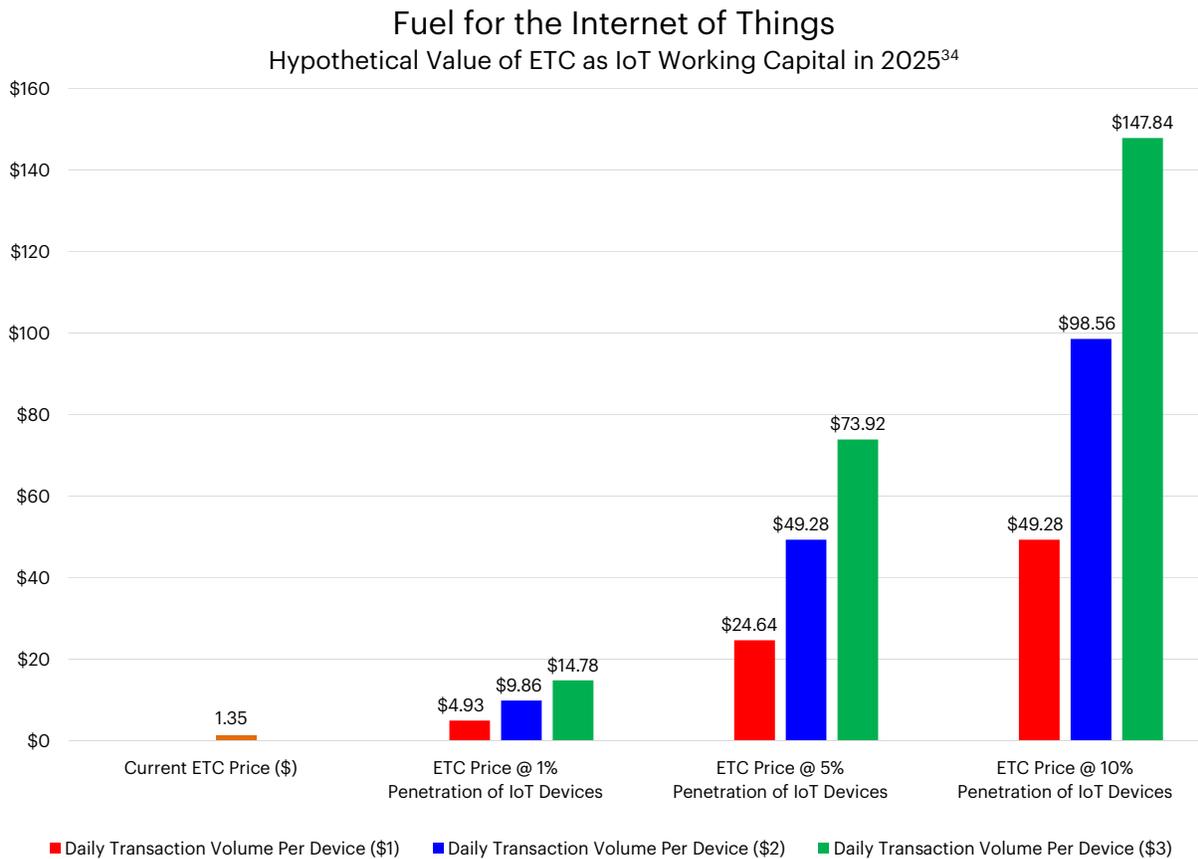
- 4) As new applications are developed on Ethereum Classic, consumer adoption can be driven by implicit incentives, via the realization of productivity gains, or explicit incentives, perhaps in the form of ETC rebates.

By completing this cycle, ETC can transition from a digital currency whose value is driven by speculative demand to one whose value is driven by utilitarian demand.

### The IoT Market Opportunity for ETC

We evaluate the investment opportunity for ETC, as a digital commodity powering IoT applications, using a working capital framework. According to IHS Markit, a leading source of research and analytics for the technology ecosystem, approximately 75.4 billion devices may be connected to the IoT by 2025.<sup>33</sup> Assuming that some percentage of these devices run Machine-Payable Web operations using Ethereum Classic and that a certain amount of value, denominated in ETC, will need to be in the ‘pipes’ as the ‘fuel’ facilitating these transactions, we can begin to assess the asymmetric return potential of ETC.

