

Swiss Finance Institute Roundups

Blockchains, Cryptoassets, and DeFi: Unpacking the Jargon and Exploring the Implications

Editorial



The future of Decentralized Finance (DeFi) appears simultaneously promising and uncertain, as revealed in this SFI Roundup through the diverse perspectives of leading financial experts. This blend of academic, regulatory, and industry viewpoints provides a well-rounded exploration of the challenges and opportunities. Future scenarios unfold in various directions, raising fundamental questions on the nature of trust, the appropriate degree of centralization and of transparency, and the need for regulation. The experts converge on one point: whether DeFi proves to be a game-changer or merely an incremental improvement, it has already forced the financial industry to evolve, from banks' internal systems to the emergence of cryptocurrencies as an investible asset class.

We wish you an enjoyable read.

A handwritten signature in blue ink, appearing to read 'F. Degeorge', with a horizontal line underneath.

Prof. François Degeorge
Managing Director

Contributors

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**Fabian Schär**

Fabian Schär is an SFI Faculty Member and Assistant Professor for Distributed Ledger Technology and Fintech at the University of Basel. He is a visiting researcher at the International Monetary Fund, a technical advisor to the Committee of Payments and Markets Infrastructure, and an invited expert for numerous central banks, the Bank for International Settlements, the Financial Stability Board, and the G20. He holds a PhD in Economics from the University of Basel.

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Matthias Jüttner is the Head of Banking Operations Analysis at the Swiss National Bank. His team works on the strategic development of the Swiss payment system and on integrating central bank money into a distributed ledger technology infrastructure. He holds a PhD in Finance from the University of Zurich and the Swiss Finance Institute.

**Stephan Zwahlen**

Stephan Zwahlen is the Chief Executive Officer of Maerki Baumann, an independent private bank founded in 1932. He is known for having driven the bank's crypto strategy without losing sight of its long-held reliability, security, and trust values. He is also a member of the Foundation Board of the Swiss Finance Institute and the Zurich Banking Association. He holds a PhD in Business Administration from the University of St.Gallen, where he is currently a lecturer in banking.

Definitions

Blockchain is a distributed and decentralized ledger that securely records transactions. It ensures the chronological order of these transactions by organizing them into blocks confirmed by a network of computers. This technology provides security and transparency, making it attractive for tracking cryptoassets.

Cryptoassets refers to cryptocurrencies, stablecoins, or other assets represented by tokens and backed by blockchain technology. Cryptocurrencies function as digital currencies; examples include bitcoins and ethers. Stablecoins are specifically designed to maintain a stable value by being pegged to a reserve of assets, such as the US dollar. Cryptoassets rely on decentralization and cryptographic principles to maintain their value and functionality.

Decentralized Finance (DeFi) involves creating a financial system, including lending, derivatives, and other services, using smart contracts on a blockchain, thus eliminating the need for centralized intermediaries. It operates on decentralized platforms to minimize potential single points of failure and trust requirements. DeFi uses public blockchain networks to create open, transparent, and composable financial protocols—predefined sequences of rules and events—which allow users to retain complete control over their assets. While blockchain-based finance exists in various forms, true DeFi is characterized by truly decentralized protocols, in which no one has any special permissions, as opposed to services such as On-Chain Centralized Finance, in which the protocols are under the control of a single entity and resemble traditional financial applications.

Learn more by taking a free online course with Fabian Schär on "Bitcoin, Blockchain, and Cryptoassets" and "Smart Contracts and Decentralized Finance."
<https://cryptolectures.teachable.com/courses/>

Facts and Figures on Monetary Systems

When and why was money developed?

▶ **Fabian Schär:** Although it's difficult to pinpoint when money was created, historians agree that small communities initially used a "gift-giving" system, through which resources were shared among families. Memory-based accounting of the exchange of various favors was sufficient. As communities became more complex, the need for a better means of exchange arose. The first form of money was "commodity money," based on the value of an underlying commodity, such as salt, rice, or gold. Coins in precious metals, typically gold, were first minted around 600 BCE, with the right to issue such coins commonly held by the ruler. In the 7th century CE, alongside the invention of paper in China, "promissory notes" were issued by private merchants and found to be more convenient than coins; these notes introduced the concept of trust in the issuer. "Commercial bank money" emerged in medieval Europe: Merchants deposited their coins with banks, which gave them promissory notes in return. Such banknotes could be used for trade, similarly to how we use checks today. During the 17th century, "central bank money" was created, when central banks with the monopoly right to issue money arose as entities separate from the government.

▶ **Stephan Zwahlen:** Money serves three primary purposes: It stores value, acts as a unit of account, and is used as a medium of exchange. The last function is crucial in today's world, as it allows people to specialize, producing the goods and services they are efficient at, while buying others from their trade partners. Without money, self-production and bartering, both cumbersome, would be the norm. For money to succeed, it must be acceptable, authentic, divisible, durable, portable, uniform, and in limited supply. While central bank money fulfills all these characteristics, it is interesting to note that cryptocurrencies might be more beneficial when it comes to the efficiency of transactions, or might serve similar purposes as gold for the storage of value.

How do end users, commercial banks, and central banks interact financially?

▶ **Matthias Jüttner:** Central banks offer accounts to commercial banks and other regulated financial institutions and provide central bank money to the public in the form of coins and banknotes. Commercial banks can transfer funds among themselves, either through a "real-time gross settlement" fund

transfer system provided by a central bank, or directly, using commercial bank money. For example, in Switzerland, the SIX Interbank Clearing (SIC) system facilitates real-time large-value interbank payments in Swiss francs. In 2023, a daily average of approximately 4 million transactions, amounting to CHF 228 billion, were settled via the SIC system. Retail payments accounted for 98% of the transactions and 11% of the turnover, while interbank payments accounted for 2% of the transactions and 89% of the turnover. Since 2023, SIC has offered an instant payment service. This service allows bank customers—provided their bank also offers instant payments—to process time-critical retail payments within seconds around the clock. End users can also make transactions using physical central bank money and commercial bank money through their commercial bank.

