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Research article

Hayek's theory of private money as a conceptual framework for Sustainable DeFi

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Abstract: In this article, we explored the continuity between Friedrich August von Hayek's theory of private money (1976) and the modern phenomenon of Sustainable DeFi while critically examining the gaps between Hayek's ideal and current reality. We demonstrated that Sustainable DeFi implements key Hayekian mechanisms, competition among issuers, voluntary currency choice, market-based selection, and decentralized governance, through technologies Hayek could not have anticipated, such as smart contracts, algorithmic stabilization, and permissionless protocols. However, we also identified significant limitations: Ownership concentration among "whales" undermines genuine competition; the pseudonymous nature of crypto creates tension with Hayek's emphasis on rule of law and transparency; and stablecoins, as mirrors of state currencies, serve transactional functions but do not represent true alternatives to state money. We developed a multi-dimensional scoring framework to evaluate crypto assets against Hayekian criteria and examined empirical evidence of failures (as market discovery procedures) and resilience (as proof of market-based coordination). We concluded that Sustainable DeFi is best understood not as a completed realization of Hayek's vision but as an ongoing, large-scale experiment in monetary competition that has validated some of Hayek's insights while revealing new challenges unknown to him, including technological risks, regulatory fragmentation, and the need for institutional maturity. The future of this experiment will depend on whether the ecosystem can address these challenges while preserving the competitive discovery process that Hayek championed.

Keywords: Hayek; private money; Sustainable DeFi; blockchain; currency competition; monetary theory; smart contracts

JEL Codes: B24, B25, G01, G28, E44

1. Introduction

The financial revolution initiated by the emergence of Bitcoin (2009) and the subsequent explosive growth of Sustainable DeFi ecosystem after 2020 has deep intellectual roots in the writings of F. A. Hayek's "Denationalization of Money" (1976). He proposed a radical idea: Eliminate the state monopoly on issuing money and allow private institutions to issue competing currencies. Our purpose of this article is to demonstrate that Sustainable DeFi not only embodies many of Hayek's postulates, but also expands them with new digital technologies.

Throughout this paper, we use the term "Sustainable DeFi" to refer to the long-term institutional and economic sustainability of a free-forming market; that is, a market that can maintain competition, discovery, and innovation over time. We are not referring to environmental sustainability, which is a separate and important issue but beyond the scope of this paper. The term "green" is often used to refer to environmental sustainability; to avoid confusion, we use "sustainable" throughout this paper.

Hayek criticized the Keynesian model of government management of the money supply, which leads to inflation, economic cycles, and abuse (Hayek, 1979). This process, Hayek believed, distorts relative prices and the structure of production, creating artificial "booms" followed by inevitable and painful recessions; a theory of the economic cycle developed within the framework of the Austrian School of Economics (Hayek, 1931).

As a radical alternative, Hayek proposed to eliminate the state monopoly on emission, putting forward the project of competitive private money. This mechanism is similar to competition in any other market, where product quality is the key to success (Hayek, 1976; Hayek, 1999). The market, according to Hayek, will weed out weak currencies and choose the most stable ones. He assumed that the winner would most likely be a currency backed by a basket of commodities, which would ensure its stability and predictability (Hayek, 1976; Hayek, 1999).

A Sustainable DeFi ecosystem, built on public blockchains (primarily Ethereum), is a unique technology laboratory for testing Hayek's ideas. It provides the necessary infrastructure for creating, exchanging, and managing private, competitive monetary units without a central controller (Table 1).

In Sustainable DeFi, money becomes a highly programmable digital asset (token), whose properties (interest income, collateral, automatic rules) are embedded in smart contracts. Their value directly depends on the trust in this code and the security model, which corresponds to Hayek's idea of money as a commodity whose quality determines demand.

The history of Sustainable DeFi shows a brutal market selection. Unstable algorithmic stablecoins (like TerraUSD in 2022) are failing, while more reliable and transparent models are gaining trust and market share (Klages-Mundt et al., 2020). This process is a direct analog of Hayek's "currency selection" by market forces.

Participation in Sustainable DeFi and the use of its currencies is voluntary and does not depend on government regulations. Users make decisions based on open information about the security, profitability, and mechanisms of the protocols, which implements the principle of refusal from the forced exchange rate.

Table 1. Friedrich von Hayek's main contribution to contemporary ideas.

Period	Main Works	Modern Application
1920	Monetary Theory and the Trading Cycle (1929)	Algorithmic Stablecoins
1930	Monetary Nationalism and International Stability (1937)	Algorithmic Stablecoins
	Profit, Interest, and Investment (1939)	Decentralized Prediction Markets
1940	Pure Capital Theory (1941)	Decentralized Oracles
	The Road to Slavery (1944)	Decentralized Autonomous Organizations (DAOs); Confidential Computing
	Individualism and Economic Order (1948)	Decentralized Infrastructures; Confidential Computing
	The Political Ideal of the Rule of Law (1955)	Decentralized Autonomous Organizations (DAOs); Smart Contracts
1960	Freedom Constitution (1960)	Decentralized Autonomous Organizations (DAOs); Smart Contracts
	Studies in Philosophy, Politics, and Economics (1967)	Decentralized Infrastructures
1970	Private Money (1976)	Decentralized Finance (Sustainable DeFi) and cryptocurrencies
	Denationalization of money (1976)	Decentralized Finance (Sustainable DeFi) and Cryptocurrencies
	New Studies in Philosophy, Politics, Economics, and the History of Ideas (1978)	Tokenomics
1980	1980s Unemployment and Trade Unions (1980)	Tokenomics
	Pernicious Arrogance (1988)	Decentralized Autonomous Organizations (DAOs)

Source: Author.

Aharon and Demir (2022), Alonso et al. (2024), and Alston et al. (2022) found relationships between NFTs and traditional asset classes (stocks, bonds, commodities) in the context of the COVID-19 pandemic. Using the TVP-VAR model to estimate dynamic connectivity, the authors concluded that NFTs can serve as a diversification tool, especially during market shocks.