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<sup>33</sup>Source: IHS Technology. IoT platforms: enabling the Internet of Things, March 2016, Sam Lucero.

<sup>34</sup>Source: TradeBlock. McKinsey Global Institute: The Internet of Things: Mapping the Value Beyond the Hype, June 2015. Overview of ETC Monetary Policy Proposal, December 13, 2016, London, Matthew Mazur, Architect of ECIP1017. Current ETC price is based on the TradeBlock ECX Index value as of March 2, 2017. Simulated price estimates are based on an estimated ETC supply of 153M as of January 2025. THE FUTURE ETC PRICES SHOWN ARE PURELY HYPOTHETICAL AND SPECIFICALLY ASSUME THAT ETC PRICES WILL INCREASE. The financial projections set forth herein are subject to great uncertainty. There can be no assurance that the projected hypothetical prices will be achieved. Actual future prices will depend on numerous factors, including the future liquidity of ETC, all of which may differ from the assumptions on which the hypothetical prices contained herein are based. NO REPRESENTATION IS BEING MADE THAT ANY RESULTS WILL OR ARE LIKELY TO ACHIEVE PRICES SIMILAR TO THOSE SHOWN.

For example in 2025, if 1% of IoT devices were to run on Ethereum Classic, each with an average daily transaction volume of \$1, approximately \$754 million worth of ETC could be needed as working capital on a daily basis. Conservatively, assuming that the market capitalization of ETC would need to be at least equivalent to the daily working capital requirement, the price of a single token of ETC could be worth roughly \$5. Moreover, if 10% of IoT devices were to run on Ethereum Classic, each with an average daily transaction volume of \$3, approximately \$22.62 billion worth of ETC could be needed as working capital. In this scenario, the price of a single ETC token could approach \$150.<sup>35</sup>

By giving the IoT a common language to communicate in, a common currency to transact with, and an immutable global blockchain to store, track, and manage the flow of information and value, quickly, accurately, securely, and without the need for trusted intermediaries, Ethereum Classic can capture synergies across every setting and payment segment.

## ETC in Portfolio Construction

As Ethereum Classic promotes economic growth in innovative ways, ETC gives investors an opportunity to build more efficient portfolios.

Slow global growth, secularly high debt burdens, deteriorating effectiveness of monetary policies, and low yielding assets are all contributing to a savings crisis that threatens the economic welfare of future generations. We are entering a low return environment with significant downside risks, where it will be difficult for many investors to achieve their target returns. There are two options available to investors:

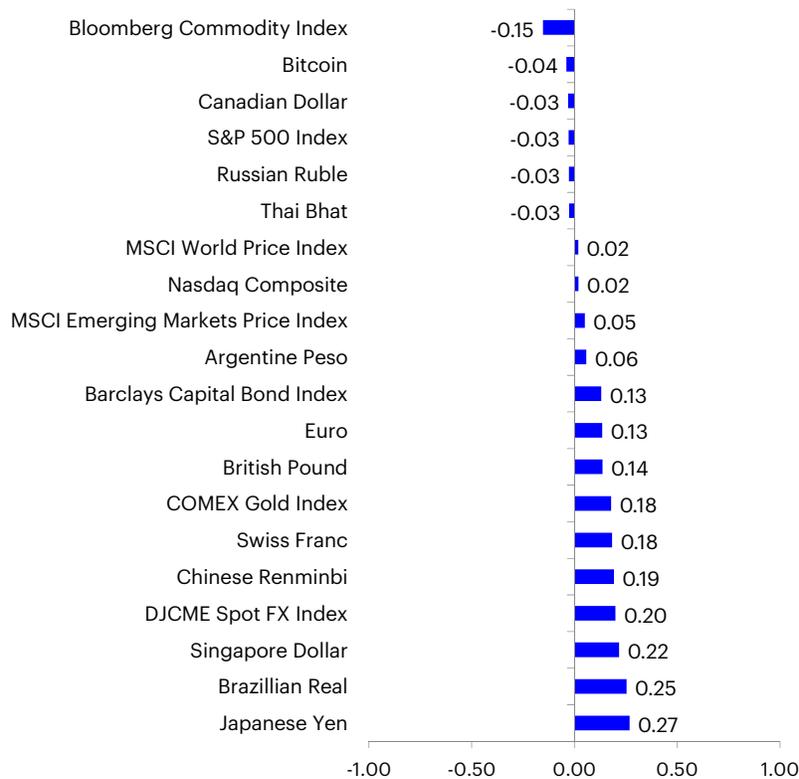
- 1) Increase exposure to risky assets already held in their portfolios in hopes of generating higher returns. However, this will mean holding more concentrated, less diversified portfolios, with higher risk of ruin.
- 2) Identify uncorrelated assets with positive expected returns, and use them to build more balanced portfolios.