What initiatives have been created to ensure trust within the monetary system?

▶ **Andreas Fuster:** Trust is fundamental to any monetary system and has significantly shaped our society. The phrase, "I promise to pay the bearer on demand the sum of five pounds," still found on banknotes issued by the Bank of England, harkens back to a time when such notes were backed by gold, and one could exchange them for gold coins at any Bank of England agency. While this "gold standard" strengthened trust in the money issued by the bank, it was globally inefficient. It limited the flexibility of exchange rates and government policies during economic downturns and periods of high unemployment. Central banks operating under a gold standard could only expand their balance sheets in line with the availability of gold, constraining their ability to implement expansive monetary policies. This tight framework ultimately led to the abandonment of the international gold standard in 1971, as the US government grappled with significant budgetary challenges stemming from the Vietnam War. Since then, most currencies and central banks have relied on their balance sheets and the securities they include, sometimes with government guarantees, increasing the importance of trust. The status of most central bank money as "legal tender" further reinforces this trust, as it ensures these currencies are accepted for settling debts and making transactions within the issuing country. Of course, the trust placed in central banks is under scrutiny from many sides and should not be taken for granted by these institutions.

When and why were cryptoassets created?

► **Philippe Meyer:** David Chaum, a computer scientist and cryptographer, is often referred to as "the godfather of cryptocurrency." In 1982, he laid the foundations of the first blockchain protocol, a set of rules and events designed to facilitate financial transactions and services; he created the first digital currency in 1995. Chaum's contribution was essential in defining the basic characteristics of blockchains, electronic cash, cryptoassets, and cryptocurrencies. In 2008, a short whitepaper titled "Bitcoin: A Peer-to-Peer Electronic Cash System," written under the pseudonym Satoshi Nakamoto, defined an electronic coin as a chain of digital signatures and proposed to replace a trusted third party with a peer-to-peer network whose main task is to ensure that the distributed ledgers all match and that double-spending cannot occur. The system was implemented in 2009, and the first bitcoin was created. In 2010, the first known commercial transaction occurred when two pizzas were purchased for 10'000 bitcoins (worth approximately USD 880 million at today's value). In 2013, Vitalik Buterin published "A Next Generation Smart Contract & Decentralized Application Platform," a white paper describing how blockchain technology could be leveraged to allow developers to attach real-world assets to a blockchain and code "smart contracts," which would automatically move the assets according to pre-defined rules. The Ethereum blockchain was subsequently launched in 2015, with ether as its corresponding cryptocurrency, and the first decentralized finance (DeFi) transactions occurred in 2017.

► **Andrea Barbon:** The history of cryptocurrency is closely connected to significant economic events. The 2008 financial crisis damaged public confidence in banks and revealed the shortcomings of various regulatory efforts. Many people doubted the effectiveness of having the central banks print large amounts of money to stabilize the economy. They began searching for a way to bypass traditional financial institutions. Bitcoin emerged as a viable alternative. It was transparent, with every transaction recorded on the blockchain visible to everyone. It was irreversible, operating under the principle that "code is law" and users were responsible for their own actions, including safeguarding their access codes. Additionally, it was decentralized, with a global network of computers maintaining the ledger, instead of relying on a central authority like a bank. Lastly, its supply was limited to 21 million bitcoins. The Bitcoin genesis block—the blockchain's first block—includes the message "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks." Referring to a headline in *The Times* of London, this timestamp proved that the genesis block was created, or "mined," on or after the 3rd of January 2009, while also highlighting the financial turmoil ongoing at that time.



The Theory

What is Decentralized Finance (DeFi) and why was it developed?

► **Fabian Schär:** The idea behind DeFi is to create a neutral financial infrastructure with universal access and minimal trust requirements. The neutrality of the infrastructure ensures that it operates without being controlled by anyone, unlike traditional finance, which operates under the control of an entity with special permissions, responsibilities, and privileges. DeFi utilizes public blockchain networks and smart contracts to create open, transparent, composable, and non-custodial financial protocols. "Open" means there are no restrictions on access: no know-your-customer rules, whitelisting, or minimum amounts. "Transparent" means that anyone can verify everything: All relevant rules are on the blockchain, with every process step transparently defined in the code. "Composable" means that protocols can be combined, like Lego pieces, to create new services. Finally, "non-custodial" means that anyone can hold assets and interact with the financial protocols directly, without relying on any intermediaries.

How does DeFi operate?

► **Stephan Zwahlen:** The DeFi system has several layers, ranging from the settlement layer, where ownership information and native assets like bitcoins and ethers are stored, up to the aggregation layer, where multiple applications are interconnected to provide users with a seamless experience. Although technically complex, the system operates smoothly. It is worth noting that everything on the Ethereum blockchain is entirely separate from the Bitcoin blockchain. The only way to move from one chain to another is to convert your bitcoins to ethers, for example, through a decentralized exchange.

What are the main differences between centralized finance and DeFi?

► **Matthias Jüttner:** The main differences lie in the characteristics of the ledger and in the governance model. In traditional finance, users rely on banks or centralized exchanges, with whom they have exclusive relationships, to manage the ledger, process transactions accurately, offer services, and safeguard the funds. In DeFi, users rely on a network of computers to operate and maintain the ledger. Financial applications are automated and are provided without using centralized intermediaries. In addition, applications can be combined to create new financial services. Some DeFi applications also allow users to vote on changes and updates to the applications themselves, thereby including the users in the governance process.

What are the main differences between central bank money, cryptocurrencies, stablecoins, and tokens?

► **Matthias Jüttner:** When we consider the three main functions of money—to store value, to act as a unit of account, and to be used as a medium of exchange—it's clear that cryptocurrencies still have a long way to go before they can be considered equivalent to central bank money. First, bitcoins and ethers don't store value well, due to their high volatility compared to other assets. Second, they are rarely used as a unit of account; most people think of their accounts in terms of central bank money, such as US dollars or Swiss francs. Last, cryptocurrencies are not generally accepted as a medium of exchange in the real world. In contrast, regulated financial institutions or central banks issue today's most widely used forms of money. Banks authorized to create commercial bank money must comply with strict capital and liquidity requirements, as well as with anti-money laundering and know-your-customer rules.