This applies the theory of polycentric orders (political scientist Vincent Ostrom) to analyze governance in blockchain networks (Bitcoin, Ethereum). The authors argue that these networks evolve through constitutional rules and competition, creating new forms of private order that interact with government regulation.

Castañeda et al. (2024), Demirgüç-Kunt et al. (2022), Carstens et al. (2022), and Campino and Yang (2024) developed a theoretical model of parallel currency competition at a floating exchange rate. The researchers set out the conditions under which private currencies can co-exist stably with public ones, contributing to the academic debate initiated by Hayek.

Analyzing the volatility, the authors concluded that cryptocurrencies do not correspond to Hayek's vision of stable competing currencies, confirming the role of the state as a guarantor of stability (Mayer and Bofinger, 2024; Neves and Mead, 2021; Peneder, 2022; Podhorsky, 2024).

The study shows an overall increase in independence, but notes an increase in political pressure, which is relevant for discussions about CBDCs and cryptocurrencies. The authors concluded that there is relatively low overall connectivity, which confirms the potential benefits

for portfolio diversification, especially for NFTs (Yousaf et al., 2022; Yousaf and Yarovaya, 2022; Romelli, 2024). Using the TVP-VAR model, the study reveals low connectivity tofiat currencies, highlighting the unique nature of the Sustainable DeFi market, but notes increased connectivity during periods of high stress.

Kochergin et al. (2024) and Mikhaylov (2021) analyzed the impact of the virtual currency market on monetary policy and developed Friedrich Hayek's theory of private money and its applicability to digital currencies.

2. Materials and methods

2.1. Stablecoin competition

Stablecoin are digital assets whose value is pegged to a benchmark (for example, the US dollar); they are a direct analogue of Hayek's private currencies. Their issuers are centralized organizations (Tether, Circle) and decentralized protocols (MakerDAO, Liquity).

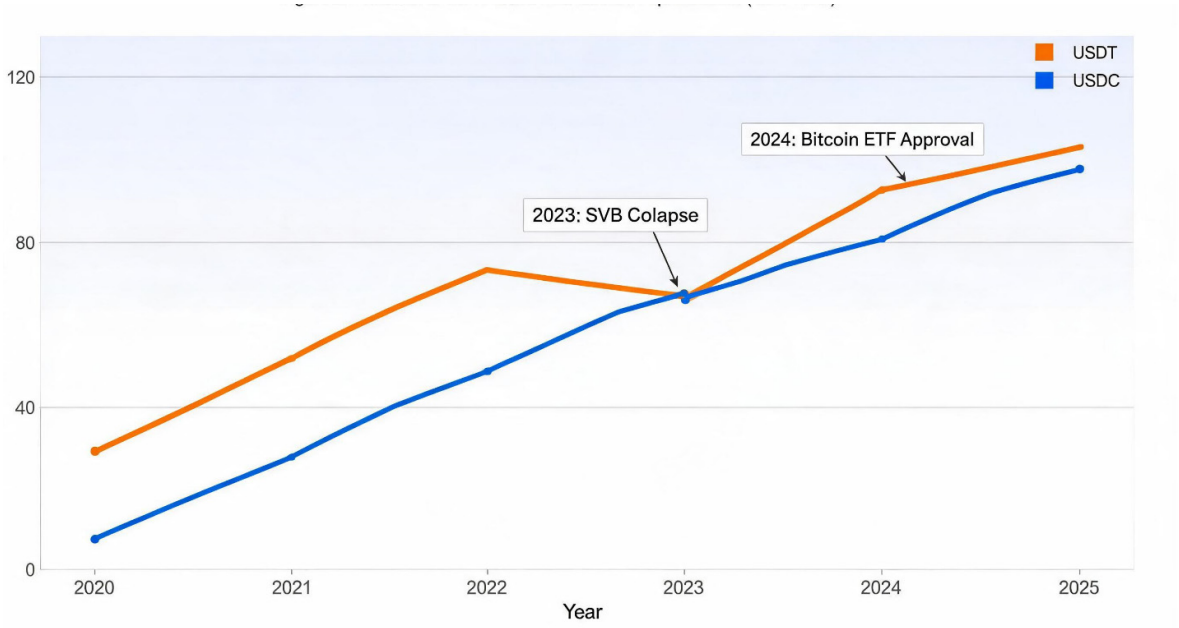


Figure 1. Evolution of USDT and USDC market capitalization (2020–2025). Source: Coinmarketcap.com.

Figure 1 shows the growth trajectory of both dominant stablecoins, with USDT growing from ~$4 billion to over $150 billion and USDC from ~$0.5 billion to ~$40 billion. The chart highlights key events, including the Terra/UST crash (May 2022) and the SVB collapse (March 2023), which temporarily shifted the balance in favor of USDT. This figure directly precedes and provides visual context for Table 3, which offers detailed analysis of these dynamics.

An algorithmic stablecoin backed by excess collateral in cryptoassets. Parameters (interest rates, collateral types) are managed by holders of the MKR management token through voting. This implements the idea of responsible issuance, controlled by the community, and not by the central bank.

Users freely choose between USDT, USDC, DAI, and others, evaluating their sustainability, risks, and utility in various protocols, which corresponds to Hayek's "natural selection".

