

STATE STREET DIGITALSM

Fall 2022 Digital Digest

Volatility and the Digital Transformation

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Preface

Three is a symbolically powerful number across cultures and religions – one that often conjures images of solidity, completeness, order and perfection. (Think, the three-legged stool, or the Holy Trinity in Christianity). It is with some irony, then, that the major thrust of our third edition of the State Street Digital Digest focuses on recent market volatility and turmoil around cryptocurrency – what has been popularly dubbed this summer’s “crypto winter,” which negatively impacted an influx of new investors in the space.

Indeed, summer has been very cold for crypto. For the uninitiated: During the worst of the volatility this summer, the alternative asset class lost a third of its value, with Bitcoin – the largest cryptocurrency on the market – plummeting from a November 2021 high of nearly \$69,000 to below \$19,000 by June 2022. The fallout included Terra Luna stablecoin imploding, Three Arrows Capital crypto hedge fund going bankrupt, and some crypto trading and lending platforms also collapsing.

Against that chilly backdrop, however, it is no accident that in August a number of leading financial institutions were all busy making investments of different kinds in the digital asset space. (It so happened that Bitcoin itself

experienced a somewhat significant rebound in August.) And, despite the volatility, there has been growing – even surging – interest from large institutional investors, who might look to cryptocurrency as an alternative asset that can help hedge sophisticated portfolios. So, the question remains: If digital finance is the future, how do we read the tea leaves from the past few months?

Never afraid of tackling the tough questions, the fall edition of our Digital Digest provides a deep dive into stakeholder concerns around volatility in the digital finance space. Specifically, in these pages you’ll find articles about the potential silver lining in our season of crypto cold – namely

how the crypto markets correction and consolidation is helping to accelerate regulation and innovation. Also in the fall Digest is an update on where the industry stands regarding President Biden's March "Executive Order on Ensuring Responsible Development of Digital Assets," which called for a broad review of digital assets; an article detailing why we believe ETFs are the investment vehicle most likely poised to benefit in the near term; and the debut of a new item, which features a Q&A on cryptocurrency with Riccardo Negro, chief operating officer at Fideuram Intesa Sanpaolo Private Banking. We take another look at ESG in an article about decentralized finance titled, "DeFi: Putting the 'G' in ESG," and we investigate macro policy implications of the mainstreaming process of stablecoins, as well as how stablecoins and the broader crypto industry may help maintain the USD-centered global monetary order.

Disruption, by its very nature, is volatile. Think about it for a moment and you'll find that both these words are synonymous with change – an inarguable and unavoidable ingredient when it comes to the future.

That future, and our investment in it, is here, and must be embraced. Change, however, is always challenging, and sometimes slippery.

No one said it would be easy, or devoid of risk, or would follow a precisely straight line. But that's the mystery and wonder of the future. And, if "*the times they are a-changin*," it would be wise to remember some other words from that same Nobel Prize-winner: "*He who isn't busy being born is busy dying.*"

Speaking of the future, as this issue goes to press we are busy fielding the State Street 2023 Digital Assets Study, a major survey of 300 global investment institutions, assessing these organizations' preparedness for digital tokenization and securitization at a technological and operational infrastructure level, as well as their views of digital assets from an ESG perspective. Expect survey findings to appear in our next Digital Digest, due out in January 2023. As always, watch this space, as the future never sleeps!

Sincerely,



NADINE CHAKAR
Executive Vice President and
Head of State Street Digital

Table of Contents

Resilience Merges with Reality	5
A Digital Assets Q&A with Riccardo Negro, Chief Operating Officer, Fideuram Intesa Sanpaolo Private Banking	12
Advancing Crypto Regulation	17
DeFi: Putting the “G” in ESG	24
Crypto Technology and ETFs: The Tokenization Revolution	30
A Financial Revolution in the Making: Mainstreaming Stablecoins	35
Glossary	40
Acknowledgements	42

Resilience Merges with Reality

— BY MICHAEL METCALFE

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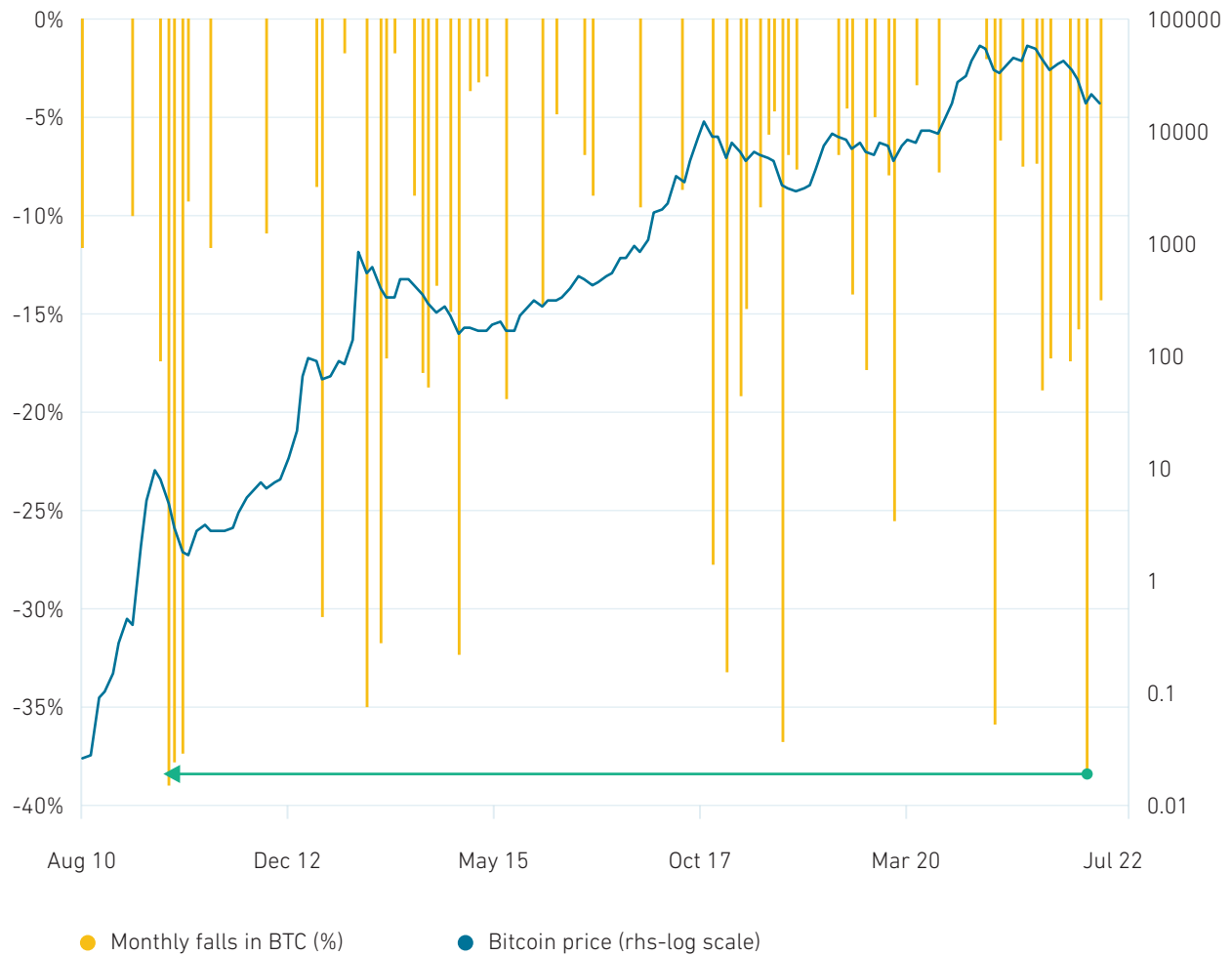
As we enter its final quarter, 2022 will prove to be a 'break and make' year for crypto assets. The year featured Bitcoin's worst monthly performance since its price was in double digits (a sobering thought right there!), a shattering of hopes that it might be an inflation hedge, and Terra Luna's collapse. But it will also be a year when long-term holders increased their Bitcoin holdings, trading volumes remained solid, and innovation – as reflected in Ethereum's long awaited merge – continued apace. All of this speaks to an impressive underlying resilience in the trend toward digital assets that should not be lost amidst the challenge of liquidity withdrawal across all assets, traditional or otherwise. Winter arrived, but crypto is still coming.

Breaking, Badly

Whatever happens in the remainder of 2022, it will not change the fact that Bitcoin lost more than half its value from its peak, including the sharpest monthly decline in more than a decade.

Even for an asset that still has annualized volatility in excess of 50 percent, this is bad and potentially existential.