As a distinct, uncorrelated asset, ETC can broaden a digital currency allocation and further diversify investor portfolios to help them achieve their investment goals. Between July 23<sup>rd</sup> and March 2<sup>nd</sup>, 2017, ETC had an average cross-sectional correlation of 0.1 with the following major asset classes and currencies. Notably, ETC was negatively correlated with bitcoin during the same period.

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<sup>35</sup>See footnote 34.

## Correlation of ETC to Asset Classes & Currencies<sup>36</sup> Based on Rolling 10-Day Returns



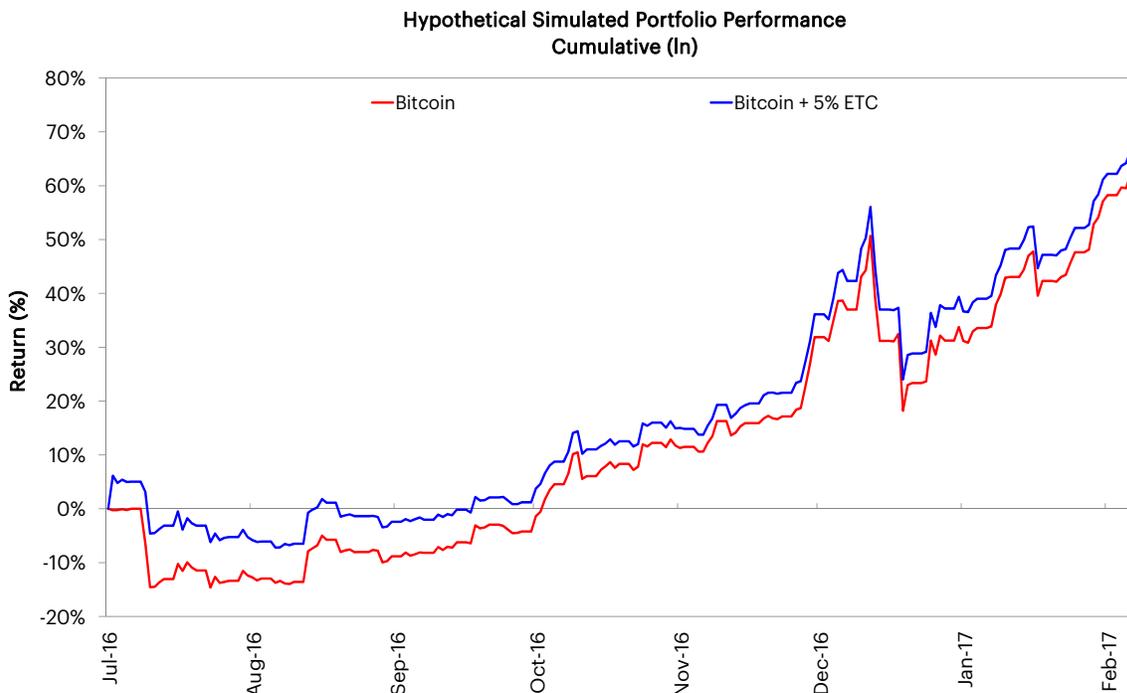
To gain a deeper understanding of the diversification benefits that ETC can offer, we ran a series of simulations on both digital currency and traditional investment portfolios.