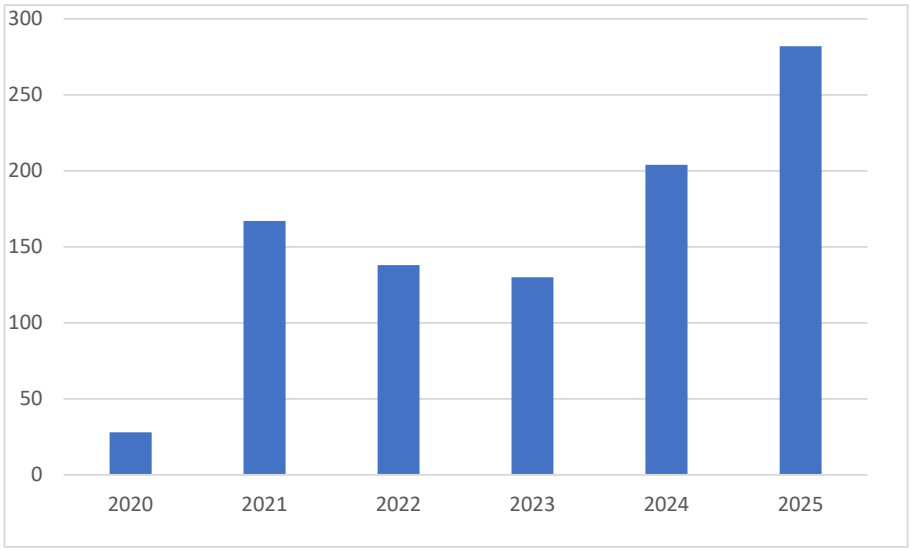


Figure 2. Total stablecoin market capitalization (2020–2025). Source: Coinmarketcap.com.

Figure 2 presents the evolution of the total stablecoin market capitalization from 2020 to 2025, illustrating growth from approximately $30 billion to over $160 billion. The chart highlights key events that affected market dynamics: The Terra/UST crash in May 2022, the collapse of Silicon Valley Bank in March 2023, and the approval of Bitcoin ETFs in January 2024. We have provided a detailed commentary following the figure, explaining the significance of each event and the market's resilience through these crises. This figure precedes and provides visual context for Table 2, which presents the detailed RWA market data.

Hayek emphasized trust in the issuer. Sustainable DeFi replaces trust in an institution with trust in a code (smart contract) that is open to audit and works independently. The rules of issue, collateral, and repayment are programmed and executed automatically, minimizing human factors and arbitrariness. Anyone with internet access can issue, use, or provide liquidity for this "private money" by creating the truly global currency competition. Hayek talked mostly about money. Sustainable DeFi goes further, creating an entire decentralized financial system based on this private money:

It enables someone to get loans secured by crypto assets or earn interest on deposits, bypassing traditional banks and enables token trading directly between wallets through automated market makers.

The tokenized real asset (RWA) market has grown from near-zero in 2022 to a projected $75 billion by the end of 2024. Starting with the tokenization of traditional financial instruments (treasury bonds via MakerDAO), the market quickly expanded to include commodities (gold) and money market funds (BlackRock BUIDL). The participation of giants such as BlackRock is a signal of legitimization of the direction and can be a catalyst for the next wave of growth (Table 2).

RWAs provide stablecoins and other Sustainable DeFi protocols with access to profitable, low-volatility assets from the traditional world, increasing their sustainability and attractiveness.

Table 2 shows how niche innovation (RWA) has become a major trend in just two years, the link between traditional and decentralized finance.

Table 2. Stablecoin capitalization and major events.

Year	Capitalization (USD billion)	Highlights
2022	0.0	Start of the trend: Maker RWA (the first major project tokenizing US Treasury bonds).
2023	2.5	Expansion: Tether Gold (tokenized gold), growth of capitalization of other early projects.
2024	5.0	Mass adoption: Ondo Finance, BlackRock BUIDL (money Market fund), Paxos Gold, many other projects.
2025	75	Exponential growth. The RWA market is becoming one of the largest Sustainable DeFi segments attracting traditional financial institutions.

Source: Author's calculations, European Central Bank.

Hayek viewed competition not as a static state but as a dynamic discovery procedure. In the context of money, competition among private issuers serves to discover which monetary arrangements best serve users' needs. This is not merely about offering different currency brands but about creating an evolutionary process where: Issuers experiment with different stabilization mechanisms; users signal preferences through their choices; the market aggregates dispersed information about monetary quality; and inferior monies are weeded out through a survival-of-the-fittest process. As Hayek (1976) argued, the market is superior to central planning precisely because it generates information that no single mind could possess. Monetary competition, therefore, is valuable not only for its outcomes but for the information it produces about what constitutes "good money".

Crucially, Hayek did not advocate for the absence of rules. On the contrary, the rule of law, clear, stable, and universally applicable legal norms, is foundational to his vision. Hayek's critique is directed against arbitrary state intervention, not against law. Private money competition must operate within a framework of contract enforcement, property rights, and dispute resolution. This is not a libertarian fantasy of lawless markets but a proposal for constitutional constraints on monetary policy.

Hayek's theory of knowledge emphasizes that prices aggregate dispersed information that no central authority could collect. In monetary competition, exchange rates between competing currencies serve as information signals about relative stability, inflation expectations, and issuer credibility. The market outcomes, which currencies are adopted, which fail, and under what conditions, provide information that guides future decisions.

Hayek's opposition to state monopoly on money is not an objection to states as such but to their ability to impose a single currency as legal tender while excluding alternatives. This monopoly, he argued, removes the primary check on poor monetary policy: The ability of citizens to "vote with their feet" by adopting superior alternatives. Without competition, there is no mechanism to discipline monetary authorities, and no market signal to indicate when policy has gone astray.

2.2. Typology and mechanisms of securing stablecoins: A comparative economic analysis

This model is a digital extension of the traditional banking system and the most direct analogy of fiat money in the blockchain. Its representatives, Tether (USDT) and USD Coin (USDC), dominate the market in terms of volume. Their essence is the centralized storage of traditional assets (dollars, bonds) and the issue of an equivalent number of digital tokens, each of which represents a debt obligation of the issuer.