Figure 1: Raining Crypto: Bitcoin's Biggest Monthly Drawdown in a Decade

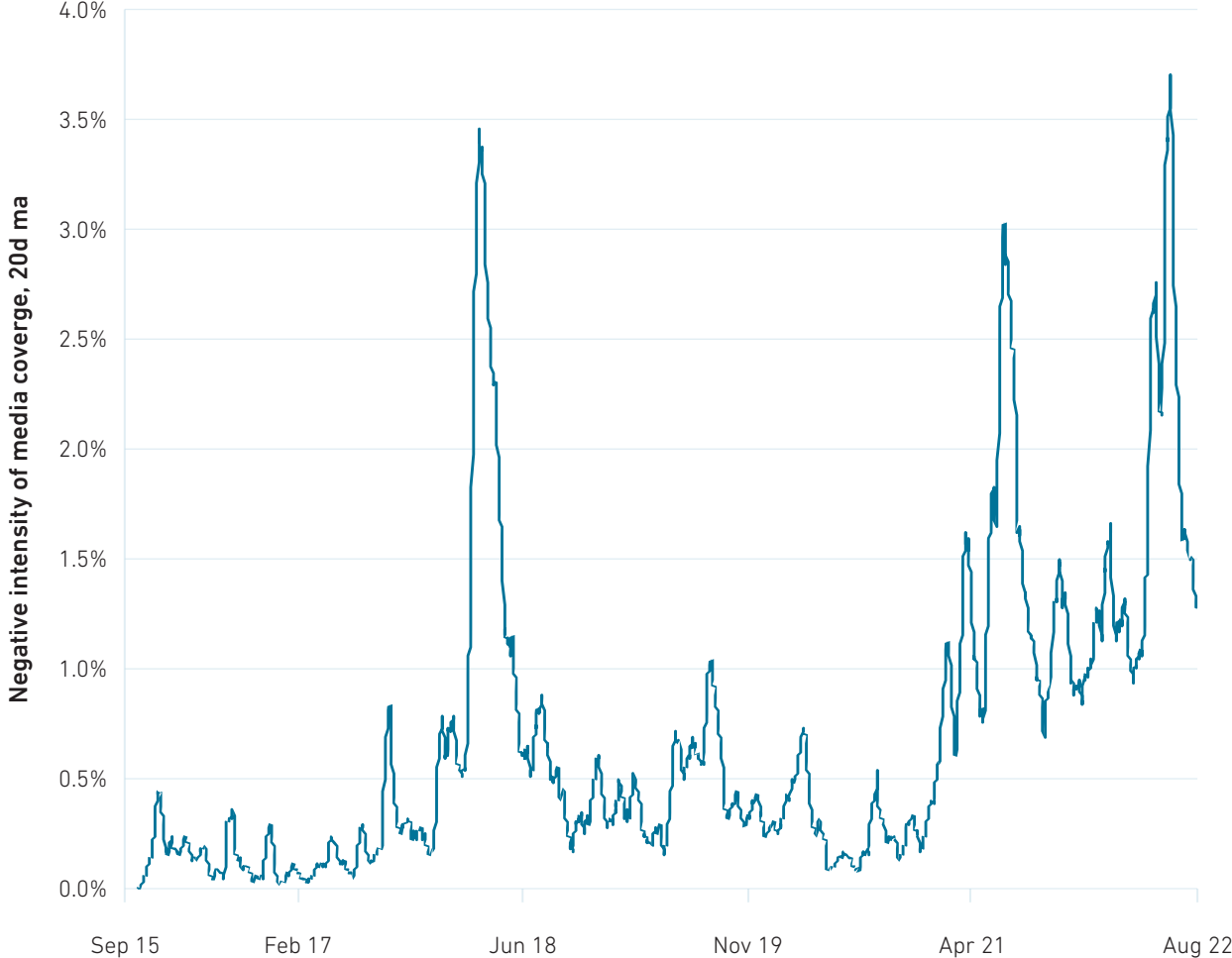


Source: Glassnode, State Street Global Markets

While in the end this was not the case for Bitcoin, it was for a number of digital assets, most notably stablecoin Terra Luna. On top of the spectacular price action in Bitcoin itself, this prompted a wave of negative media sentiment toward crypto,

the like we have not seen before. Through our partnership with MKT media stats, we are able to capture the intensity of media coverage on various macro themes and in particular when press coverage is negative.

Figure 2: A New High in Negative Media Coverage of Bitcoin

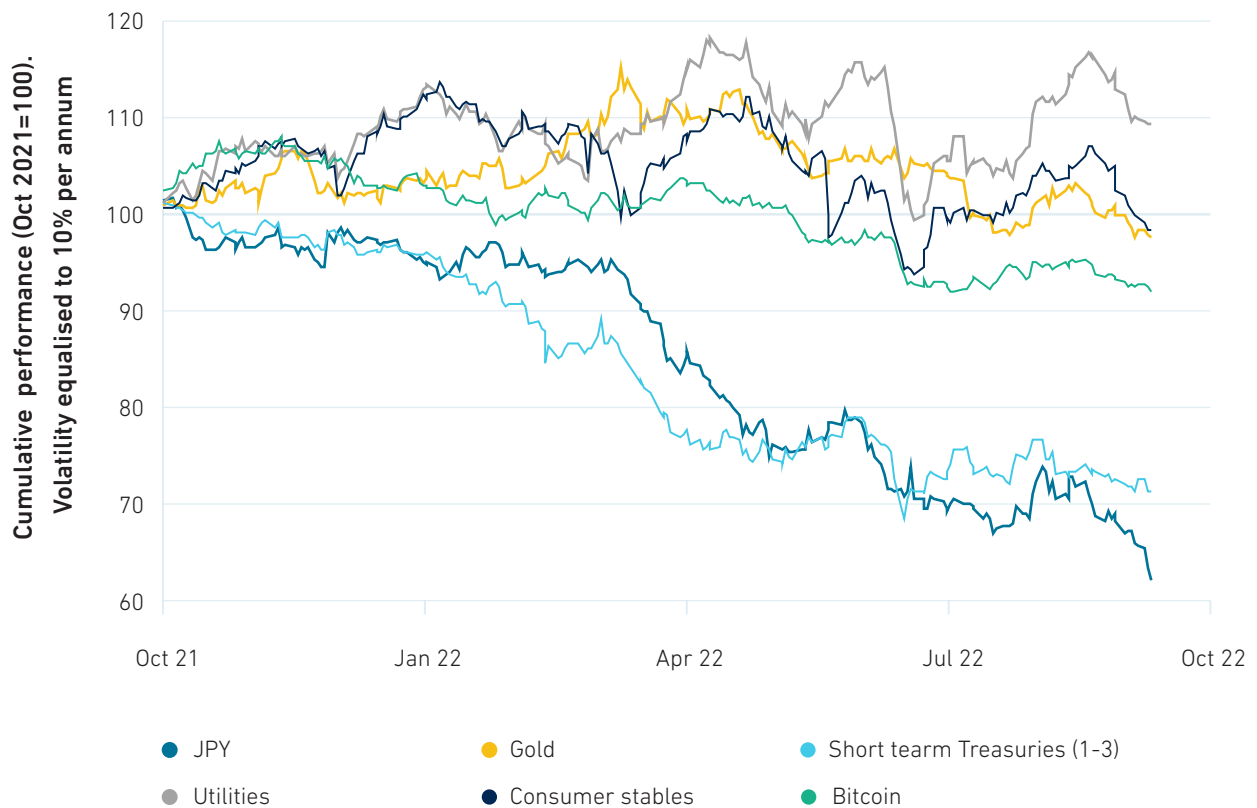


Source: State Street Global Markets

The negative intensity of Bitcoin coverage hit a new high in early July 2022, surpassing the prior peak in 2017/18. Just as media scrutiny of inflation can and has influenced consumer expectations, negative coverage of Bitcoin can potentially discourage adoption by investors, especially retail investors.

Perhaps importantly, though, Bitcoin is hardly the only asset that has been receiving negative coverage in recent months. Central banks' rapid response to catch up with an inflation shock, which was exacerbated by the war in Ukraine, has caught even the supposed safest asset markets off guard. If we control for volatility, the losses in US Treasuries and the Japanese yen are even greater than Bitcoin. This does not make the performance of crypto any less bad, but context is important (and it does make it relatively better).