In the first example, we looked at how a digital currency portfolio consisting of 95% bitcoin and 5% ETC would have performed versus a portfolio solely comprised of bitcoin. We ran this simulation for the following reasons:

- ETC shares common properties with investable digital currencies like bitcoin that fundamentally support its role as a store-of-value asset and inflation hedge over long-term investment horizons.
- While both ETC and bitcoin are digital assets with store-of-value properties, each have unique, diversifying characteristics. For example, ETC could become the dominant digital currency for the Machine-Payable Web, while bitcoin will likely continue to be the dominant peer-to-peer digital currency.
- It can provide insight as to whether a diversified investment in a basket of select digital currencies might deliver better risk-adjusted returns than a standalone investment in bitcoin.

<sup>36</sup>Source: Bloomberg, TradeBlock, Poloniex, Bitfinex. PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. As the period during which ETC has been available has only been approximately six months, the correlations may not be meaningful when considering longer periods. Correlations are based on 10-day rolling returns from July 23, 2016 through March 2, 2017. Performance of bitcoin is based on the daily values of the Bloomberg Bitcoin/US Dollar Spot Price. Performance of ETC is based on the daily values provided by Poloniex from July 23 through July 26, Bitfinex from July 27 through December 13, and the TradeBlock ECX Index thereafter.

Hypothetical Simulated Portfolio Performance <sup>37</sup> July 23, 2016 through March 02, 2017		
Portfolio	Bitcoin	Bitcoin + 5% ETC <sup>38</sup>
Cumulative Total Return	91.3%	99.6%
Annualized Total Return*	179.5%	199.0%
Annualized Std Dev*	42.1%	40.8%
Sharpe Ratio*	4.26	4.88
Change in Annualized Return*	--	19.5%
Change in Annualized Risk*	--	-1.4%
Ratio Improvement*	--	15%



As the above figures show, the blended portfolio, containing bitcoin and ETC (blue), produced a hypothetical simulated cumulative return that was more than 8% higher than that of a pure bitcoin portfolio (red), with lower volatility.<sup>39</sup>

In the second example, we looked at the incremental effects of adding a broader digital currency allocation (1-5%), comprised of bitcoin (90%) and ETC (10%), to a Global 60/40 portfolio. Since digital currencies provide exposure to market opportunities not captured by traditional asset classes, we were excited to quantify the potential benefits that they can offer.

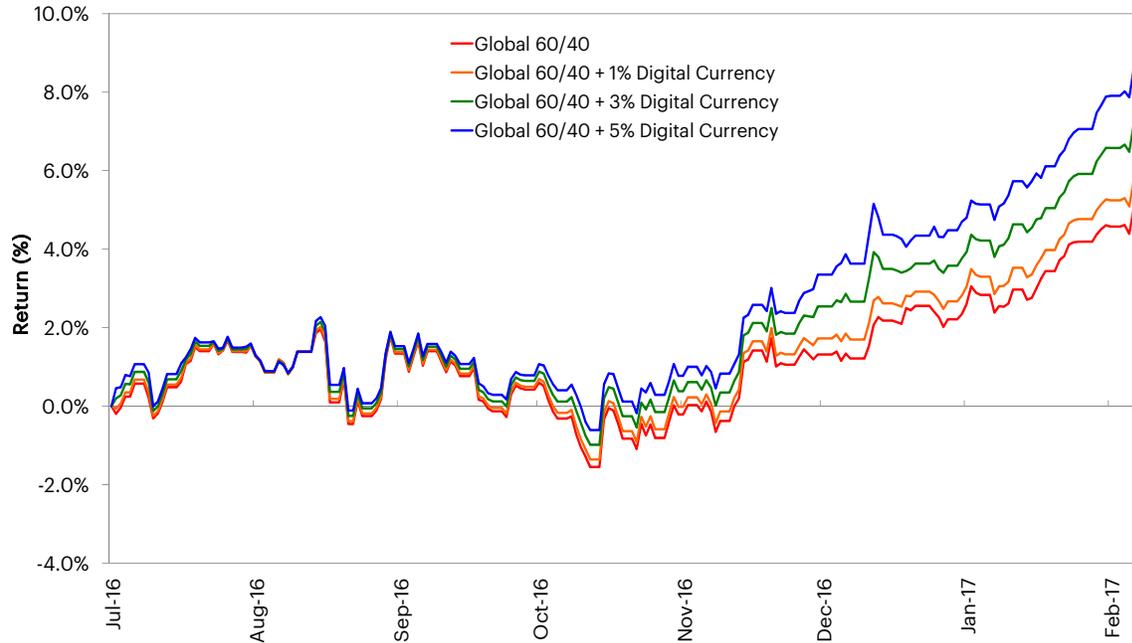
<sup>37</sup> HYPOTHETICAL SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. There is no guarantee that the market conditions during the past period will be present in the future. Rather, it is most likely that the future market conditions will differ significantly from those of this past period, which could have a materially adverse impact on future returns. Unlike an actual performance record, simulated results do not represent actual trading or the costs of managing the portfolio. Also, since the trades have not actually been executed, the results may have under or over compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. SEE "NOTE ON HYPOTHETICAL SIMULATED PERFORMANCE RESULTS" IN IMPORTANT DISCLOSURES FOR ADDITIONAL DISCLOSURES.