► **Andreas Fuster:** Central bank money is not typically available in the cryptoasset world, so trading in it on the blockchain is not possible. Stablecoins bridge this gap. In most cases, a unit of conventional central bank currency (or safe assets of corresponding value) backs each stablecoin on the blockchain. For example, Circle has issued the "USD Coin" with a 1:1 USDC to USD ratio, backed by around USD 35 billion invested in US Treasuries, repos, and cash. Stablecoins provide the benefit of using the blockchain without being affected by the price fluctuations of bitcoins or ethers, and without the need to go through the onboarding and offboarding process for each transaction. But stablecoins are not guaranteed to maintain a stable value (despite their name). They carry a significant risk of failure, especially if not transparently backed by safe real-world assets. In a famous case, the TerraUSD stablecoin collapsed overnight in 2022,

wiping out around USD 20 billion. The tokenization of real-world assets, such as stocks, bonds, real estate, and art, likely represents one of the genuine contributions of the blockchain. Using tokens can improve market efficiency and liquidity, by allowing 24/7 trading and reducing settlement risk. For instance, RealT, a US-based firm, offers fractional real estate investment opportunities to investors worldwide through a blockchain using a USD stablecoin. Each property is tokenized individually, providing a direct real estate investment solution, with each token priced at around USD 50 and the expected income in the 6% to 20% range. However, tokenization alone cannot solve agency problems: Investors still need to trust some third-party manager to make the appropriate decisions, as RealT's underlying assets remain in the real world.



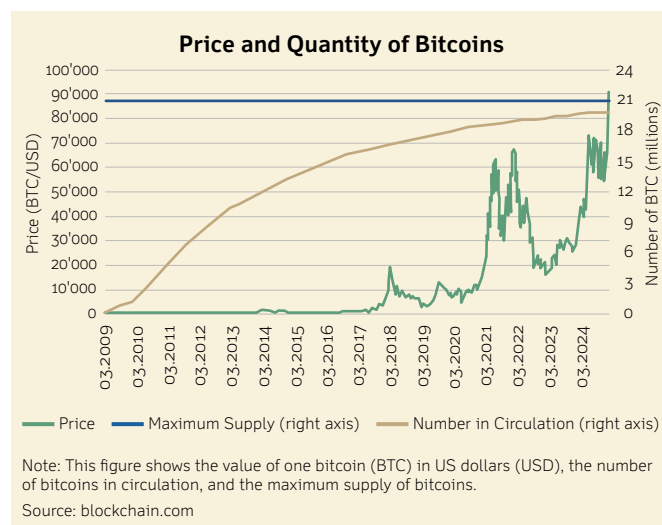
Is an integrated centralized and DeFi solution the way forward?

► **Fabian Schär:** While a decentralized foundation may not provide the perfect solution for every need, it is possible to build centralized applications on top of a public permissionless blockchain. As such, DeFi increases the available options. Regulation and centralized services can still be introduced on the smart contract level. However, the reverse—to deploy a decentralized application on top of a ledger that is under the control of a small group of institutions or companies—is not possible.

What are some of the main misconceptions surrounding blockchains, cryptoassets, and DeFi?

► **Fabian Schär:** The term "DeFi" is often used in a context that is clearly not appropriate. People fail to differentiate between "Decentralized Finance" and what should be called "On-Chain Centralized Finance." It is important to distinguish between the truly neutral infrastructure (true DeFi) and services that use the blockchain to replicate a traditional intermediary-based structure (On-Chain Centralized Finance). Another common misconception is the belief that blockchain users are anonymous. Public permissionless blockchains are often portrayed as being infrastructures where individuals can maintain privacy and conceal illicit activities. In reality, public permissionless blockchains offer, at best, pseudonymity and provide virtually no privacy. Every transaction is immutably recorded and publicly visible. Exposing your wallet address (pseudonym) allows third parties to track both your past and your future transactions, facilitating the creation of detailed user profiles. While this ability may benefit law enforcement, it raises significant privacy concerns. I am not aware of any other payment system requiring users to disclose every transaction and to display their balances publicly. Contrary to common media narratives, the fundamental issue with blockchain is not opacity, but rather the lack of privacy. There are interesting technical solutions to address these concerns, but the challenge lies in finding the right balance. Neither complete anonymity nor the possibility of mass surveillance seems desirable.

► **Philippe Meyer:** The environmental impact of cryptocurrency mining—creating new units of cryptocurrencies while solving complex mathematical algorithms with large computers—is often criticized. While the electricity use, carbon footprint, water footprint, and land footprint of cryptocurrency mining worldwide are significant, it's important to consider these figures in context. The extraction of gold, for example, also significantly impacts water, air, soil, nature, and society. According to various research papers, the annual CO₂ equivalent emissions of bitcoin mining are comparable to those of gold mining. While this fact doesn't erase the negative environmental impacts of cryptocurrencies, some positive developments are on the horizon. First, nearly 95% of all available bitcoins have already been mined. Second, the energy resources required to mine a bitcoin decrease as computers become more advanced. Finally, the Ethereum blockchain, which offers more DeFi solutions than the Bitcoin one, has reduced its energy consumption by more than 95% since it shifted from a proof-of-work (PoW) to a proof-of-stake (PoS) consensus mechanism. PoW relies on solving complex algorithms to validate transactions, while PoS allows validators to create new blocks based on the coins they hold and stake, resulting in a more energy-efficient process.



The Reality

What is currently DeFi's most significant innovation?

► **Stephan Zwahlen:** With DeFi, we see advantages in efficiency and speed, and hence in lower transaction costs. Currently, yield-generating offerings such as liquid staking—a trade through which investors stake their assets, receive liquid tokens representing those assets, then further trade those tokens—are the most attractive to tech-savvy market participants. However, these offerings come with the price of missing regulations and the lack of a tangible counterparty in case of a problem. In the long term, non-bankable assets, as well as traditional assets like equity, bonds, and real estate, should be considered for tokenization, as it enables faster and safer trading. However, appropriate valuation models, end-user adoption, and market liquidity are needed to accelerate the widespread acceptance of these solutions.