Figure 3: Cumulative Performance of Selected Assets Past 12-months (Normalized to 10% Volatility)



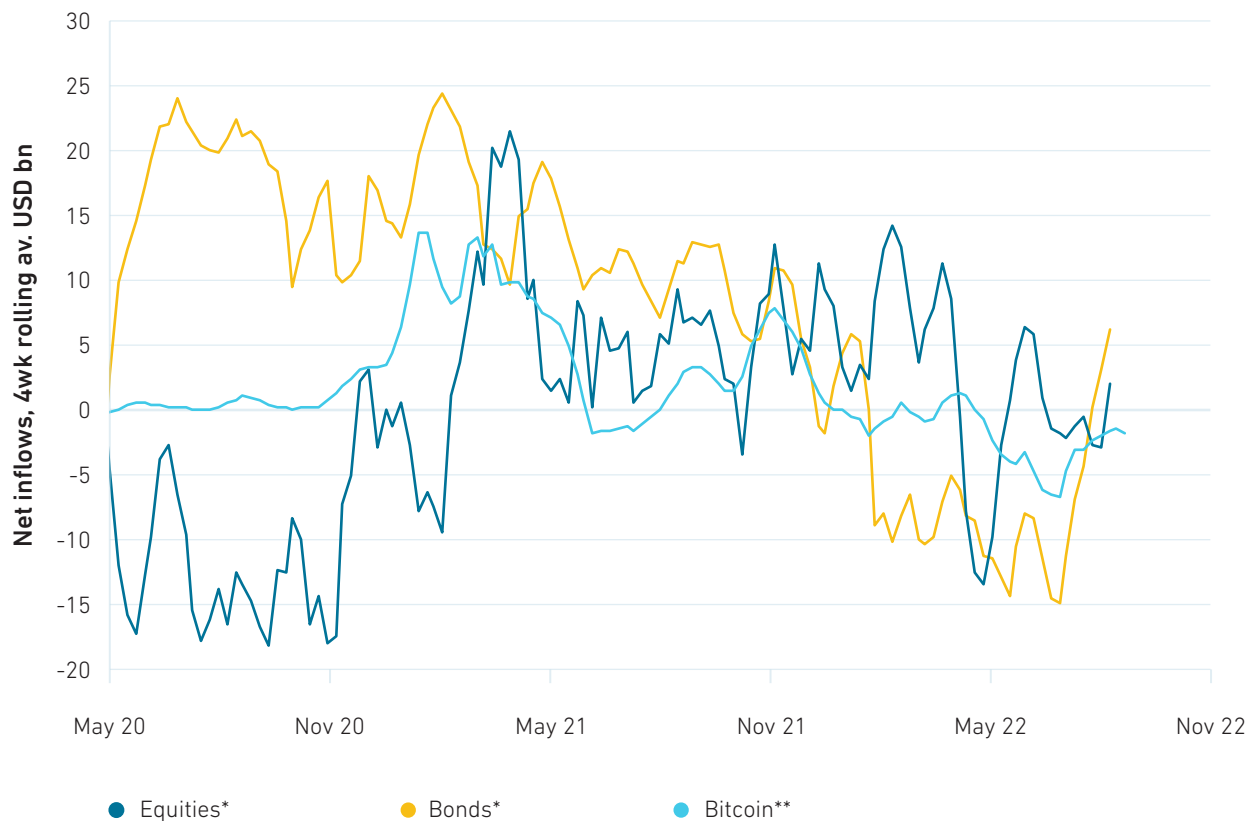
Source: Bloomberg

Steadier Hands Emerging from the Cold

This shared pain is most clearly seen in various metrics of investor behavior across traditional and digital assets. Figure 4 goes back to an observation we made in our [first Digital Digest](#) at the turn of the year. At that time, we noted that the rising tide of liquidity that had so boosted inflows into equity and bond funds and also lifted net inflows into Bitcoin (as captured by

monthly changes in realized market capitalization). Bitcoin, it appeared, was in the same pool as traditional assets. That has since proved its downfall this year, as inflation has taken hold and liquidity is being rapidly reversed. As Figure 4 notes, equity, fixed income and Bitcoin have all seen significant outflows in response.

Figure 4: Net New Cash Flows into Equity, Fixed Income Mutual Funds and ETFs, and Bitcoin



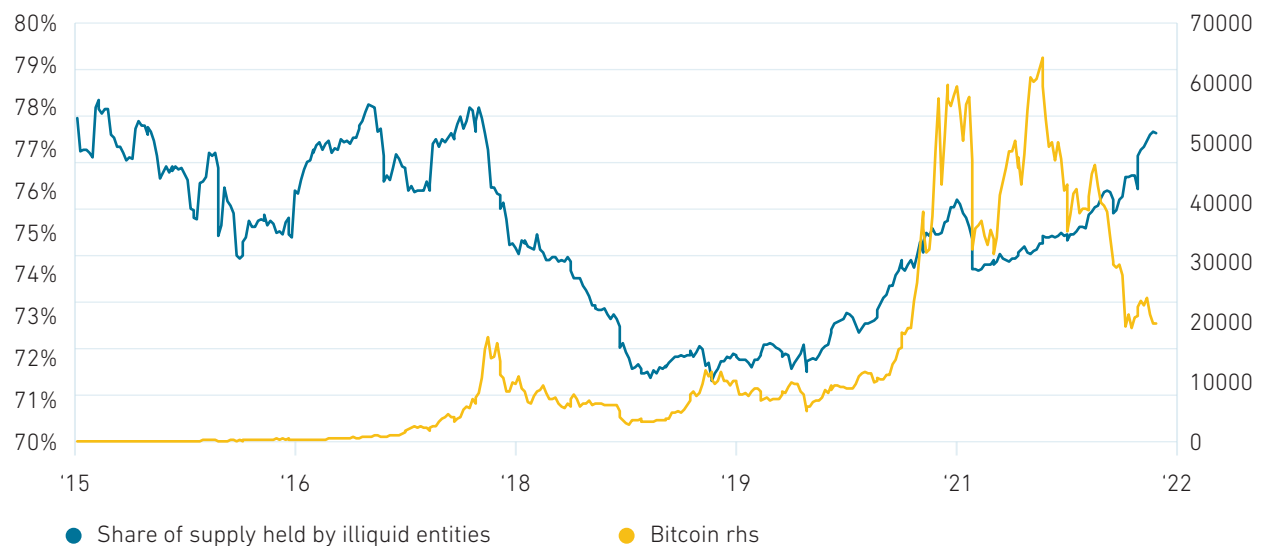
Source: *ICI, **Glassnode

This co-movement of flows with traditional assets is also reflected in prices. Bitcoin has become more correlated with equities over the year and has demonstrated beyond doubt that it is not an inflation hedge, either. This has focused the rationale for holding Digital assets back toward its core underlying function, a focused technology play.

This narrowing and concentration is apparent in the shift in Bitcoin holdings, too. The entities, individuals or institutions that control groups of

addresses that have bought Bitcoin on a net basis this year are long-term buyers; defined here as entities that have bought (cumulatively) at least three times more Bitcoin than they have sold. Since they buy so much relative to their sales they are also known as illiquid holders. Using data from Glassnode, Figure 5 shows that these investors now hold 78 percent of the Bitcoin supply. This is the highest share in five years and is a marked change in behavior to the 2017/18 crash, when long-term holdings capitulated.

Figure 5: Share of Bitcoin Supply Held by Long-Term Buyers



Source: Glassnode

As the name of this group suggests, this has potentially troubling implications for liquidity and means short-term price movements may be even more hostage to shorter-term investors who buy and sell more frequently. But in the medium term, the participation of long-term buy

and hold investors (whether they are institutions or individuals) is usually a welcome development for an asset. For sure, right now government debt agencies all around the world are hoping such illiquid entities want to buy their new issuance.



A Digital Assets Q&A with Riccardo Negro, Chief Operating Officer, Fideuram Intesa Sanpaolo Private Banking

— BY DENIS DOLLAKU

Head of State Street Bank International, Italy



Denis Dollaku
Head of State Street Bank
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Riccardo Negro
Chief Operating Officer, Fideuram
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Denis: Riccardo. Thank you for taking the time to meet with us today.

This decade, even though in its early stage, has brought a global pandemic, recession, and the biggest inflation shock in 40 years. And now there is war being waged in Europe's eastern border.

Because of all this, safe haven assets, e.g., those that are considered the safest in times of crises (the so-called flight to quality), have taken on a near mythical property in financial markets. Having said that, when I think of safe haven assets, cryptocurrencies were not ones that jumped to my mind.

With the benefit of hindsight, we can go back to the beginning of 2020, and compare how Bitcoin has fared relative to traditional safe haven assets. And surprisingly, at least it was surprising to me, the early evidence suggests that it has held up reasonably well.

Still with the benefit of hindsight, we must also state that cryptocurrencies in general – and Bitcoin in particular – have gone through a number of market cycles of buying and selling in the last five years and, as a matter of fact, the current prices of cryptocurrencies have plunged this year as interest rates have risen, with Bitcoin tumbling more than 50 percent since January, in what has been defined as the crypto winter.

Now, with that background, does this volatility tell us anything more about this asset class than we knew when they were new? Or is this consistent with what we knew before?