Issue and repayment mechanism (1:1). The process is strictly tied to trust in the issuer. An institutional client transfers, for example, $ 1 million to the issuer's bank account. After verification (KYC/AML), the issuer issues (mint) via its smart contract 1 million USDT or USDC tokens and sends them to the client. The reverse process (redemption or "burning") similar: The user returns tokens to the issuer, which destroys them in the blockchain and transfers the equivalent in fiat to the user's account, withholding the commission. The stability of the 1:1 exchange rate to the dollar is based on two pillars: Arbitration (the ability to get a dollar for a token) and the issuer's legal promise.

For the reserve structure, transparency is the main challenge. This is where the key questions are focused. Reserves never consist only of cash dollars in the accounts. Their structure is a compromise between liquidity (to secure repayments) and profitability (for the issuer's profit). A typical portfolio includes:

1. Deposits with banks, funds on money market accounts.
2. Corporate debt obligations with a high rating (A-1/P-1).
3. US government bonds.
4. In the past, Tether even included commercial promissory notes and secured loans in reserves.

A key element of trust is audit and transparency. The USDC regularly publishes reports certified by major audit firms (Grant Thornton) detailing assets. Tether has long been criticized for being opaque, but has also moved to publish quarterly reserve reports. However, even certified reports are not a real-time guarantee and leave room for risks related to asset quality.

The system is based on the belief that the issuer (Tether Limited or Circle) is honest, solvent, and will not commit fraud or make a mistake in managing reserves. This is a classic centralized intermediary risk.

The issuer operates in the legal field. Its bank accounts can be frozen and its operations suspended by a court order (as was the case with Tornado Cash and OFAC sanctions that indirectly affected the USDC). Regulators may require changing the structure of reserves or prohibit repayment for certain categories of users.

While we focus on economic sustainability (the long-term viability of competitive monetary systems), it is worth noting the significant environmental implications of the crypto infrastructure. The migration of Ethereum from Proof-of-Work (PoW) to Proof-of-Stake (PoS) in September 2022 (the "Merge") reduced the network's energy consumption by approximately 99.95%. This transition has implications for the Hayekian framework as well: PoS systems introduce new governance dynamics where validators are chosen based on stake rather than computational work, potentially creating new forms of concentration and centralization that Hayek would have scrutinized. Most DeFi-supporting protocols (Ethereum, Polygon, Solana, Avalanche) now operate on PoS or similar energy-efficient consensus mechanisms, which may affect their long-term viability and regulatory

acceptance. We leave a fuller exploration of environmental sustainability and its intersection with the Hayekian framework for future research.

If a significant part of the reserves is invested in commercial securities or bonds, and there is a panic in the market and many users simultaneously want to redeem tokens in fiat, the issuer may not have enough liquid funds. Forced asset sales during a crisis can lead to losses and split parity.

3. Results

3.1. Market anatomy: Structure, leaders, and driving forces of competition

The stablecoin market, with a capitalization exceeding $160 billion, has evolved from a niche crypto tool to a system-forming segment of the global digital economy. Its anatomy reveals the intense competition between centralized and decentralized paradigms, where the struggle is not only for market share, but also for the very nature of future money.

The success of a stablecoin is measured by three interrelated metrics that form a positive feedback loop.

Total value of tokens in circulation. High capitalization is the primary indicator of trust and acceptance. Tether (USDT) has long dominated with a share of over 70%, but its positions are gradually eroding. USD Coin (USDC) consistently holds second place, while the decentralized DAI is fixed on the third-fourth position. The dynamics of capitalization is sensitive to macroeconomic conditions (the Fed's rate hike made fiat stablecoins attractive) and confidence crises, as shown by the collapse of TerraUSD, after which the total market capitalization decreased by a third.

Despite the turmoil, these two stablecoins make up the vast majority of the market. Crises (SVBS) only temporarily shifted the balance in favor of USDT (Table 3). Events like the collapse of Terra and SVB have shown that stablecoins have become a backbone element of the crypto ecosystem. In moments of panic, the capital does not leave it completely, but is redistributed between stablecoins. The collapse of the SVB (impact on the USDC) and the US elections (waiting for new laws) are events from the traditional world that have a direct and strong impact on the private digital money market.

The share of stablecoins in the total capitalization of the crypto market has stabilized at ~12–15%, which indicates the maturity of this segment and its well-established role as the main trading pair and a tool for preserving value.

This analysis confirms the thesis that the stablecoin market, having passed through a stage of experimentation, has entered a phase of consolidation and institutionalization, where trust and regulatory clarity become more important than technological innovation.

Share of stablecoin in trading pairs on centralized (CEX) and decentralized exchanges (DEX). USDT is the undisputed leader, acting as a "dollar" for the crypto market; more than 70% of trading pairs on Binance use USDT. This creates a powerful network effect: Exchanges list USDT because traders want it, and traders use USDT because it has maximum liquidity and market depth. USDC dominates regulated segments (such as Coinbase) and institutional transactions.

The number of stablecoins is blocked as liquidity or collateral in smart contracts of Sustainable DeFi protocols. This indicator reflects the utility of an asset as productive capital. Here, USDC and DAI have historically competed for leadership, as their transparency and technical integration are preferred for complex financial protocols. The fall of Terra showed a direct correlation: The collapse

of UST led to a reduction in the total TVL in Sustainable DeFi by hundreds of billions of dollars, collapsing the ecosystem.

The duopoly of Tether and Circle is a confrontation between two philosophies: Aggressive growth for the crypto-native market and regulated integration with traditional finance.

Table 3. Capitalization of USDT and USDC stablecoins in 2020–2025.