What is the ongoing impact of blockchains, cryptoassets, and DeFi on end users, commercial banks, and central banks?

► **Andreas Fuster:** Despite the increase in cryptoasset transactions, their value remains small relative to the overall financial market. Nonetheless, transactions facilitated by blockchains and smart contracts are gaining traction. For instance, repos can be efficiently executed through a smart contract, allowing one party to sell securities to another with an agreement to repurchase them at an agreed-upon price in the future. The combination of instant settlements, highly liquid collateral (typically Treasuries), and predefined buy-back conditions makes repos ideal for large DeFi-based transactions among financial institutions. Recent data indicates that the monthly volume of US repos on permission-based blockchains surpasses USD 1.5 trillion.

► **Philippe Meyer:** Traditional security settlement systems are divided into two legs—the bank money leg and the security leg—leading to inefficiencies and costs while reconciling the two legs. The DeFi-based Uniswap protocol, which executes trades based on smart contracts on the Ethereum blockchain, makes possible a single transaction that encompasses both legs. However, one challenge in DeFi comes from an excess of transparency: "Front-running" can occur, when users place transactions that can financially benefit them, based on the publicly visible book of transactions waiting to be validated, and pay a higher price to see their transactions validated first. Estimates indicate that certain advanced DeFi participants have made billions of US dollars in profits at the expense of retail investors through such practices.

► **Matthias Jüttner:** The Bank for International Settlements recently issued a paper focusing on banks' risks when transacting on permissionless blockchains. While many of these risks, such as operational, liquidity, and market risks, are known to traditional banking, other risks stem from the blockchains' reliance on unknown third parties, which makes it difficult for banks to conduct necessary due diligence. These risks require new risk management strategies. However, current practices have not been tested under stress in the DeFi world. In particular, it is still uncertain how permissionless blockchains can establish a solid legal foundation for settlement finality.

Does DeFi have the potential to become mainstream?

► **Philippe Meyer:** Conducting transactions on the blockchain requires having a "wallet," which only a fraction of the population currently possesses. However, I foresee a rapid transition in the next few years as end users become more familiar with the technology. The first Apple iPhone, arguably the first smartphone, was released in 2007. Today, virtually everybody has a smartphone. Getting started in the world of DeFi is much more accessible, as we already have the necessary hardware and only need to download an app. With the younger generation increasingly engaging in the DeFi environment, with more practical solutions being developed to onboard clients, and with better expertise, in terms of both anti-money laundering and know-your-customer regulations, it's only a matter of time before DeFi becomes mainstream.

How do exchanges occur in the DeFi world?

► **Andrea Barbon:** DeFi exchanges typically occur in an automated market maker setting. The strength of these settings lies in their simplicity. In a traditional exchange, market makers must constantly provide quotes for bids and asks. In a decentralized exchange, it is done automatically through an algorithm. Users deposit their cryptoassets in liquidity pools and mathematical formulas—not people—set the price ratios for each pair of cryptoassets, based on the amounts in the various pools. For example, Uniswap, a highly used exchange platform, operates with a constant product formula. Exchanges on such automated platforms can occur 24/7 and are instantly settled.

Can one achieve portfolio diversification in the DeFi world, as in the real world?

► **Philippe Meyer:** The fundamental metrics of finance, such as risk and return, are consistent whether dealing with traditional or tokenized assets. Therefore, portfolio diversification can be achieved similarly in the DeFi world. While the cryptoasset market value is still small, compared to traditional centralized exchanges, the DeFi sector has the potential to tokenize more assets, due to lower issuance costs, and to see more liquid exchanges, thanks to automated market maker settings. Consequently, the range of investable tokens is expected to expand, offering more investment options in a more liquid environment and increasing market capitalization. Although there are obstacles to overcome before large firms' stocks are actively traded on decentralized exchanges, it is technically feasible.

What types of tokenized assets can currently be traded?

► **Andrea Barbon:** Tokenized assets represent real-world assets, such as equity, bonds, real estate, art, gold, or collectibles, on the blockchain. Creating a tokenized asset involves transferring the ownership rights of such assets onto the blockchain. Tokenized assets can be either fungible or non-fungible. Fungible assets, like US dollars bills and bitcoins, are fully interchangeable, with no difference in value between individual units. Non-fungible tokens (NFTs) represent unique assets that cannot be exchanged on a one-to-one basis and are identified with a unique identifier on the blockchain, leading to different prices for different NFTs. NFTs gained attention with the release of a collection of 10'000 algorithmically generated unique "Bored Apes" on the Ethereum blockchain, with ownership granting intellectual property rights, access to an online club, and event invitations. Bored Ape #8817 was purchased for USD 3.4 million in early 2022, while Bored Ape #3552 was recently on sale for USD 28'600. Despite this initial craze, NFTs can potentially expand the digital goods market and create a new ownership market. However, deploying NFTs is complex and costly and represents an investment with minimal hedging opportunities in a less liquid and more complex-to-price environment.

Can mainstream blue chip stocks or central bank money be bought, stored, and sold within the DeFi environment?

► **Stephan Zwahlen:** Currently, the short answer is no. One challenge is the lack of established liquid secondary markets. An on-chain cash settlement is essential for a functioning securities market, but despite various initiatives to launch a Swiss stablecoin none has yet succeeded. However, I assume that these trials and errors will lead to success within the next few years. In Switzerland, compared to other jurisdictions, regulatory guidelines for distributed ledger technology applications are very advanced.

How do monetary policy shifts from central banks transmit to stablecoins?

► **Andrea Barbon:** With US dollars, you can earn risk-free interest by holding Treasury Bills. This fact makes you wonder if earning interest with USD stablecoins is possible. Typically, stablecoin issuers don't pay interest, but investors can lend stablecoins to third parties through decentralized exchanges. However, the lender in this case faces two risk components: One is based on the borrowers' risk profile, while the other is risk-free. Research has shown a strong correlation between the risk-free component of stablecoin lending and the Federal Reserve rates. This correlation suggests that the monetary policies of the central banks do affect the DeFi world and adds to the discussion about remunerating central bank digital currencies (CBDCs).