Riccardo: Today, I think that cryptocurrencies must be considered the fourth most popular financial asset among investors, after stocks, mutual funds and bonds. In many market surveys, it emerged that in recent years cryptocurrencies have become an important diversification asset for portfolios.

We can see there has been a big increase in the capitalisation of cryptocurrencies, from \$5.2 billion in 2015 to \$2 trillion in 2020. Since then there's been a lot of volatility and today there is a capitalization of around \$1 trillion. I think crypto assets have absolutely unique and innovative characteristics, both in terms of risk and yield drivers. And we can say that the crypto sector represents a new asset class with an important role for portfolio diversification.

I think it's important to remember some key events that confirm that cryptocurrencies are a real asset class:

- Firstly, Bitcoin has become a security that can be bought in-bank like a share or a bond and from this year even in Italy
- The listing of Coinbase on Wall Street, the largest platform for buying and selling cryptocurrencies, was an important endorsement for the crypto world
- The first country, El Salvador, has adopted Bitcoin as a legal currency like the dollar
- Bitcoin is officially entered in the activity of the banking supervisor agency
- And last but not least, in the US the first ETF based on Bitcoin has been listed on Wall Street

Denis: Thank you, Ric. If we focus for a moment on the inflation shock. In the last year or so, with the advent of the war in Ukraine we've had inflation after a sustained COVID pandemic, which has further impacted the macroeconomic environment.

State Street Global Advisors' recent Inflation Impact Survey, which focuses on how inflation is influencing investment, shows that two out of three investors are concerned about the economic outlook and more than half are concerned about market volatility, and the fact that the value of their investments is eroding.

So nearly half of these [retail] investors say rising inflation is causing them stress and anxiety. The majority are changing their spending behavior, and they are cutting back on discretionary expenses.

One in four claim that they passed on vacation this year, and the majority believe that the economy is headed for a recession.

Now, with that picture in the background, have there been any effects on cryptocurrencies as an investment, as a result of the economic environment, that are noteworthy in understanding them as an asset class? What can you share with us from that perspective?

Riccardo: I think the trend of cryptocurrencies was impressive, given the macro events. On one hand, there was the COVID-19 crisis, on the other the Russian-Ukrainian conflict, and the following inflationary spiral.

In my opinion these events, the first external and the second internal to the economic-financial system, determined two of the most important shocks of Bitcoin and cryptocurrencies. During the pandemic period of 2020-21, after the initial shock, Bitcoin began to gain after PayPal allowed the use of cryptocurrencies. I think a lot of investors at this time, locked up at home and with pockets full, started investing and betting on Bitcoin. In six months, cryptocurrencies increased from \$12,000 to over \$63,000. The surge has also attracted the attention of the institutional investor, and reached its peak with the IPO of Coinbase, which I mentioned before, in April 2021.

But I think it's clear this boom was very short because in September 2021 China banned crypto mining, there was a need for regulation from the US and from Europe. Finally, Elon Musk highlighted the environmental cost of mining cryptocurrencies and in this situation Bitcoin decreased below \$30,000 at the end of July. The decrease in the value of bitcoin has continued due to the rise in interest rates and the big inflation and today the price of bitcoin is around \$20,000.

If you look at an index called "Crypto Fear & Greed Index," Bitcoin is in the "extreme fear zone." But also, this period offers many investors an opportunity to buy. And so we see that many institutional investors decided to buy cryptocurrencies and to hold them for a long time, for portfolio diversification. In conclusion my opinion is that it is a mistake to think about the end of crypto assets, and we can consider this a natural process of consolidation of the sector, and cryptocurrencies will play an important role in the financial market and for the institutional portfolio.

Denis: So let's take a trip back in history. Bitcoin was created in 2008, as a response to the global financial crisis and to counter reliance on banks. Investor interest grew and questions started surfacing more and more on the regulatory treatment of this asset. As a matter of fact, 2022 is panning out to be the year of digital finance regulation.

We have regulatory authorities across all major regions, North America, Europe, and Asia Pacific, all taking concrete steps to bring regulatory clarity to facilitate responsible growth in this market. By way of example, we have the EU's MiCA Crypto Assets regulation, which was approved this summer. If I look at the US, President Joe Biden ordered a wide range of Federal agencies to produce at least 17 reports on topics related to CBDCs, the so-called central bank sponsored digital currency, topics related

to consumer protection, illicit activities and international operations. And in Hong Kong, regulatory guidance is expected. So, as you can see, there is a flurry of regulatory activity.

Another element to consider, and you touched upon it slightly in your response before, it has become very apparent that cryptocurrencies get a bad reputation from environmentalists and, we must say, with good reason.

The Cambridge Bitcoin electricity consumption index said that Bitcoin consumes more electricity in a year than several entire countries, including Sweden, Norway, and the United Arab Emirates. And that's quite shocking, right? Especially in light of the recent war in the Ukraine, and the effect that it is having on energy, and energy prices, when here in Europe we're even thinking of putting caps on the utilization of electricity during the upcoming winter.

So against that background, what potential do cryptocurrencies have as an institutional asset class? And what uses, if any, might they have in an institutional portfolio in light of regulation coming for ESG, but also at the same time with what we talked about before, in terms of their performance during the times of crisis.

Riccardo: About four years ago, when Bitcoin was trading below \$10,000 the market was dominated by retail traders, but in the following years there was a great involvement of financial institutions. Cryptocurrencies have a different trend from other financial assets, and for this reason they capture the interest of financial institutions who want both

to reduce the correlation with the other assets in their portfolio and to diversify the assets.

And in the last year institutional players have started to accumulate larger volumes of Bitcoin and Ethereum, not only as a way of combatting inflation but as a way to generate a constant, tangible and fixed income stream. I've seen surveys showing that large investors believe that, by 2026, 7 percent of their assets will be in cryptocurrencies and that 38 percent of traditional hedge funds are currently investing in digital assets. This is strong growth, when you consider only one year ago, hedge fund activity in the crypto world was only 21 percent of the total.

Finally, my opinion is that cryptocurrencies will become a real asset class. We are in a phase of consolidation. There are regulatory problems, reputational risks and problems related to the use of resources for mining. But these problems will be progressively solved and crypto assets will be more and more present in the portfolios of institutional investors.

Denis: So it looks like institutional investors' behaviors are changing. They see this as a dynamic asset class, in strong evolution. And actually regulation might contribute to making this more stable as an asset class, a more constant part of institutional investment strategy.

Thank you Riccardo, for your time and your valuable input here, it was a very interesting contribution to the topic.

Advancing Crypto Regulation

— BY JUSTIN MCCORMACK

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Volatility has been a hallmark of crypto asset markets.¹ Last year, crypto asset markets nearly tripled in value, but by June of this year almost all those gains had been wiped out in the “crypto winter.”

In this article, we explore the impact of market volatility on the regulation of crypto assets by first understanding recent market events and their root causes, and then by examining the current state of global regulatory efforts.

We identified 2022 as the year of global regulatory activity in an article published earlier this year, and we find that market volatility has only served to galvanize those efforts.² Indeed, continuing regulatory efforts are a recognition of the staying power of crypto asset innovation, along with the need to appropriately regulate the industry to promote financial stability.

What’s behind the “crypto winter”?

While some may view the recent decline in market value of crypto assets as validating risk concerns regarding the crypto asset class as a whole, a closer look at the events underlying the crypto winter indicate that imprudent business practices, rather than a problem with crypto assets themselves, were largely to blame.

Much of the negative pressure in the second and third quarters of 2022 traces back to a number of market events, starting with the collapse of the TerraUSD stablecoin (UST) and its related Luna crypto asset in May 2022, and the subsequent insolvencies of hedge fund Three Arrows Capital and crypto asset lending firms Voyager Digital and Celsius.

UST was an algorithmic stablecoin that, instead of relying on a reserve of assets to maintain a peg to the U.S. dollar, used a smart contract algorithm tied to the relationship between UST and its companion coin, Luna. One dollar worth of Luna could always be converted for one UST. In connection with each swap, a percentage of Luna was permanently destroyed, or burned, increasing its scarcity. Thus, arbitrage opportunities based on the value of UST and the fixed conversion price of Luna were designed to keep UST at a value of \$1.³ A loss of confidence in UST led to a flight out of the coin, which led to a downward spiral in the value of both UST and Luna over the course of a few days.⁴

The remarkable speed of the UST/Luna decline, when combined with rising inflation and a declining stock market, resulted in an acceleration of the market-wide sell-off of crypto assets. The UST/Luna scenario was reportedly a leading contributor to the subsequent insolvency of crypto hedge fund Three Arrows Capital, also known as 3AC. News reports estimated 3AC may have had up to a \$600 million exposure to the Luna coin.⁵ The downfall of 3AC led to its default on a crypto loan valued at over \$650 million from Voyager Digital, ultimately contributing to the bankruptcy filing of Voyager on 1 July 2022.⁶ Finally, the UST/Luna-inspired crypto market sell-off also brought down crypto lender Celsius, who filed for bankruptcy in July 2022.⁷ Both Voyager and Celsius offered clients high returns on their deposits of crypto assets, which they financed through risky investments – in many cases through decentralized finance platforms.