<sup>38</sup>Source: Bloomberg, TradeBlock, Poloniex, Bitfinex. Performance is shown from July 23, 2016 through March 2, 2017. \*Annualized figures and related statistics are shown for illustrative purposes only and do not reflect a full year of performance. Annualized figures are based on 252 trading days. Performance of bitcoin is based on the daily values of the Bloomberg Bitcoin/US Dollar Spot Price. Performance of ETC is based on the daily values provided by Poloniex from July 23 through July 26, Bitfinex from July 27 through December 13, and the TradeBlock ECX Index thereafter. THE BITCOIN +5% ETC RESULTS ARE HYPOTHETICAL AND ARE NOT BASED ON ACTUAL RETURNS OR HISTORICAL PERFORMANCE. Component asset weights are held constant over the period. The Sharpe Ratio is calculated as the annualized excess return of the portfolio over the 3-month US T-Bill divided by the standard deviation of excess returns.

<sup>39</sup>See footnote 37.

Hypothetical Simulated Portfolio Performance <sup>40</sup>				
July 23, 2016 through March 02, 2017				
Portfolio	Global 60/40	Global 60/40 + 1% Digital Currency <sup>41</sup>	Global 60/40 + 3% Digital Currency <sup>41</sup>	Global 60/40 + 5% Digital Currency <sup>41</sup>
Cumulative Total Return	4.8%	5.5%	7.1%	8.7%
Annualized Total Return*	8.0%	9.3%	12.0%	14.7%
Annualized Std Dev*	5.8%	5.7%	5.6%	5.7%
Sharpe Ratio*	1.37	1.63	2.12	2.57
Change in Annualized Return*	--	1.3%	4.0%	6.8%
Change in Annualized Risk*	--	-0.1%	-0.2%	-0.1%
Ratio Improvement*	--	18%	55%	87%

Hypothetical Simulated Portfolio Performance  
Cumulative (ln)



Our analysis revealed that even small allocations to digital currency can significantly enhance the returns of traditional portfolios, while also reducing risk.

- Adding a 1% digital currency allocation to the Global 60/40 increased the hypothetical simulated cumulative return by 78 bps, while also reducing volatility to improve risk-adjusted returns.<sup>42</sup>
- Adding a 3% digital currency allocation to the Global 60/40 increased the hypothetical simulated cumulative return by 235 bps, while also reducing volatility to improve risk-adjusted returns.<sup>43</sup>
- Adding a 5% digital currency allocation to the Global 60/40 increased the hypothetical simulated cumulative return by 394 bps, while also reducing volatility to improve risk-adjusted returns.<sup>44</sup>

<sup>40</sup>HYPOTHETICAL SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. SEE FOOTNOTE 37 AND “NOTE ON HYPOTHETICAL SIMULATED PERFORMANCE RESULTS” IN IMPORTANT DISCLOSURES FOR ADDITIONAL DISCLOSURES.