How do bubbles form within the fungible and non-fungible tokenized markets?

► **Andrea Barbon:** Risk management tools like options, futures, and forwards are standard in the fungible token market. These tools allow investors to, for instance, short bitcoins. While these tools are valuable for price discovery and market efficiency, they can be expensive and are offered mainly by traditional banks on centralized exchanges. In the NFT space, things are more complicated. Due to the unique nature of the underlying asset, hedging is nearly impossible. You can't return to the market to buy the asset to close your position, as the asset is no longer available. This characteristic of the NFT market may contribute to price bubbles.

► **Philippe Meyer:** While derivatives and shorting opportunities allow investors to express their opinions on asset prices, bubbles can still form in well-regulated and liquid stocks. Financial market efficiency should prompt investors, both in the real world and in the crypto space, to issue options, futures, and forwards, and increasingly these tools do exist on the blockchain. Additionally, it's essential to recognize that cryptocurrencies do have value: They provide a service by facilitating transactions. It's inaccurate to consider cryptocurrencies to be worthless.

What solutions exist to minimize technological risks in the DeFi world?

► **Andrea Barbon:** Some third-party firms offer auditing services to verify and pre-check smart contracts. However, many developers opt to launch their contracts into production on the blockchain without these audits, instead using small amounts and observing the outcome. Alternatively, they may offer a bug bounty to "White Hat Hackers" to report security glitches or vulnerabilities.

What are the key regulatory challenges?

► **Andreas Fuster:** In the US, the primary debate revolves around what defines a cryptoasset as a "security." Being labeled as a security involves compliance with the requirements of the Securities and Exchange Commission and the disclosure

of large amounts of information, which goes against the initial concept of DeFi. While a tokenized real-world asset is considered a security, whether cryptocurrencies should be classified as securities is still uncertain. Bitcoin, for example, has been confirmed to be a commodity, not a security, and is subject to compliance with the Commodity Futures Trading Commission. It's currently unclear whether ether is a security or a commodity. Another essential debate concerns consumer protection. There have been numerous cases globally where retail investors have lost their entire life savings due to the collapse of a stablecoin, leading to discussions about whether the crypto world should be restricted to qualified investors.

Does regulation help or hurt DeFi?

► **Fabian Schär:** Regulating true DeFi is challenging. As a result, regulation will likely focus on the intersection between DeFi and traditional centralized finance, specifically on the on- and off-ramps. Whether this approach is beneficial or detrimental depends on the specific type of regulation. On the one hand, regulation can reduce uncertainty and allow regulated entities to leverage neutral financial protocols. On the other hand, regulation risks stifling innovation and re-centralizing otherwise neutral financial infrastructures, potentially creating monopolies and systemic dependencies. Ultimately, the outcome will hinge on the legislative process.



The Adoption

One of DeFi's main characteristics is the lack of intermediaries. How have traditional banks reacted to this new market model?

► **Stephan Zwahlen:** The original concept of DeFi indeed aimed to eliminate intermediaries and the inefficiencies that go along with financial intermediation. However, it has become clear that this goal is not entirely feasible, for several reasons. First, regulators and central banks aim to require blockchain investors to adhere to the same laws as traditional financial players. Second, the financial world is intricate and requires third-party professional guidance. Last, there is an emotional aspect to banking and asset management. In the wealth management industry, most beneficial owners tend to trust more in an institution or a person than in technology. Traditional banking and DeFi systems will converge, with traditional banks implementing more applications based on distributed ledger technology and with DeFi becoming more regulated.

Banks are typically seen as legacy-heavy. What is the best route for them to adopt the modern DeFi mindset?

► **Philippe Meyer:** Banks need to manage digital and non-digital assets similarly. Cryptoassets are just a new form of an existing concept. The first step is to integrate clients' digital and non-digital assets into a unified system. To do so involves addressing the anti-money laundering and know-your-customer issues that arise in the digital world and adjusting the banks' internal operating systems. Banks can then take advantage of the largely untapped potential of smart contracts to streamline their payment and back-office operations and to move away from the complex web of banking systems and databases currently in use—a move that will take years, if not decades, to finalize.

Partnerships are becoming increasingly frequent. Why?

► **Matthias Jüttner:** Partnerships between private companies or between private and public entities are essential in the banking world. A single institution can't possess all the necessary qualities. For example, the Swiss National Bank has the exclusive right to issue banknotes, but a third party prints them, utilizing security features developed by other parties. For the wholesale central bank digital currencies (CBDC) pilot, the Swiss National Bank is collaborating with SIX. The Swiss National Bank has the exclusive right to issue the digital currency, while SIX runs a regulated financial market infrastructure based on distributed ledger technology. Six commercial banks—*Banque Cantonale*

Vaudoise, Basler Kantonalbank, Commerzbank, Hypothekbank Lenzburg, UBS, and Zürcher Kantonalbank—participated in the Helvetia III pilot, and digital bond issuances were settled against wholesale CBDC. Such collaboration allows all the parties involved to better understand the implications of a tokenized financial system.

► **Andreas Fuster:** The number of partners involved depends on the banks' vision for the future and the type of blockchain they want to use—permissionless or permissioned. From a speed and cost perspective, a good option is a permissioned blockchain that all banks active within a jurisdiction can use. Another option is a permissionless blockchain that displays transaction sizes and quotes, providing transparency for market participants and everyone else. It's important to consider what information banks want to make visible and what they want to keep private. A bank operating in a challenging environment may prefer to keep certain information hidden from the public.

Some view DeFi as "shadow banking on steroids." What is your view?

► **Andrea Barbon:** Due to the nature of trust within the blockchain, an individual's identity has no influence on a transaction. As a result, borrowing and lending require substantial over-collateralization. Consequently, liquidation happens frequently, making borrowing and lending largely speculative, rather than practical. Significant adjustments will be needed before leveraged financing, comparable to what traditional commercial banks currently offer, will emerge in a true DeFi environment.