The Crypto Winter is not Chilling the Blossoming Regulatory Environment

The crypto winter and associated loss of market value has not had a chilling effect on global regulation to date. Instead, regulatory interest in crypto assets (and in particular stablecoins and cryptocurrencies) has blossomed globally and all signs, including from international regulatory bodies, are that activity will only increase.

The Biden Administration is Pursuing a 'Whole of Government' Approach to Crypto Assets

Three months into the crypto winter, on March 9, 2022, President Biden issued an executive order demanding a “whole of government” approach to digital asset

regulation.⁸ The executive order stressed the need to reinforce US leadership in the global financial system and the need to support technological advances that promote responsible development and use of digital assets, while at the same time protecting the US and global financial stability by bringing newer digital market participants within the regulatory perimeter using a “same business, same risks, same rules” approach.

To implement that policy, the executive order requested more than 24 federal agencies to produce at least 17 reports addressing the risks posed by digital assets, evaluating how existing regulations and policies apply and proposing rulemakings to address gaps, and developing and implementing a framework for interagency and international regulatory coordination on digital asset matters – most of which were due to be delivered by 5 September 2022.

Actions to date in response to the executive order include:

- Ahead of schedule, the US Treasury, in consultation with other federal departments and agencies, delivered a framework for international regulatory coordination and engagement on digital assets to President Biden on 7 July 2022.
- Each of the US Commerce Department and the US Treasury, which is tasked with leading many of the reports, have issued requests for comment seeking public input on potential opportunities and risks presented by digital assets to help inform their reports.

- In September the White House announced it had received nine reports that were to “articulate a clear framework for responsible digital asset development and pave the way for further action at home and abroad”. The reports called on regulators and consumer protection agencies to “aggressively pursue” people committing “unlawful actions in the digital space”, but also to “support innovative technologies” aimed at using digital finance infrastructure to give people better access to payment methods. It also reiterated and formalized the cross-agency data sharing approach outlined in March, gave the Treasury responsibility for coordinating anti-cyber crime initiatives and made commitments to supporting US firms in international digital asset markets through “global leadership”.

Numerous bipartisan digital asset bills have been introduced or are reportedly in advanced stages of negotiation in Congress, with the most notable being:

- In June 2022, Sens. Lummis (R-WY) and Gillibrand (D-NY) introduced the *Responsible Financial Innovation Act*, a wide-ranging bill that proposes, among other things, to provide legal clarity around the classification of a digital asset as a commodity or a security, include a new disclosure regime for certain digital assets to increase financial stability, expand the remit of the Commodity Futures Trading Commission (CFTC) to include regulation of spot digital asset commodity trading and exchanges, and codify the legal framework for custodial services offered by banks, including clarification that

custodied assets are not assets or liabilities of the custodian and should not be recorded on the balance sheet of the custodian.⁹

- In August 2022, Sens. Stabenow (D-MI) and Boozman (R-AR), introduced the *Digital Commodities Consumer Protection Act*¹⁰ which, similar to the Responsible Financial Innovation Act, would expand the authority of the CFTC to include spot “digital commodities” transactions, which are defined as including “property commonly known as cryptocurrency or virtual currency, such as Bitcoin and Ether,” but excludes securities, physical commodities or anything else the CFTC determines not to be a digital commodity.
- There is also reportedly a bill under negotiation by Congresswoman Maxine Waters (D-CA) and Congressman Patrick McHenry (R-NC) that would establish federal oversight of stablecoins.

Not all regulatory activity related to crypto in the US, however, has been coordinated.

On 31 March 2022, Securities and Exchange Commission (SEC) staff issued Staff Accounting Bulletin 121 (SAB 121)¹¹, which requires an entity that safeguards crypto assets for customers to recognize the fair value of the custodied assets as both a liability and an asset on its balance sheet. The SAB 121 position represents a marked departure from the historical treatment of custodied assets as off-balance sheet items, and disproportionately impacts those crypto asset custodians that are subject to prudential capital requirements, such as banks, that are required to maintain capital based on assets included on their balance sheet.

One of the reasons cited by SEC staff for their position was that treatment of custodied crypto assets in the event of a bankruptcy of a custodian has not yet been tested in court. The bankruptcies of Celsius and Voyager will therefore help to address this uncertainty, as will the recently finalized amendments to the Uniform Commercial Code (UCC), the primary source of commercial property rights in the United States, to formally address digital assets, which a proposed new UCC Article 12 refers to as “commercial electronic records.” The amendments to the UCC¹², which were finalized by a committee of American Law Institute and the Uniform Law Commission, are now ready for adoption by the individual US states.

EU Legislation is at an Even More Advanced Stage and Continues to Push Ahead

On 30 June 2022, it was announced that EU trilogue negotiations had reached a final provisional agreement on the Markets in Crypto Assets, or MiCA, proposal. MiCA establishes a regulatory framework covering issuers of cryptocurrencies and stablecoins, as well as the activities of various crypto asset service providers, such as trading venues and custodians.¹³ This represents the culmination of a nearly two-year effort in the EU to define a new category of investment instrument and apply a comprehensive regulatory regime design to support innovation while at the same time promote financial stability through appropriate registration.

Although the final version of MiCA has not yet been published, regulators including the President of the European Central Bank are already discussing the need for a MiCA II,

extending the original to cover topics such as interconnectedness of crypto assets with traditional financial institutions, cryptocurrency staking and lending, decentralized finance and regulation of crypto assets having no identifiable issuer, such as Bitcoin.¹⁴

The UK Lags the EU, but its Regulatory Efforts are Accelerating

The United Kingdom has been slower in its embrace of crypto assets, but in April 2022, HM Treasury published a response to their prior consultation paper regarding the UK regulatory approach to cryptoassets, stablecoins and distributed ledger technology.¹⁵ The response noted a number of progressive actions that were expected, including the extension of the existing payments regime to cover issuers of stablecoins and entities providing related services, and also that HM Treasury would work closely with the Bank of England, Financial Conduct Authority (FCA) and industry on possible regulatory changes to enable tokenization of securities. In addition, the report identified that the FCA, Prudential Regulatory Authority (PRA) and HM Treasury would establish a sandbox-style regime (the Financial Market Infrastructure (FMI) Sandbox) whereby participants could request exemptions from or modifications to existing legislation, in order to facilitate testing of DLT in FMIs. The report anticipates that the sandbox would be up and running in 2023. Finally, the report noted that HM Treasury would be pursuing a consultation later in 2022 on its proposed approach to cryptocurrencies.

Asian Regulatory Efforts Also Include New Legislation

At the height of the crypto winter, the Japanese Financial Services Agency (JFSA) issued a public consultation on 30 June 2022 proposing changes to relevant law that would remove the prohibition on Japanese trust banks from conducting a cryptoasset safekeeping business.¹⁶ The rationale for this proposed change, which may become effective as early as this fall, is to leverage the experience and risk management resources of trust banks for cryptoassets to strengthen investor protection and promote appropriate market development.¹⁷ This consultation comes about a month after Japan passed a bill to regulate stablecoins and promote investor protection.¹⁸

In addition, on 07/06/2022, the Hong Kong government introduced its first virtual asset-specific legislation, which includes a new licensing regime for virtual asset exchanges.¹⁹ This legislation, which reflects anti-money laundering and counter-terrorist financing guidance from the Financial Action Task Force (FATF), would introduce a licensing regime for virtual asset service providers (VASPs), currently limited to virtual asset exchanges, and would give the Securities and Futures Commission of Hong Kong (SFC) supervisory responsibility for the exchanges.²⁰

International Bodies are Rallying Around Global Crypto Standards

Finally, also in July 2022, the Financial Stability Board (FSB), an international body comprising the ministers of finance and central bank governors of G20 countries and beyond,

as well as organizations having a major role in global financial stability, issued a Statement on International Regulation and Supervision of Cryptoasset Activities²¹. The statement stressed following a path of “same activity, same risk, same regulation” when approaching cryptoasset activities, voiced support for timely implementation of international standards, such as those proposed by the FATF with respect to AML/CFT and the travel rule, and noted the need to adopt regulations to address financial stability risks arising from cryptoassets (in particular, stablecoins). Finally, the FSB noted that it plans to issue a report to the G20 Finance Ministers and Central Bank Governors in October covering a review of its recommendations for regulation and oversight on “global stablecoin” arrangements, and proposed recommendations for promoting international consistency of the regulatory approaches to other cryptoassets.