<sup>41</sup>Source: Bloomberg, TradeBlock, Poloniex, Bitfinex. Performance is shown from July 23, 2016 through March 2, 2017. \*Annualized figures and related statistics are shown for illustrative purposes only and do not reflect a full year of performance. Annualized figures are based on 252 trading days. Global 60/40 consists of a 60% allocation to the iShares MSCI ACWI and a 40% allocation to the Vanguard Total International Bond ETF. Performance of bitcoin is based on the daily values of the Bloomberg Bitcoin/US Dollar Spot Price. Performance of ETC is based on the daily values provided by Poloniex from July 23 through July 26, Bitfinex from July 27 through December 13, and the TradeBlock ECX Index thereafter. “Digital Currency” consists of a 90% allocation to bitcoin and 10% allocation to ETC. THE GLOBAL 60/40 + 1%/3%/5% DIGITAL CURRENCY RESULTS ARE HYPOTHETICAL AND ARE NOT BASED ON ACTUAL RETURNS OR HISTORICAL PERFORMANCE. Component asset weights are held constant over the period. The Sharpe Ratio is calculated as the annualized excess return of the portfolio over the 3-month US T-Bill divided by the standard deviation of excess returns.

<sup>42</sup>See footnote 37.

<sup>43</sup>See footnote 37.

<sup>44</sup>See footnote 37.

It is important to highlight that adding a small allocation to ETC within the digital currency sleeve further enhanced the risk-adjusted returns of the Global 60/40 versus simulations only including bitcoin. We emphasize this point because the hypothetical simulated performance data supports our thesis that there are benefits that investors can realize by incorporating multiple investable digital currencies into the construction of their portfolios. It also reinforces that digital currency has grown to become a new asset class that encompasses more than just bitcoin. Even though our hypothetical simulated analysis is limited by the short timeframe over which Ethereum Classic and ETC have existed, our findings are consistent with the mathematical principle that uncorrelated assets with positive returns can improve the efficiency of investor portfolios.

## Conclusion

We believe in a future of multiple digital currencies, in which unique comparative advantages allow each to play a distinct role in driving economic growth and in diversifying modern investment portfolios. Yet as new tokens enter the fold, it becomes more and more difficult to sift through the noise to identify truly revolutionary assets. Recognizing that this can be challenging for many investors, we have developed a framework to qualify digital currencies with long-term investability. Through this lens, we have come to believe that ETC marks the next generation in a class of investable digital assets, complementing bitcoin, and broadening a dynamic new asset class. With its store-of-value properties, abundant real-world applications, asymmetric return potential, and diversifying characteristics, ETC stands to radically improve many aspects of our lives while also providing investors with a new tool to build efficient portfolios. We look forward to learning more from our experience with this exciting new asset and will continue to deliver investment insights on the broader digital currency ecosystem.

## About Grayscale Investments

A trusted authority on digital currency investing, Grayscale provides market insight and investment exposure to the developing digital currency asset class. Grayscale's cornerstone product, the Bitcoin Investment Trust, provides titled, auditable bitcoin exposure through a traditional security structure. The Bitcoin Investment Trust's shares are the first publicly-quoted securities solely invested in, and deriving value from, the price of bitcoin (symbol: GBTC). The Ethereum (ETC) Investment Trust is Grayscale's second digital currency product.

More information regarding Grayscale can be found at [www.grayscale.co](http://www.grayscale.co). Grayscale and the Ethereum (ETC) Investment Trust can be followed at [@GrayscaleInvest](https://twitter.com/GrayscaleInvest) and [@EthereumTrust](https://twitter.com/EthereumTrust), respectively. Alternatively, please contact Michael Sonnenshein, Head of Sales & Business Development at [michael@grayscale.co](mailto:michael@grayscale.co) or (212) 668-3911.

## Important Disclosures & Other Information

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Investors should be aware that Grayscale Investments, LLC is the sponsor of the Ethereum (ETC) Investment Trust (“ETCT”). Information provided about the ETCT is not intended to be, nor should it be construed or used as investment, tax or legal advice, a recommendation, or an offer to sell, or a solicitation of an offer to buy, an interest in the ETCT. Any offering or solicitation will be made only to certain qualified investors pursuant to a formal offering with additional documentation, all of which should be read in their entirety. Any offer or solicitation of an investment in the ETCT may be made only by delivery of the ETCT’s confidential offering documents (the “Offering Documents”) to qualified investors, which would contain material information not contained herein and which would supersede the information provided herein in its entirety.