In terms of portfolio diversification, how useful are bitcoins and ethers?

► **Stephan Zwahlen:** It is challenging to answer this question, because we have limited historical data. However, at Maerki Baumann we suggest that clients allocate between 1% and 3% of their wealth to a diversified portfolio of cryptoassets, depending on their risk tolerance. This investment increases the portfolio's yield more than its risk level. More than 80% of this allocation has—in our approach—been invested in bitcoins and ethers, with the remaining portion allocated to other tokens with medium to large market capitalizations.

And in terms of inflation hedging?

► **Andreas Fuster:** I don't think cryptocurrencies like bitcoins are generally good inflation hedges. Their volatility makes them unsuitable as a reliable store of value. During the recent burst of inflation after the pandemic, we saw that cryptocurrencies did not systematically appreciate when bad inflation news came out. More broadly, it's difficult to imagine a perfect hedge against inflation. Even gold is not a flawless means of storing value. Finally, central banks like the Federal Reserve and the Swiss National Bank are trusted institutions with a clear mandate to manage inflation, and their track record demonstrates that they fulfill this mandate effectively. Of course, the case for holding cryptocurrencies as a hedge is stronger in countries with high and volatile inflation and a less trusted central bank.

How much exposure should banks have to cryptoassets?

► **Stephan Zwahlen:** This decision primarily depends on the individual bank's risk appetite. I think banks should hold some cryptoassets to experience and understand this new asset class, as well as the opportunities and challenges of DeFi. However, managing a large portfolio may not align with most private banks' primary business focus.

► **Andreas Fuster:** DeFi offers significant enhancements to our existing financial system, so it's reasonable for banks, central banks, and regulators to dedicate resources to comprehending and testing its capabilities. However, evaluating the true economic worth of bitcoins and ethers is challenging and even more so for smaller cryptoassets. Consequently, I do not think mainstream banks should make significant direct investments in cryptoassets or take extensive risks as market makers.



► **Philippe Meyer:** The acceptance of cryptoassets as a viable investment option varies from bank to bank. If a bank has a history of engaging in proprietary trading, it may consider venturing into the world of cryptoassets. However, it's important to note that these assets are highly volatile, which makes them both lucrative and risky. At BBVA Switzerland, although our focus is on wealth management, not on proprietary trading, we strive to offer our private clients investment opportunities in the most compelling digital assets. Our clients have been able to include bitcoins in their portfolios since 2021.

Do you see a lot of interest from private clients in investing in cryptoassets?

► **Stephan Zwahlen:** Traditional wealthy clients' interest in cryptoassets has definitely increased, but with a focus on simple investments in individual cryptocurrencies or simple cryptoassets. Wealthy individuals from the crypto community are also looking to access the traditional banking world. To diversify, they aim to convert some of their cryptoassets into central bank money. However, before entering the traditional banking space, they must go through several steps, including know-your-customer procedures, anti-money laundering checks, tax clarifications, and blockchain analyses. Only after completing these steps can they utilize traditional wealth management services. One of the significant advantages of blockchain technology is that the history and previous ownership of each cryptoasset can be openly verified, making client onboarding, in many cases, transparent and straightforward.



How knowledgeable are private clients about cryptoassets?

► **Philippe Meyer:** Their level of knowledge is quite diverse, and banks play a crucial role in educating their clients further. Currently, banks focus on the technology, rather than on the product, which needs to be reversed. Clients understand the products—cryptoassets and cryptocurrencies—and the fact that they are stored on a blockchain is just a minor detail.

► **Stephan Zwahlen:** The wealth management market has different levels of client expertise. Members of the younger generations are usually familiar with DeFi concepts, and many of them have purchased cryptoassets and stored them in personal wallets. Members of the older generations have, on average, more wealth to invest, but are not as tech-savvy; they show an increasing interest in further education. These factors make DeFi-based wealth management a fascinating task.

How knowledgeable are bankers about cryptoassets?

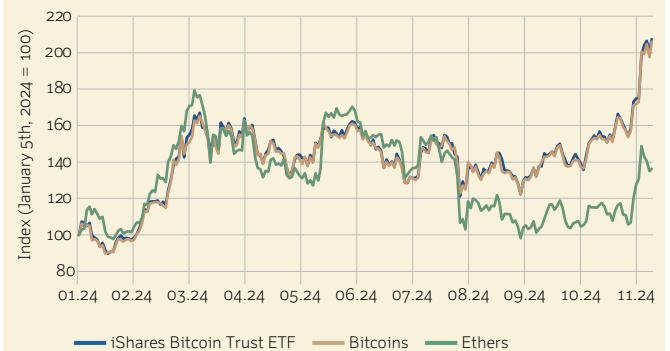
► **Philippe Meyer:** People are creatures of habit, and banks are usually low-tech environments. These factors explain why digital finance was developed outside the traditional banking world. It's important to remember that bitcoins and blockchain technology were created in 2008 to respond to the failure of the banking system. However, things are changing, and more people recognize the efficiency and practicality of smart contracts, wallets, and tokenized assets.

► **Stephan Zwahlen:** Bankers' knowledge levels often correlate with their bank's openness toward cryptoassets. Being unbiased regarding disruptive technologies is essential. In my opinion, it is crucial for a bank's board of directors and its executive board to acquire knowledge about blockchain technology and crypto applications, rather than delegating such learning to the staff. What is increasingly rewarding in today's environment is the positive dynamic through which customers share their knowledge with their bankers, and bankers share their expertise with their customers.

When buying shares in a cryptocurrency exchange-traded fund (ETF), what are investors buying, and what risks are they exposing themselves to?

► **Andrea Barbon:** Introducing such ETFs allows more investors, particularly institutional ones, to access the market. However, it's important to note that investing in these ETFs essentially means investing in bitcoins, ethers, and other cryptocurrencies. It doesn't involve DeFi. To buy into an ETF from a major market player like Blackrock, on a centralized exchange such as NASDAQ, through a large broker like Charles Schwab, goes against the concept of DeFi. Nonetheless, this trend indicates that many market players who lack the necessary skills to invest directly in bitcoins or ethers still desire exposure to the cryptocurrency market. Although the onboarding process, including know-your-customer and wallet creation, can be cumbersome, trading becomes remarkably straightforward once these steps are completed.