The Silver Lining Revisited

Most financial innovations come with increased risk in their infancy, and the volatility of digital assets demonstrates that they are no different. While volatility can be disruptive and painful, there's a silver lining: The market learns more about the innovation and gains a better understanding of the appropriate regulatory framework to support innovation while mitigating risk to financial stability. Global regulators have recognized that the growth of digital assets and their impact on the global financial system cannot be ignored, and have responded to the volatility of the crypto winter by accelerating regulatory efforts to ensure continued responsible development.

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DeFi: Putting the “G” in ESG

— BY JAY BIANCAMANO
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One of the most profound discussions recently in the world of digital assets is around their impact on environmental, social and governance (ESG) considerations.

In May of this year, State Street Global Head of ESG Rick Lacaille published [an article](#) assessing the “friendliness” of digital assets to investors focused on ESG. One of his primary conclusions was: “As things stand today, an ESG investor would have a hard time making the case to invest in cryptocurrencies.”

While his focus in the article was mostly on the environmental issues surrounding crypto, he also touched on the governance issues of decentralized finance (DeFi).

DeFi is an innovative financial technology that uses distributed ledgers (DLT/Blockchain) to eliminate the need for intermediaries. DeFi incorporates tokens, smart contracts and other components of DLT in lieu of intermediaries such as banks.

This is a crucial topic because, while institutional investment in cryptocurrencies has accelerated a bit, it has increased beyond them into DeFi tokens and protocols. And, in conversations with clients and other industry stakeholders, DeFi is where

State Street sees the most interest, particularly for managers of digital asset funds.

This is reflected in the development of digital financial infrastructure. The various platforms built on Ethereum alone have become increasingly complex. The DeFi "market" (for lack of a better word) is fast developing into an alternative financial ecosystem, gaining the attention of institutional investors much more quickly than the initial crypto market did.

Total Value Locked in DeFi



Source: DeFiLlama

As a result, institutional investors are asking questions like: Since DeFi does not, by its very nature, have any overarching governance structure, could it ever be considered an ESG-friendly investment (with emphasis on the 'G')? And, while the term "decentralized" itself could lead one to automatically conclude it could not, developments in the ways these blockchains are "governed" might actually result in the opposite conclusion.

Years ago, governance of blockchain protocols was mostly done "off chain," via manual processes such as email, forums and the like. This was at its core a simple matter of coordinating responses, whether via email or even in a chat room to evaluate changes to the rules governing the asset. However, as more blockchain projects were introduced, governance of more complex and disparate projects have made this approach more difficult. And many more participants have made it harder to disseminate information and steer an entire community toward a shared goal.

As new blockchains were developed and became more sophisticated, most of the governance moved "on chain," allowing any and all participants and other stakeholders to propose as well as "vote" for changes directly on the chain itself. The system in place is essentially a one-token, one-vote system. The governance of these protocols is done by Decentralized Autonomous Organizations (DAOs), comprising the participants themselves.

The processes of the one-token, one-vote system are mostly quorum-type voting events, meaning that in order for a proposal to be implemented,

a minimum number of DAO members must participate. The process is a very simple one. When a participant on the blockchain has an idea, a proposal is formulated and presented to the network. In turn that leads to a discussion about the proposal, which is refined and submitted to the community via the DAO. Voting can occur on the chain itself or can be done via a number of DeFi voting systems such as Snapshot. The proposals are posted with all required information, including who proposed the change and the current status of the vote. It also validates whether you are able to vote based on when you owned the tokens (no different than the voting protocol for equity shareholders).

DAOs historically have, for the most part, adhered to the one-token, one-vote model. But, while that model has been fairly successful over the last few years, it is probably not sustainable.

One reason is that it will eventually lead to what we have seen in traditional markets; that minority shareholders tend to have very little influence, which ultimately leads to apathy among the voters. This means some changes may or may not pass, which could have a detrimental effect on the long-term sustainability of the project. Also, this type of approach has been exploited and resulted in something called "governance attacks." This is when a blockchain project using the one-token, one-vote structure allows for a single entity, either a person or group of individuals, to change the "rules" of that blockchain in order to make them vulnerable to an attack.

One of the most well-known attacks was cryptocurrency Beanstalk Farms, where attackers were able to “take over,” or gain enough voting rights to reshape the rules that allowed them to send users funds to themselves. The issue of governance attacks, as well as the rapid level of development and growth in DeFi, has resulted in a range of new ways to increase participation and also to offer better governance of DeFi. The approaches all have advantages over one, token one vote, but are also open to legitimate criticisms. However, if managed effectively they could result in better governance of digital assets, which could in turn be perceived as friendly to the concept of sustainable finance.

Computational Voting Theory

This particular solution has been advanced by Jesus Rodriguez, co-founder of blockchain data platform, IntoTheBlock. His solutions include building token models that decouple the economic interest from the governance participation. Removing this duality can indirectly lower the risk of market manipulation attacks. However, it raises the question of what would attract participants in the absence of economic incentives.

Alternatively, networks could implement technologically sophisticated voting models that require considerably more resources to manipulate, which is increasingly complicated. Will participants be open to more sophisticated voting models? In the age of financial democratization it's a potentially unpopular endeavor. One solution he provides is “quadratic voting,” which allows for purchase of votes, meaning there is an additional cost associated with trying to influence an outcome.

Proof of Participation (Play-to-Play)

This is an idea advanced by Vitalik Buterin that aligns with computational voting theory. The premise is that voting is limited only to active participants on the network, who are incentivized to keep the network running transparently and in the interests of all token holders.

Governance Tokens

Governance tokens are exactly what they say: tokens aligned to a certain DeFi project and limited to certain parameters or functions of a particular blockchain. These tokens only allow the owners to propose changes that affect the protocols they belong to. If the owners of these tokens were chosen for their disinterestedness and responsibility (for example in a regulated environment, or with rules that sanction certain obviously undesirable protocol changes), it would reduce the likelihood of manipulation.

Traditional Governance Elements

Just as one token, one vote to a large extent resemble the voting rights of traditional shareholders, so there are other elements of traditional governance – similar to the roles currently provided by custodians and other independent agents – that can be adapted for and incorporated into the digital asset world.

- Verification and validation of market data
- Regulatory monitoring of:
 - Financing structure
 - Visibility and alignment to stated objectives

- Transparency of actions of market participants
- ESG score claim validation
- Open marketplace concept
- Platforms designed to facilitate this transparency and security of trade, ownership, and accountability, in digital assets contexts

At its core, blockchain technology is one that it is built to remove friction from the processes involved in owning and trading financial assets. But, just as traditional market infrastructure has been through many iterations of best practice and regulation over the decades in an effort to protect investors, the democratic digital environment creates its own challenges that will need to be solved by continuous assessment of the market by its participants as it develops.

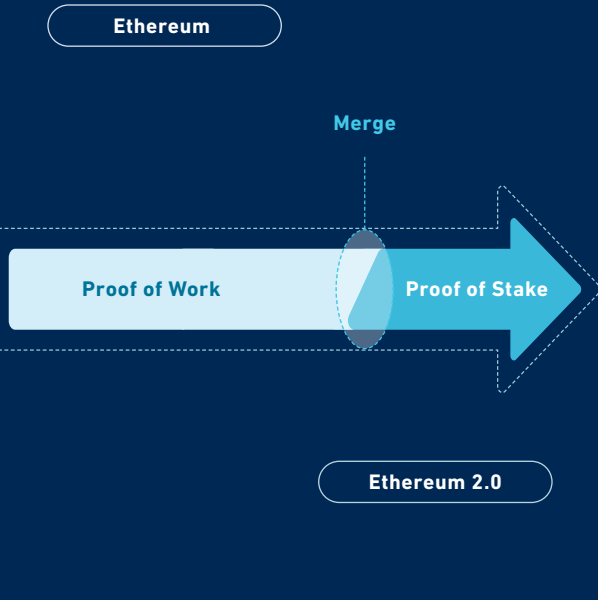
Innovative approaches, such as those mentioned above, are the beginning of the process of finding a way to balance the improved freedom of participation and direct control for stakeholders that this technology promises, with always seeking to ensure that their wealth and savings are secure. This process will best be served by an informed and interested community of market participants, who are kept involved by future innovation that continues to be inclusive and democratic.

Ethereum Merge

The Ethereum merge involves a change of governance model similar to those discussed here.

In addition to limiting voting rights to validators, there will be a system of sanctions for inappropriate voting, for example governance attacks (proposing “illegitimate blocks”).