Interests in the ETCT will not be registered under the U.S. Securities Act of 1933, as amended, or any state securities laws, and the ETCT will not be registered under the U.S. Investment Company Act of 1940, as amended. Any interests in the ETCT described herein have not been recommended by any U.S. federal or state, or non-U.S., securities commission or regulatory authority, including the Securities and Exchange Commission. Furthermore, the foregoing authorities have not confirmed the accuracy or determined the adequacy of this document. Any representation to the contrary is a criminal offense.

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### Note On Hypothetical Simulated Performance Results

HYPOTHETICAL SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. There is no guarantee that the market conditions during a past period will be present in the future. Rather, it is most likely that the future market conditions will differ significantly from those of this past period, which could have a materially adverse impact on future returns. Unlike an actual performance record, simulated results do not represent actual trading or the costs of managing the portfolio. Also, since the trades have not actually been executed, the results may have under or over compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN ABOVE. PAST PERFORMANCE IS NOT NECESSARILY INDICATIVE OF FUTURE RESULTS.

The hypothetical simulated performance results are based on a model that used inputs that are based on assumptions about a variety of conditions and events and provides hypothetical not actual results. As with all mathematical models, results may vary significantly depending upon the value of the inputs given, so that a relatively minor modification of any assumption may have a significant impact on the result. Among other things, the hypothetical simulated performance calculations do not take into account all aspects of the applicable asset’s characteristics under certain conditions, including characteristics that can have a significant impact on the results. Further, in evaluating the hypothetical simulated performance results herein, each prospective investor should understand that not all of the hypothetical assumptions used in the model are described herein,

and conditions and events that are not accounted for by the model may have a significant adverse effect on the performance of the assets described herein. Prospective investors should consider whether the behavior of these assets should be tested based on different and/or additional assumptions from those included in the information herein.

IN ADDITION TO OTHER DIFFERENCES, PROSPECTIVE INVESTORS SHOULD NOTE THE FOLLOWING POTENTIALLY SIGNIFICANT DIFFERENCES BETWEEN THE ASSUMPTIONS MADE IN THE HYPOTHETICAL SIMULATED PERFORMANCE AND THE CONDITIONS UNDER WHICH THE ETCT WILL PERFORM, WHICH COULD CAUSE THE ACTUAL RETURN OF THE ETCT TO DIFFER CONSIDERABLY FROM RETURNS SET FORTH BY THE HYPOTHETICAL SIMULATED PERFORMANCE, TO BE MATERIALLY LOWER THAN THE RETURNS AND TO RESULT IN LOSSES OF SOME OR ALL OF THE INVESTMENT BY PROSPECTIVE INVESTORS:

(NOTE, HOWEVER, THAT THE ETCT WILL BE SOLELY INVESTED IN ETC, WHEREAS THE HYPOTHETICAL SIMULATED PERFORMANCE WAS INTENDED TO SHOW HYPOTHETICAL PERFORMANCE OF AN INVESTMENT IN ETC AND OTHER ASSETS.)

THE GENERAL MARKET DATA USED IN THE HYPOTHETICAL SIMULATED PERFORMANCE DOES NOT REFLECT ACTUAL TRADING ACTIVITY AND COULD NOT BE REPLICATED BY THE ETCT IN ITS ACTUAL TRANSACTIONS. If actual trading activity was executed at levels that differed significantly from the general market data used in the hypothetical simulated performance, the actual returns achieved would have varied considerably from the results of the hypothetical simulated performance and could have been substantially lower and could result in significant losses.

UNLIKE THE ETCT, THE HYPOTHETICAL SIMULATED PERFORMANCE DOES NOT ASSUME ANY GAINS OR LOSSES FROM TRADING AND THEREFORE DOES NOT REFLECT THE POTENTIAL LOSSES, COSTS AND RISKS POSED BY TRADING AND HOLDING ACTUAL ASSETS.