Value of the iShares Bitcoin Trust ETF, Bitcoins, and Ethers



Note: This figure shows the value of the iShares Bitcoin Trust ETF (IBIT), bitcoins (BTC), and ethers (ETH). IBIT is an exchange-traded product that invests directly in bitcoin, offering investors exposure to bitcoin without the challenges of holding it directly. IBIT was launched by Blackrock on January 5th, 2024. The correlation between IBIT and BTC, IBIT and ETH, and BTC and ETH is 0.99, 0.57, and 0.57.

Sources: blackrock.com and coinmarketcap.com

The Future

Will DeFi be a game changer, a cursor changer, or just more finance hype?

▶ **Fabian Schär:** A little bit of everything that you mentioned. True DeFi represents a significant innovation. It has the potential to create a system of neutral financial protocols, to increase competition, and to reduce specific systemic dependencies, potentially transforming the basic infrastructure of finance. However, much of what is commonly called DeFi remains heavily centralized. These applications represent, at best, incremental changes and, in some cases, fall closer to the category of hype.

▶ **Philippe Meyer:** The settlement framework that DeFi offers has the potential to revolutionize many aspects of the banking industry. The foreign exchange and repo markets are some of the largest in daily trading volume, and their demand for speed and accuracy is significant. Any failure or error can result in substantial costs, and smart contracts help to minimize the likelihood of such issues. It's well known that many major international banks are already using smart contracts to facilitate these transactions. According to J.P. Morgan's estimates from last year, implementing a DeFi-based solution for securing intraday financing led to a 56% decrease in borrowing rates, compared to traditional solutions. This represents a significant improvement.

▶ **Matthias Jüttner:** The Swiss National Bank is preparing for a wide range of scenarios. It is highly improbable that we will witness a sudden and complete transition to DeFi. A hybrid scenario incorporating permission-based blockchains, in which assets can be transferred and paid for in both tokenized and traditional forms, is more probable. A high degree of

interoperability between the existing and new payment and settlement systems is essential. A lack of interoperability could lead to segmentation of the financial market infrastructure, and segmentation could lead to fragmentation of the monetary system and threaten the singleness of the Swiss franc. The Swiss National Bank pays particular attention to this issue.

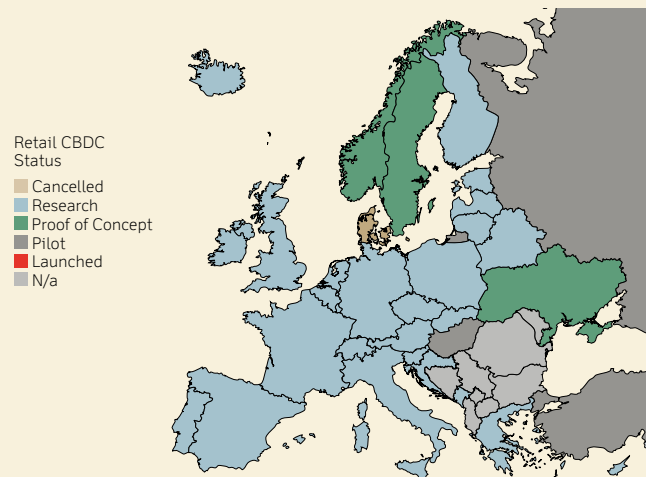
▶ **Andreas Fuster:** Blockchain technology is widely accepted as a permanent fixture, giving DeFi a "game-changing" dimension. However, it's important to remain prudent. Two years ago, the Boston Consulting Group made predictions about the size of the tokenized asset market in 2030. The baseline prediction estimated a market size of USD 16 trillion, with a best-case scenario projecting a figure of USD 68 trillion. A few months ago, McKinsey downsized this prediction to less than USD 2 trillion. Even this prediction seems highly optimistic, given that current estimates of outstanding non-stablecoin tokenized assets are below USD 15 billion, and growth so far does not appear to be exponential. The Bank for International Settlements recently issued a paper on the costs and benefits of tokenization and concluded that, although tokenization can bring benefits through automation, it also poses economic, legal, and technical challenges that cannot be minimized. The paper further argues that gains are expected to be modest when tokenization is relatively easy, such as in the repo or bond markets. In contrast, the potential benefits can be expected to be more significant when tokenization is more complex to implement. If we believe these results, the future of the tokenized market lies primarily in identifying assets suitable for being tokenized and traded in large volumes.

Is the development of central bank digital currencies (CBDC) worldwide a consequence of DeFi?

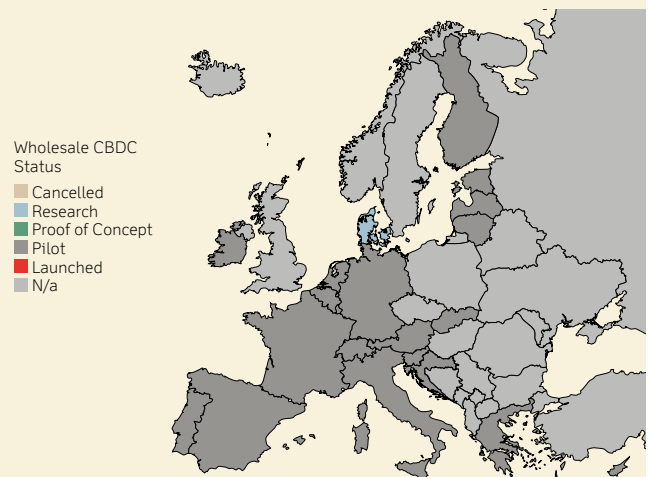
► **Andrea Barbon:** In 2019, Facebook announced a project to launch a new permission-based stablecoin, backed by a basket of international currencies, under the name "Diem" (initially "Libra"). Many big names, such as eBay, Mastercard, PayPal, Visa, and Uber, showed strong interest, revealing the willingness of large non-banks to be at the forefront of tomorrow's payment solutions. However, the Diem project never materialized, due to backlash from American and European regulators. Since then, many countries have actively worked on digital payment solutions. It's worthwhile to compare the Euro area with Switzerland. The European Central Bank is focusing on issuing a "digital euro," allowing consumers to make purchases throughout the Euro area without relying on standard credit card providers. The strategic twist behind this move is to distance the Euro area from US-based Mastercard and Visa and to have consumers rely instead on a euro-based and owned solution for electronic payments. In the meantime, Swiss consumers have largely embraced TWINT, which was launched in 2017 and currently has over 5 million users. The country's major banks own TWINT and SIX provides the underlying digital payment infrastructure that operates without credit cards. These significant shifts in financial infrastructure have clearly been triggered by the innovations of the blockchain and DeFi and by fear of seeing a prominent privately issued stablecoin, such as Diem, take the lead.