These will include reduced voting power and removal of validator status – also known as ‘slashing’ – as well as rewards for good behavior, such as identifying wrong voting.



Crypto Technology and ETFs: The Tokenization Revolution

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A copy of this article appeared on
etfstream.com in September.

Travel is often cited as an industry that was hit with a swift wave of disruption by the advent of online commerce. And it's true that the websites and apps holiday makers use to book their trips more cheaply and conveniently than before are here to stay and will continue to take market share from traditional travel agencies.

However, the internet has yet to replace the airplane as their primary mode of transport, or the beach as their ultimate destination.

Similarly, Amazon may have disrupted the record store, and Spotify the actual record and the record label, but the songs people listen to still sound the same.

The technology underpinning cryptocurrencies could dramatically alter the way other financial assets are utilised in investors' portfolios, and distributed by managers and other financial service providers in the same way as technology has revolutionised the industries above – by reducing the costs of management and distribution and bringing greater choice and easier interfaces to investors.

At State Street we have had numerous discussions with clients, regulators and industry stakeholders about the transformative potential of blockchain and distributed ledger for the asset management industry.

One longstanding trend that is likely to be more fully realised by this technology than has been possible up until now, is the creation of liquid, daily tradeable assets out of illiquid assets like real estate, infrastructure and private equity. The 'fractionalisation' of these assets – creating digital tokens or 'token-shares' that represent shares in a physical building or recreate the liquidity and ease of trading of listed equity – is a step forward in the direction the industry has been attempting to travel for a long time using derivatives and unitised property funds.

The tokenization of these assets – either as issued digital securities or as digital representations of ownership – permits atomic settlement, reducing costs and capital requirements and enables the expansion of eligible collateral and near instantaneous movements of liquidity.

This particular benefit of tokenisation will especially be felt by retail investors, who have long been searching for more and better access to these predominantly institutional, private market asset classes, but unable to easily or cheaply access them through retail and defined contribution portfolios with compulsory liquidity requirements.

Indeed, research from digital assets platform Finoa, projects that alternative assets ('other financial assets' in Figure 1 in [this article](#)), infrastructure ('other tokenisable assets') and unlisted equity, will make up approximately 45% of an expected \$24 trillion market for tokenised assets by 2027. And, beyond illiquid assets, the speed and efficiency of trading on the blockchain, removing time consuming reconciliation processes, could create applications for tokenisation in already liquid listed shares or units.

But the important thing to note about these changes is that they will ultimately be made in the service of generating outcomes that investors have been seeking (and providers seeking to deliver to them) all along; namely improved returns, investment choice and efficiency of service, coupled with lower costs. So even the most potentially disruptive elements of crypto and tokenisation revolutions will, in some ways, end up combining and making accommodations with legacy structures and methods.

Between the traditional worlds of asset management and its supplementary financial services like custody banking and fund administration on one side, and the new world of fintech facilitated liquidity and tokenisation on the other, there will be significant disruption and change. But to the end investor, especially the individual consumer, much of this will not be visible and what they will notice will be the speed and ease with which they can move their money in and out of an increasingly diversified range of asset classes.

Retail investors will most likely access these new token-shares through a combination of the way in which they currently trade listed, liquid shares and the funds containing them (increasingly online and app-based share-dealing platforms) and the way they trade existing blockchain based investments like crypto currencies (e.g., digital wallets).

In terms of the interface used by the end consumer, these will likely be the same, and easy access, intuitive single platforms for digital and traditional assets (as well as bank accounts containing cash) will become the norm.

The architecture that underpins this new, easier system of transactions will where the major changes take place – a system of accounting and traditional ledgers managed by banks on behalf of investment institutions and platforms replaced by a system of blockchain-based ‘smart contracts’ governing the issuance and transfer of tokenised assets.

The role of intermediaries such as banks in this environment will no longer be the manual updating and exchange of large volumes of data on behalf of participating institutions, but the issuance of the contracts that tokenise the underlying asset and their management through coding and technological architecture. Banks will play a significant role in the issuance and servicing of digital assets in the future.

In particular ETFs, as well as mutual funds, stand to benefit by being tokenized, creating a new way for new participants to issue, hold, trade and service assets. The benefits of Blockchain technology will allow for immediate settlement as well as seamless flow between asset classes via ETFs and mutual funds. Banks will be the leaders in the space because tokenization will be a service provided by the banks who service these assets.

The nature of the interplay of tokenized assets with traditional financial market infrastructure and the effect it will have on regulatory obligations of intermediaries such as transfer agents and distributors is a critical aspect in the development of a tokenized ETF marketplace. Fund management will still play a role in this ecosystem.

As with music and beaches, retail investors will continue to want bundles of assets representing the best companies, sectors and geographic regions for returns, whether that representation is via blockchain-based tokens or traditional stocks and bonds.

Like today, some investors will want active managers to curate funds of the best opportunities, based on their detailed analysis of individual investments. But many will want the lower costs and widespread diversification that comes through investing in indices and other large buckets of passively selected assets.

In this sphere, the ETF is in poll position to become a preferred fund-based wrapper for retail investors looking for access to private markets and other illiquid alternatives. Firstly it is the fastest-growing fund type of the past decade and its existing advantages in terms of liquidity and low fees will remain in a digital asset fund environment. Also, ETFs are at the forefront of existing use cases for blockchain in fund management. Along with other exchange traded vehicles, such as ETPs and ETNs, they make up 46 of the 73 funds globally, with an AUM of approximately \$70 billion, either holding direct cryptocurrency (mostly Bitcoin) or trading cryptocurrency futures (according to Morgan Stanley data).

This early-mover status in the crypto space is also typical of the spirit of innovation which gave birth to ETFs and has been a feature of the market ever since. They continue to be more cost effective and to outgrow mutual funds and the digital ETF market is expected to continue to grow as the ETF structure provides a low fee, transparent, regulated and listed vehicle by which institutions and other investors can add cryptocurrency and, in the future, digital asset exposure to their portfolios.

The future is coming, and as with previous technological disruptions in legacy industries, the changes will be major. For those who adapt, it will mean the ability to offer improvements that customers will see and feel as they interact with their savings and investments.

A Financial Revolution in the Making: Mainstreaming Stablecoins

— BY ELLIOT HENTOV, PH.D.

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This article is an excerpt from a State Street Global Advisors [paper](#) published in August this year.

Since the release of bitcoin in 2009, the broader crypto market has undergone a massive boom and bust cycle, with the resultant effect that the market has matured and cryptocurrencies are no longer tagged as mere speculative investments.

These developments are underpinned by an increased focus on new business models/ technologies that offer a decentralized way of doing finance. In this evolutionary journey, a significant next milestone is likely to be the mainstreaming of stablecoins, which are

blockchain-based cryptocurrencies that are pegged to other financial instruments.

Against this evolving background, we expect stablecoins to be regulated, with a view toward facilitating regulatory standardization, managing systemic risk and ensuring investor protection. Here we explore the macro policy implications of the mainstreaming process of stablecoins, especially considering the regulatory impact of this process on the domestic and the global financial system.

Key Points

First, the mainstreaming of blockchain-based finance will be disruptive despite its relative small size today.



Second, the exact dislocations in bond markets are hard to forecast, but a structural demand boost for short-dated government paper is likely.

Third, stablecoins will make it less onerous for emerging and frontier markets to access cryptos, adding a structural boost to dollarization in economies with weak governance or chronic imbalances.



Finally, stablecoins and the broader crypto industry may help maintain the USD-centered global monetary order.

Introduction to Stablecoins

Stablecoins are digital assets that are predominantly designed to maintain a stable value relative to a fiat currency or other reference assets. Due to the fast adoption of cryptocurrencies and the rise of broader decentralized of finance, stablecoins have become:

- **An essential medium of exchange for trading crypto assets that are too volatile and therefore require a stable intermediary unit**
- **A means of payment or a proxy for cash in digital asset markets**
- **Collateral used for crypto lending**
- **A yield-generating investment instrument**

Global stablecoin market cap currently stands at US\$153 bn, with an estimated +472% growth spurt over 2021.^{1,2} Like other cryptocurrencies, the attractiveness of stablecoins is partly due to their open-source design, which allows for integration with digital applications that are compatible with other systems. They can serve as cross-border payments and can be executed on a global scale, with low transaction fees and fast transfer times. Due to their reach, they have also helped businesses to send and receive money across the world.