The hypothetical simulated performance does not reflect the impact the market conditions may have had upon the ETCT were it in existence during the historical period selected.

The hypothetical simulated performance does not reflect any fees incurred by the ETCT. If such amounts had been included in the hypothetical simulated performance, the results would have been lowered.

AS A RESULT OF THESE AND OTHER DIFFERENCES, THE ACTUAL RETURN OF THE ETCT MAY BE HIGHER OR LOWER THAN THE RETURNS SET FORTH IN THE HYPOTHETICAL SIMULATED PERFORMANCE, WHICH IS HYPOTHETICAL AND MAY NEVER BE ACHIEVED. Reasons for a deviation may also include, but are by no means limited to, changes in regulatory and/or tax law, generally unfavorable market conditions and the Risk Factors set forth below.

### Certain Risk Factors

Grayscale's Ethereum (ETC) Investment Trust (ETCT) is a private, unregistered investment vehicle and not subject to the same regulatory requirements as exchange traded funds or mutual funds, including the requirement to provide certain periodic and standardized pricing and valuation information to investors. There are substantial risks in investing in Grayscale's Ethereum (ETC) Investment Trust, including but not limited to:

#### PRICE VOLATILITY

ETC has historically experienced significant intraday and long-term price swings.

#### MARKET ADOPTION

It is possible that ETC will never be broadly adopted by either the retail or commercial marketplace, in which case, ETC may lose most, if not all, of its value.

#### GOVERNMENT REGULATION

The regulatory framework of ETC remains unclear and application of existing regulations and/or future restrictions by federal and state authorities may have a significant impact on the value of ETC.

#### SECURITY

While the ETCT has implemented powerful security measures for the safe storage of ETC, there have been significant incidents of digital currency theft and ETC remains a potential target for hackers. ETC that are lost or stolen cannot be replaced, as transactions are irrevocable.

#### TAX TREATMENT OF VIRTUAL CURRENCY

On March 25, 2014 the Internal Revenue Service (IRS) released tax guidance applicable to digital and virtual currency stating "Under currently applicable law, virtual currency is not treated as currency that could generate foreign currency gain or loss for U.S. federal tax purposes. For federal tax purposes, virtual currency is treated as property. General tax principles applicable to property transactions apply to transactions using virtual currency." However, this can potentially change in the future.

#### TAX STRUCTURE OF THE TRUST

The ETCT may involve a complex tax structure, which should be reviewed carefully, and may involve structures or strategies that may cause delays in important tax information being sent to investors.

#### NO SHAREHOLDER CONTROL

The sponsor has total authority over the ETCT and shareholders' rights are extremely limited.

#### LACK OF LIQUIDITY AND TRANSFER RESTRICTIONS

An investment in the ETCT will be illiquid and there will be significant restrictions on transferring interests in the ETCT.

#### POTENTIAL RELIANCE ON THIRD-PARTY MANAGEMENT

The ETCT and its managers or advisors may rely on the trading expertise and experience of third-party managers or advisors, the identity of which may not be fully disclosed to investors.

#### FEES AND EXPENSES

The ETCT's fees and expenses (which may be substantial regardless of any returns on investment) will offset the ETCT's trading profits.

#### POTENTIAL CONFLICTS OF INTEREST

The ETCT and its sponsor, managers, advisors and agents may be subject to various conflicts of interest.

### Additional General Disclosures

Investors must have the financial ability, sophistication/experience and willingness to bear the risks of an investment. Please refer to the Ethereum (ETC) Investment Trust Private Placement Memorandum for a list of additional risk factors.

In making an investment decision, investors must rely on their own examination of the ETCT and the terms of the offering contemplated by the Offering Documents, including the merits and risks involved. An investment in the ETCT is not suitable for all investors. The ETCT is a private investment vehicle and is NOT subject to the same regulatory requirements as SEC-registered exchange traded funds or similar investment vehicles. The ETCT is not registered with the SEC and the ETCT's shares are being offered in a private placement pursuant to Rule 506(c) under Regulation D. As a result, the ETCT's shares are restricted and subject to significant limitations on resales or transfer. Potential investors should carefully consider the long term nature of an investment in the ETCT prior to making an investment decision.

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