► **Matthias Jüttner:** The Diem initiative significantly impacted the market and sparked many ongoing discussions about cryptocurrencies and stablecoins. While the Federal Council and the Swiss National Bank do not currently see a need to implement retail CBDC, they do support innovation in digital payments. For instance, initiatives on tokenized deposits or instant payments were recently introduced. The Swiss National Bank anticipates that instant payments will become established in the medium term as the new standard for electronic payments, offering final settlement in seconds and around the clock. The bank will continue to support the development of instant payments in the future.

Today's Retail Central Bank Digital Currencies Status



Today's Wholesale Central Bank Digital Currencies Status



Note: This figure shows today's status of central bank digital currencies (CBDC) for European countries. The labels are as follows: "Cancelled" means countries that cancelled or decommissioned a CBDC; "Research" means countries that have conducted first explanatory CBDC research; "Proof of concept" means countries that are in an advanced research stage and have published a CBDC proof of concept; "Pilot" means countries that have developed a CBDC that is tested in a real environment either with a limited number of parties or on a wide scale; "Launched" means countries that officially fully launched a CBDC.

Source: <https://cbdctracker.org/>

How will banks adapt to the new reality of DeFi?

► **Andrea Barbon:** Smart contracts are changing the way banks operate. For instance, last year, DBS (a multinational bank based in Singapore), SBI (a financial conglomerate based in Japan), and UBS launched the first cross-border repo across three jurisdictions on a public blockchain. The transaction settled instantly and automatically. The contrast with a traditional transaction—a classical repo can take days to settle—highlights the advantages of smart contracts for the financial market.

► **Philippe Meyer:** There are going to be significant changes across the board. In the back-office environment, the handling of post-trading settlements will be entirely reprocessed. Capital requirements will be eased, and trades will become larger, due to instant settlement. The importance of the "middleman" will also change. Banks must thoroughly rethink the value they can provide to their customers, as their days of taking a commission on capital flows are numbered. It's going to be challenging.

How will credit card and online payment companies adapt to the new reality of DeFi?

► **Fabian Schär:** DeFi, or more generally, public permissionless blockchains, create new opportunities and introduce new payment solutions. Moreover, the Diem initiative put pressure on many payment providers and highlighted opportunities for a potential technological shift, leading to numerous new initiatives. Let us be clear: None of the initiatives introduced by financial service providers are decentralized, so we should avoid the term "DeFi" here. After all, these are regulated and centralized legal entities. However, it is interesting that they utilize decentralized

permissionless blockchains as their settlement infrastructure. For example, in 2023 PayPal issued a USD stablecoin on the Ethereum blockchain; it currently has a supply of approximately USD 730 million. When compared to other stablecoins, such as Circle's USDC—which has a roughly USD 35 billion supply managed by approximately 1'000 employees—it's easy to understand why PayPal and other traditional financial service providers might feel nervous. Similarly, various initiatives exist to create a Swiss stablecoin or tokenized deposits, while internationally, there is much discussion around central bank digital currencies. It's unclear how all of this will play out. Still, one thing is clear: A significant portion of the economy—from central banks to commercial banks, credit card companies, and FinTechs—must adapt to a rapidly evolving financial market infrastructure.

How should regulatory frameworks evolve to accommodate the rapid advancements in DeFi?

► **Stephan Zwahlen:** DeFi enables new business models, so regulation is necessary. One main focus of regulation should be to ensure that clients understand what they are investing in. Many tokenized assets are mainly speculative and illiquid, and "market drama" hurts the overall perception of what DeFi offers. In the case of Switzerland, the Swiss Financial Market Supervisory Authority (FINMA) has provided valuable guidance over the past few years regarding digital client onboarding and the regulatory treatment of various cryptoassets. Such guidelines are beneficial if they define the stage and the rules of play without inhibiting new developments.

Who will be the winners and losers of tomorrow?

► **Fabian Schär:** It's hard to predict the outcome at this stage. In the best-case scenario, we all benefit from increased market competition and from having a neutral blockchain infrastructure that everyone can use. In the worst-case scenario, we could create a monopolist that controls the digital economic base layer. Imagine one organization being in control of a database that holds all kinds of currencies, assets, financial protocols—and potentially even identities—and it becomes clear why this future would be problematic. However, even a public permissionless blockchain that starts out as being neutral could eventually be undermined and dominated by one or a few entities. These dynamics are further amplified by strong network effects, making it highly likely that more and more assets will converge onto a single ledger. Therefore, the primary issue that should be discussed in the context of DeFi is governance.

How is the notion of trust going to evolve?

► **Stephan Zwahlen:** Trust cannot be bought; it must be earned. As technology becomes increasingly important, the role of the banker must adapt to prevent personal trust from being replaced by system trust. Retail bankers need to reinvent themselves quickly, particularly those who rely heavily on transactional business. However, a high degree of agility in further developing business models and client services is also necessary for private banks and asset managers to be able to defend their value propositions. Although trust in "code" has its advantages in principle, for the time being, we see that clients and regulators rely more on personal accountability.



Swiss Finance Institute

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