Date (Event)	Capitalization of USDT (approximately)	USDC capitalization (approximately)	Total Market Share	of Stablecoins Context and impact
of the Jan 2020 Event (Beginning of the period)	~$4 billion	~$0.5 billion	~3%	The stablecoin market is relatively small, with USDT dominating.
Early 2021 (Beginning of the "crypto boom")	Sharp growth	Sharp	growth Up to ~10%	The influx of capital to the crypto market increases the demand for stablecoins for trading.
May 2022 (Terra/UST Crash)	Temporarily reduced	The Peak temporarily decreases	(~15–16%), followed by a drop	in Panic and loss of trust in all algorithmic and decentralized stablecoins. Investors are fleeing to USDT and USDC as "safe havens", but the overall market share is falling due to the collapse of UST.
March 2023 (Collapse of SVB, Circle's partner bank)	Growing	Sharp Drop	Remains Stable (~12%)	Crisis of confidence in the USDC due to the risk of loss of reserves. Capital flows into USDT, which strengthens the lead. USDC recovers over time.
Jan 2024 (BTC-ETF Approved)	Growth continues	Being restored	Stable growth is being restored (~12–14%)	The legitimation of the market by institutional investors indirectly supports the demand for liquid stablecoins.
November2024 (US Election)	~$150 billion	~$40 billion	~14%	The market is consolidating in anticipation of regulatory changes. USDT dominates (~70% of the stablecoin market).
2025	Growth continues	Stabilization	~14–15%	The USDT/USDC duopoly is expected to continue. The share of stablecoins in the total capitalization of the crypto market is stabilizing.

Source: Author's calculations, European Central Bank.

Tether (USDT) operates from an international jurisdiction and has historically been characterized by minimalistic transparency, focusing on speed and convenience for crypto exchanges. Its business model is to extract profit from the spread between income on commercial paper in reserves and operating expenses. Circle (USDC), based in the United States, has positioned itself from the very

beginning as a "safe and transparent" regulatory-friendly stablecoin. Its reserves consist primarily of cash dollars and short-term U.S. Treasury bonds, as evidenced by Grant Thornton's regular audit reports Thornton. USDC is a tool for legitimate businesses aspiring to Web3.

The battle is being fought on two fronts. On the crypto front, USDT dominates the Asian and global CEX markets (Binance, Huobi), while USDC is the native dollar for the US ecosystem (Coinbase, Ethereum-based regulated Sustainable DeFi protocols Ethereum). On the front, TradFi Circle is aggressively integrating USDC into payment systems (Visa, Mastercard), fintech applications (Square), and corporate treasury tools, making it a bridge between worlds.

A key turning point was the sanctioned blocking of Tornado Cash addresses by the Office of Foreign Assets Control (OFAC) in August 2022. Circle, as a US company, was forced to freeze 75,000 USDC at these addresses. This action caused a shock in the community, demonstrating that even the most transparent stablecoin is subject to censorship at the request of the state. Tether, on the contrary, announced a more selective approach, freezing addresses only upon official requests from law enforcement agencies. This incident has become a marketing argument for decentralized alternatives, highlighting the fundamental risk of trust in a centralized issuer.

DAI has evolved from a simple model (pledged only in ETH) to a complex multicollateralization system. Today, Maker's reserves include not only crypto assets (ETH, wBTC), but also an increasing share of real-world assets (RWA); short-term US Treasury bonds purchased through specialized trusts. This is an ingenious but risky move: It brings the protocol a steady income (in 2023, RWA revenues accounted for most of MakerDAO's profits), increasing the attractiveness of the MKR management token, while reintroducing counterparty and regulatory risk through intermediaries who buy these bonds. MakerDAO has evolved into a decentralized central bank with a complex balance sheet.

LUSD is backed only by ETH, does not have a floating interest rate (only a one-time loan commission), and does not have active management (the protocol is immutable). Its stability is based on a unique mechanism of liquidations, where the liquidated ETH is distributed among other borrowers, creating internal incentives to maintain the health of the system. This is Hayek's "natural selection" in its purest form.

FRAX combines cryptographic catalogues (USDC, FXS) and algorithmic mechanisms (burning/issuing of the FXS management token) to maintain parity. After the collapse of UST, Frax shifted toward more collateralization of USDC, but retains the algorithmic component as a fine-tuning tool.

Stablecoins are not just digital dollars, but financial infrastructure. They form the basis of liquidity in AMM pools (Uniswap, Curve), where the USDC/DAI pair is one of the most liquid. They serve as the main collateral asset in lending protocols (Aave, Compound), enabling users to take out loans without selling volatile assets. Without stablecoins, Sustainable DeFi would be impossible.

For traders, stablecoin is a port, a harbor during a storm. While waiting for the market to fall, assets are converted to USDT/USDC, enabling one to save the value in dollars, while remaining inside the crypto ecosystem for quick re-entry.

In countries with hyperinflation (Argentina, Turkey, Nigeria) or tight currency controls, stablecoins are becoming a means of de-dollarization in digital form. They enable someone to save their savings, make international transfers with minimal fees, and gain access to global financial markets through Sustainable DeFi, bypassing the inefficient national banking system. This is a direct implementation of the Hayek currency competition, where citizens "vote with their feet" (or wallets) against a weak national currency.

3.2. Economic and monetary implications of stablecoin competition

Stablecoins are the largest experiment in history to test Hayek's theory of denationalization of money. Its postulates manifest themselves, but they collide with digital reality. Millions of users voluntarily choose USDT, USDC, or DAI based on their preferences in security, profitability, and ideology. This is a live competition. Hayek underestimated the power of network effects and inertia. USDT, despite periodic scandals, retains its dominance due to its primacy and deep liquidity. It has become the de facto standard, the language spoken by most of the cryptomarket. Changing this standard is incredibly difficult, even if a technically superior competitor appears. Trust here has been transformed into a habit and convenience.

Sanctioned regimes (Iran, Russia) can use stablecoins for international trade, bypassing the SWIFT system and sanctions filters based on the identification of correspondent banks. Citizens of countries with currency controls (China, Argentina) use them to withdraw capital. The answer varies from repression (China—total ban) before assimilation (EU-MICA regulation, US-search for a regulatory approach) and competition (CBDC development). The US dollar, backed by private stablecoins, has become an even more global force, forcing other countries to accelerate the development of their own digital currencies to protect digital sovereignty and monetary autonomy.