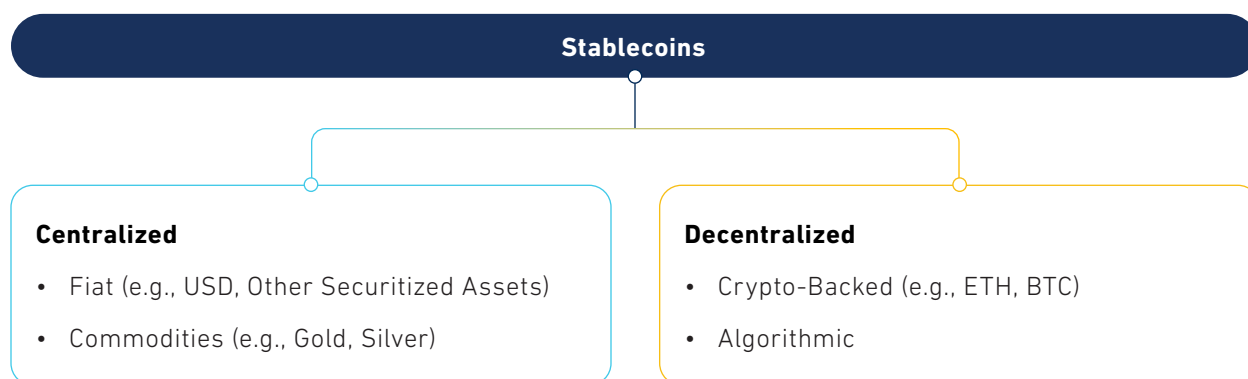
Due to the rapid adoption of digital assets, regulators, including the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC), have started taking steps to address potential spill-over risks of adopting stablecoins. Policymakers believe that a regulated stablecoin could become the single largest private digital fiat currency and the first steps toward integrating stablecoin into the financial system include formalizing regulations and taking stablecoins mainstream.

\$153_{bn}

Global stablecoin market cap currently stands at US\$153 bn, with an estimated +472% growth spurt over 2021.

While there are various types of stablecoins in circulation, we categorize them based on their collateral mechanism – i.e., whether they are decentralized or centralized (Figure 1).

Figure 1: Stablecoin Categories



Note: For an elaboration on decentralized coins see Appendix I. Source: State Street Global Advisors.

Centralized stablecoins are typically collateralized via a basket of fiat currencies, currency pairs, commodities or other securities. In terms of mainstreaming stablecoins, we believe it is most effective when users are able to redeem one unit of stablecoin for one unit of fiat currency or other tradable assets, the goal being to bind the price of stablecoins to a redemption value.

This is akin to the governance of most fixed exchange rate regimes, where a currency is fully collateralized by the US dollar and maintains a fixed peg to it. For instance, since 1966, the Bahamian dollar has maintained a 1:1 value peg to the US dollar. However, this also means, during times of financial stress, a fixed exchange rate restricts the ability of a central bank from using

monetary policy for stabilization — as such the Bahamas uses domestic fiscal policies to absorb the impact.

Decentralized stablecoins tend to rely on crypto assets in some form through two broad mechanisms. The first type resembles fiat-backed stablecoins but actually relies on crypto assets as collateral. Given the price volatility of crypto assets, these stablecoins require substantial overcollateralization to guard against crypto depreciation. The second type, algorithmic (algo) stablecoins, is not necessarily backed by collateral and aims to preserve value purely by controlling supply with the use of algorithms. We do not believe that algo stablecoins will fall under the purview of regulation in the foreseeable future.

This paper focuses on the mainstreaming of centralized stablecoins backed by established fiat currency assets. Unlike decentralized stablecoins such as UST, we believe fiat-backed (centralized) stablecoins have the operational maturity to be integrated into traditional finance.

Looking Ahead

Blockchain-powered finance will be a disruptive force in financial markets as innovation gradually enables new business models. The ecosystem requires a medium of exchange, such as stablecoins, that is technologically compatible and equivalent to fiat currency. The regulation and mainstreaming of stablecoins will therefore deliver a large tailwind to the growth of decentralized finance, with macro policy implications.

We suggest that the structural impact could be looser financial conditions in the economy of the stablecoin issuer (say, the US) and tighter financial conditions across emerging and frontier markets. Domestically, in the US, this would be achieved by draining bank deposits in favor of an enlarged money market funds-equivalent market, delivering a structural boost to demand at the short-end of the rates curve. Internationally, regulatory supervision would remove credit and counterparty risk from stablecoins, which would ignite a round of dollarization in select

emerging and frontier markets, leading to weaker currencies, higher domestic rates or capital controls. All of these developments are US dollar-positive in the long run.

The overarching question for regulators with regard to stablecoin regulation is whether to create a fresh set of regulations or to adapt existing banking or securities regulations. We expect policymakers to treat stablecoins under securities regulation, similar to that of money market funds. Specific rules will aim to ensure standardization, limit systemic risk, as well as heighten investor and household protection.

Consequently, the following collateral considerations may be made for regulators:

- **Stablecoins will initially have to be fully collateralized.** Similar to the 99.5 percent NAV minimum for money market funds, there will be limited tolerance for fractional collateralization and diversified reserve assets. However, full reserve collateralization can make it hard for a stablecoin to scale, so additional measures to facilitate such growth may be required to ensure supply.
- From the demand side, extensive national and global adoption could deepen stablecoin liquidity at some point, **during which authorities may allow for fractional collateralization.** Overcollateralization could make stablecoins uneconomic from an issuer's perspective.

Glossary

- **Altcoins:** Any digital currency that can be used as a substitute for bitcoin
- **Bitcoin:** A decentralized digital cryptocurrency, with the token issues on the bitcoin protocol, that can be sent from user to user on a peer-to-peer network without an administrator or central bank involvement
- **Bitcoin Mining:** The process of completing computational puzzles in order to find new bitcoin
- **Blockchain:** A distributed ledger technology that groups data into blocks when verified by members of the network are linked together to form the blockchain
- **Byzantine Fault Tolerance (BFT):** A system in which the various components must agree on the same approach to avoid failure; in cryptocurrency, this refers to the use of “proof of work” and “proof of stake” as methods of maintaining validation in the system
- **Central Bank Digital Currency (CBDC):** A digital token representing sovereign fiat currency
- **Central Securities Depositories (CSDs):** A financial organization that stores securities in order to easily exchange ownership through book entry instead of the transfer of physical certificates
- **Cryptocurrency:** A digital token used as a medium of exchange or store of value, with transactions recorded using distributed ledger technology
- **Crypto Winter:** Comparable to a bear market in the stock market, a crypto winter refers to a poorly performing cryptocurrency market
- **Data Stewardship:** A set of practices to promote trust in an organization’s data management
- **Decentralized Finance:** Distributed ledger technology-based financial services without traditional intermediaries and central authorities
- **Decentralized Autonomous Organization (DAO):** An organization represented by rules encoded as a computer program that is transparent, controlled by the organization members and not influenced by central government
- **Digital Assets:** Any asset in a digital form on a blockchain
- **Digital Custody:** The holding and administration of crypto assets and/or cryptographic keys used to safekeep or transfer crypto assets
- **Digital Wallet:** A place to store digital assets with a degree of security
- **Distributed Ledger Technology:** A system of record that is shared and stored across a network of participants such as a blockchain

- **Ethereum:** A blockchain platform that has smart contract capabilities
- **Fiat Currency:** A government-issued currency that is not backed by a physical commodity but by trust in the issuer
- **Governance Attack:** When an attacker gains the ability to manipulate the blockchain by amassing enough voting power to directly change the rules or influence other token holders
- **Hashing Power:** A measure of computational power used by those validating transactions in proof-of-work on the blockchain
- **Howey Test:** The US Supreme Court's standard for determining if a transaction can be categorized as an investment contract, therefore determining its classification as a security
- **Instant settlement (AKA, "T+0," "same day," and "atomic settlement"):** The transfer of funds from one account to another in seconds
- **Initial Coin Offering (ICO):** An initial public offering in cryptocurrency
- **Nonfungible Tokens:** A unique and non-interchangeable unit of data stored on a digital ledger
- **Programmable Money:** A cryptocurrency that can be programmed for a specific outcome using smart contracts
- **Proof of Stake (PoS):** A decentralized method of validating a cryptocurrency transaction by algorithmically selecting validators based on the quantity of cryptocurrency they hold
- **Proof of Work (PoW):** A decentralized method of validating a cryptocurrency transaction by requiring members of the blockchain network to compute a mathematical puzzle in order to prevent anyone from tampering with the public ledger
- **Smart Contract:** A dynamic, open-ended mechanism that provides for coded sets of rules for a specific use case on a distributed ledger technology network
- **Stablecoin:** A cryptocurrency pegged to the value of a fiat currency such as the dollar, backed by traditional assets or algorithmically attached to digital assets that are automatically bought and sold in order to maintain a stable value
- **Tokenization:** The process of creating a digital token on a distributed ledger technology network
- **Web 3:** An extension of the World Wide Web through standards set by the World Wide Web Consortium (W3C) with the goal to make Internet data machine-readable

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