Table 4. Factors affecting cross-border stablecoin flows.

Group of factors	Indicator for the sending country	Indicator for the receiving country
Economic development	Average GDP growth (%)	Average GDP growth (%)
Inflation and volatility	Inflation (%)	Inflation volatility (%)
Other	Instability	Bilateral exchange (%)

Source: Author's calculations, European Central Bank.

The classic risk of the banking system takes on catastrophic proportions in the digital environment. In a traditional bank, the raid is limited to the physical queue and business hours. In the world of stablecoins, panic withdrawals can start at any time and reach millions of users around the world in a few clicks within minutes (Table 4).

Tether or Circle may face a situation where repayment requirements exceed the liquid portion of their reserves (cash and Treasury bonds). A forced sale of commercial paper in a crisis can lead to losses and loss of parity, which will exacerbate the panic. Sanctions risk (freezing of accounts) can be a trigger.

A panic can lead to a massive repayment of DAI and withdrawal of collateral. This will cause pressure to sell assets (ETH) in the market, bringing down their price and triggering a wave of liquidations of collateral with a low level of collateral. The protocol must be economically resilient to the recursive loop of falling collateral prices.

Stablecoins are a backbone node in the Sustainable DeFi network. Their collapse is guaranteed to bring down the ecosystem. They are used as collateral, liquidity, and an insurance asset. If a large stablecoin loses parity, it leads to instant losses for the protocols and users who held it. Banks that accept it as collateral are threatened with unsecured debts. The example of Terra (LUNA/UST) led to a drop and a loss of $40 billion for investors. The collapse of one protocol caused a full-scale liquidity and credit crunch across the industry.

The Sustainable DeFi ecosystem provides the most comprehensive laboratory yet for testing Hayek's competitive discovery procedure. The stablecoin market embodies competition in several dimensions: Competition among issuers (users freely choose between USDT, USDC, DAI, and other stablecoins, evaluating their stability mechanisms, transparency, yield opportunities, and governance structures); competition among protocols (beyond currencies, Sustainable DeFi creates competition among lending protocols, exchanges, and yield-generating strategies); and evolutionary selection (the market has demonstrated brutal selection pressure; unstable algorithmic stablecoins have failed, while over-collateralized models have persisted). The collapse of TerraUSD in 2022 exemplifies the discovery process: An algorithmic model failed under stress, revealing its fragility and causing capital to flow to more robust alternatives.

Hayek's emphasis on the rule of law raises important questions about Sustainable DeFi's regulatory status. Smart contracts as code-based rules represent a form of "algorithmic rule of law"; rules that are transparent, deterministic, and enforceable without human discretion. Regulatory uncertainty (the SEC's classification of some stablecoins as securities, the CFTC's view of them as commodities, the EU's MiCA regulation) illustrates the struggle to fit new instruments into existing legal categories. Hybrid governance (MakerDAO's integration of real-world assets through legal trusts) suggests that Hayek's vision is not necessarily opposed to law but seeks to constrain arbitrary state discretion.

The stablecoin market generates rich information signals: Exchange rates as signals (the 1:1 peg of USDC and USDT to the dollar signals market confidence); Total Value Locked as sentiment indicator (the flow of stablecoins into different protocols signals where the market perceives value); and yield spreads as risk signals (interest rates on stablecoin lending reflect different risk assessments).

4. Discussion

4.1. Regulatory risk: The battle for the future of money

The key uncertainty hanging over the market is the final regulatory qualification. The US Securities and Exchange Commission (SEC) considers some stablecoins as unregistered securities, as investors expect profits from the issuer's efforts (for example, from reserve management). The Commodity Futures Trading Commission (CFTC) considers them commodities. Banking regulators see them as analogous to electronic money or deposits, which would require a banking license. In the EU, the MiCA regulation finally classifies them as "equity tokens linked to assets", introducing uniform rules. This confusion creates a legal vacuum and a risk for issuers that can be attacked from different sides.

Possible scenarios of regulatory intervention:

1. Unlikely for the US/EU due to loss of competitiveness, but possible in authoritarian regimes.
2. The requirement to obtain the status of electronic monetary institutions or limited banking licenses with mandatory participation in deposit insurance systems (which will destroy the business model economically).

The stablecoin market is a dynamic arena where a fundamental redistribution of power in the monetary sphere is taking place. The competition between centralized USDT/USDC giants and decentralized ecosystems like MakerDAO is testing Hayek's economic theories and the foundations of modern state sovereignty. The driving force is the voluntary choice of millions seeking stability, utility, and freedom. However, the future of this market will be determined not only by user preferences,

but also by its ability to manage colossal systemic risks and find a modus vivendi with state regulators who face a choice: Suppress this competition, assimilate it, or join it themselves through CBDCs. The anatomy of this market today is a preliminary sketch of the financial system of tomorrow, which can become more open, competitive, and efficient, but also more fragile and difficult to control.

4.2. The future of competition: Trends, forecasts, and development scenarios

The market of modern private money, represented primarily by stablecoins, is in a phase of intensive evolution and structuring. There are three key development vectors.

Consolidation around two poles: Regulated fiat and proven decentralization. The market is moving away from chaotic experiments and consolidating around two dominant, polar models, each of which responds to different requests and types of trust. On the one hand, these are regulated collateralized stablecoins, such as USDC (Circle) and EURC, which are becoming the digital equivalents of trust in the traditional financial system and its supervisory authorities. They offer maximum legal clarity, regular audits, and cooperation with government agencies, making them a predictable tool for institutional players and a springboard for TradFi. On the other hand, the position of reliable decentralized models (decentralized/crypto-collateralized) is being strengthened, the main representative of which is DAI (MakerDAO). Their sustainability is based not on trust in a particular issuer, but on trust in mathematically verifiable redundant software and the smart contract code. This makes them preferable for ideologically motivated Sustainable DeFi participants who value sovereignty and censorship resistance. Competition is shifting from the number of coins issued to the quality of security, transparency, and reliability of the model.

Increasing the importance of yield for holders (Yield-bearing stablecoins). Passive stablecoin storage is no longer sufficient. There is a growing trend to integrate the underlying yield directly into the asset. Stablecoins such as DAI or stablecoins that automatically retake their collateral in Sustainable DeFi protocols (for example, in Aave or Compound) are transformed from a simple medium of exchange or savings into productive capital. This corresponds to Hayek's idea of money as a market commodity, the quality of which is determined not only by stability, but also by useful properties; in this case, the ability to generate interest income without additional actions on the part of the holder. This trend blurs the line between money and an investment asset, creating hybrid tools that are more effective for economic agents.

Fragmentation across blockchains and the emergence of stablecoins. Paradoxically, in parallel with the consolidation of models, their territorial fragmentation across blockchain ecosystems occurs. The dominance of Ethereum as the only release platform is being replaced by a strategy of native presence in every significant ecosystem. USDC and USDT are issued as native assets in the Polygon, Solana, Avalanche, Base, and other networks. Moreover, there are stablecoins that were originally designed as multi-chain assets, or complex bridge and wrapper solutions were being developed. This creates a single liquid space on top of technological boundaries while increasing the systemic risks associated with the complexity of cross-chain infrastructure and bridge safety (Table 5).

The emergence of CBDC represents the most serious challenge to the idea of private competitive money, as it is an attempt by the state not to ban, but to technologically modernize and strengthen its monetary monopoly in the digital age.

Potential for "crowding out" or creating a hybrid system. The development of CBDCs can follow two scenarios in relation to private stablecoins. The first is a direct crowding-out scenario, in which the CBDC, having the status of legal tender, free basic transfers, and direct integration into the state financial system, will make private stablecoins uncompetitive for everyday payments. The second, more likely scenario is the formation of a two-level hybrid system. In it, CBDC will take the place of "digital cash" for interbank settlements and civil payments, while private stablecoins will perform specialized functions in niche areas; as high-yield instruments in Sustainable DeFi, as a tool for cross-border trade, or as a framework for programmable corporate finance. They will not be direct competitors, but rather complementary assets operating in the regulatory space.

Programmability of money and its implications for competition. A key technological feature of CBDCs is their potential programmability. The state can set rules for using the digital currency: Time limits (loans for training, paid only for rental housing), automatic tax write-offs, or targeted social payments. This dramatically changes the nature of competition. If Hayek's private money competed on the basis of stability and trust, then CBDCs introduce a functionality parameter defined by the issuer. This creates pressure for private stablecoins to innovate: They will have to offer either ultra-reliable collateral models or unique, inaccessible to CBDCs, programmability features focused on market rather than political needs (for example, automated derivatives or complex credit products in Sustainable DeFi) (Tables 6–7).

Table 5. Hayek's concepts to Sustainable DeFi implementations.

Hayek's Concept	Sustainable DeFi Implementation
Competition among private currencies	Competition among stablecoins (USDT, USDC, DAI, LUSD)
Market selection of the best money	Market selection through protocol usage and TVL
Voluntary choice of currency	Permissionless access to all stablecoins
Trust in the issuer	Trust in open-source, auditable smart contracts
Price stability through competition	Algorithmic and collateral-based stability mechanisms
Freedom from state monetary monopoly	Censorship-resistant, borderless financial infrastructure

Table 6. Major crypto assets (Bitcoin, Ethereum, USDC, DAI, LUSD, and a CBDC comparator) across seven Hayekian dimensions.

Hayekian Criterion	Metric	Bitcoin	Ethereum	USDC	DAI	LUSD	CBDC
Supply predictability	Inflation rate/supply cap	10	6	0	4	6	0
Censorship resistance	Ability to freeze/block	10	8	2	6	9	0
Decentralized governance	Concentration of control	7	6	1	5	9	0
Competition/alternatives	Market share diversity	8	9	3	7	5	1
Rule of law compatibility	Legal clarity/regulatory status	4	5	9	5	4	10
Collateral transparency	Reserve transparency	10	10	8	7	9	9
Long-term viability	Adoption/institutionalization	9	9	8	6	4	10
Total Score (range 0-70)		58	53	31	40	46	30

Table 7. Analysis of centralized platform failures versus DeFi protocol resilience.

Event	Type	Outcome	Hayekian Interpretation
Mt. Gox (2014)	Centralized exchange	Complete collapse; loss of 850,000 BTC	Lack of transparency; centralized control concentration risk
TerraUSD/LUNA (2022)	Algorithmic stablecoin	Complete collapse; $40B loss	Failed experiment; market discovery of fragile algorithmic design
FTX (2022)	Centralized exchange	Complete collapse; fraud exposed	Centralized trust replaced by decentralized verification essential
Celsius (2022)	Centralized lending	Bankruptcy; opaque risk management	Lack of transparent, open-source risk assessment
Aave hack (2023)	DeFi protocol	Protocol rescued; no fund loss	Resilience through transparent code, community response, market mechanisms
Curve Finance hack (2023)	DeFi protocol	Partial recovery; market-driven resolution	Community coordination; market-based risk pricing

4.3. Market development scenarios by 2030

By 2030, the private money market can evolve according to one of four fundamental scenarios, each of which represents a different degree of realization of the Hayek ideal.

4.3.1. The dominance of licensed fiat

This is the most conservative and likely scenario in developed jurisdictions (EU, USA). A key role is played by the adoption of comprehensive regulation (like MiCA in Europe). The dominant position is occupied by 2–3 large, fully licensed fiat stablecoins (analogs of USDC), which are becoming the de facto standard for digital payments, docking with traditional finance and the basis for most Sustainable DeFi protocols. They are as transparent as possible, controlled by supervisory authorities, and technologically safe (Bourveau et al., 2024; Halaburda et al., 2022; Mayer and Bofinger, 2024). Decentralized stablecoins (such as DAI) remain a niche product for a narrow circle of ideological adherents and specific, high-risk financial transactions. Competition is shifting from the issue sphere to the sphere of additional services and integrations. Hayek's currency competition is limited to the competition of several regulated brands within a strict framework (Amiram et al., 2022; Bertomeu et al., 2024a; Bertomeu et al., 2024b)

4.3.2. Decentralized dominance

This scenario is implemented in the event of a technological breakthrough that will make trust in the algorithm and cryptography not only equal, but also superior to trust in state or corporate institutions. For example, the appearance of a stablecoin with absolutely reliable, verifiable, and collapse-resistant algorithmic software, or the creation of unbreakable, formally verified smart contracts. In this world, decentralized, censorship-resistant, high-yield stablecoins are becoming the preferred store of value and settlement for the global middle class. CBDCs and fiat stablecoins are retreating to the periphery, serving only areas that are strictly related to state coercion (taxes,

court payments). This is the closest scenario to Hayek's ideal, where the market selects currencies based on their objective technological and economic qualities.

4.3.3. Suppression of private competition

A pessimistic scenario in which states, seeing private stablecoins as a threat to monetary sovereignty and financial stability, go into an aggressive suppression mode. Through draconian licensing requirements, outright bans on security in crypto assets, and criminal prosecution of anonymous developers, the private money market either goes deep underground or is eliminated in the legal field. The dominant (or only) form of digital money is CBDC with advanced control functions: The ability to disable wallets, restrictions on transfers, and expiration. This scenario is the antithesis of Hayek; a complete victory of the state's monetary monopoly, reinforced by digital control technologies.

4.3.4. Regional and functional specialization

The most likely scenario on a global scale, given different regulatory speeds and philosophies, is the following. The world is divided into several blocks with different money modes:

1. "Regulatory Block" (EU, part of Asia): There is a "Regulatory Harmonization" scenario with the dominance of licensed fiat stablecoins.
2. "Innovation/offshore block" (selected countries of the United Arab Emirates, Singapore, El Salvador, decentralized jurisdictions): They purposefully create favorable conditions for experimenting with decentralized models, becoming hubs for Sustainable DeFi and the "Decentralized Dominance Scenario".
3. "Authoritarian bloc" (China, possibly Russia): Implements the "State Monopoly Scenario" with CBDC as a control tool.

Within each jurisdiction, the market is divided into functions: CBDC for social payments and public services, fiat stablecoins for business, and TradFi decentralized for investments and niche online communities.

In this world, Hayekian currency competition occurs not within countries, but between regions and legal systems, and users de facto "vote with their wallet", choosing the jurisdiction that offers the preferred monetary model.

4.4. The role of stablecoins in Sustainable DeFi

Stablecoins are not merely digital representations of fiat currency; they are the foundational infrastructure upon which the Sustainable DeFi ecosystem is built. Without stablecoins, the decentralized financial system would lack a reliable unit of account, a stable medium of exchange, and a dependable store of value; all essential functions that traditional finance takes for granted.

Stablecoins provide the essential liquidity that powers Sustainable DeFi protocols. In automated market maker (AMM) platforms, such as Uniswap and Curve, stablecoin pairs (USDC/DAI, USDT/USDC) consistently rank among the most liquid trading pairs, facilitating efficient price discovery and low-slippage transactions. This liquidity is not incidental; it is the direct result of user preference for stable value when providing liquidity or executing trades. The

deep pools of stablecoins enable traders to move in and out of positions without exposing themselves to the volatility of cryptocurrencies like Ethereum or Bitcoin.

Furthermore, stablecoins serve as the primary base currency for trading pairs across decentralized exchanges. The dominance of USDT on centralized exchanges and USDC on regulated decentralized platforms creates a network effect: Liquidity attracts traders, and traders attract more liquidity. This self-reinforcing cycle has made stablecoins indispensable for the functioning of DeFi markets (Galati and Ho, 2003; Ganowski and Rowlands, 2020; Gurrib et al., 2019; Haq et al., 2021).

In lending protocols such as Aave and Compound, stablecoins play a dual role. First, they are the most commonly deposited assets, as users seek to earn interest on their stable holdings rather than letting them sit idle in wallets. Second, they serve as preferred collateral for borrowing, as their price stability reduces the risk of sudden liquidations compared to volatile assets like ETH or wBTC. Borrowers can take out loans against their stablecoin deposits, using the borrowed funds for trading, yield farming, or other investment strategies.

The ability to earn interest on stablecoin deposits, often higher than traditional savings accounts, has attracted a wave of users to DeFi, particularly in countries with negative real interest rates or limited access to banking services. This represents a democratization of credit markets, aligning with Hayek's vision of financial services free from centralized control.

Stablecoins are the entry point for yield-bearing strategies that generate returns through various DeFi mechanisms. Users can deposit stablecoins into liquidity pools to earn trading fees, lend them to borrowers earning interest, or stake them in yield farming protocols to earn governance tokens. The composability of DeFi, the ability to combine protocols in novel ways, means that stablecoins can be used across platforms simultaneously, maximizing capital efficiency.

Protocols like Yearn Finance automate the process of moving stablecoins between lending and yield-generating strategies, searching for the highest returns. This automation, enabled by smart contracts, creates a competitive marketplace for yield that benefits users and drives innovation. The emergence of yield-bearing stablecoins such as sDAI or stablecoins that automatically restake their collateral further blurs the line between money and productive capital, transforming passive holdings into active investments (Fry, 2018; Fry and Cheah, 2016; Funashima et al., 2020).

For traders and investors, stablecoins function as a safe harbor during periods of market turbulence. When cryptocurrency prices fall sharply, users convert their volatile assets to stablecoins, preserving their dollar-denominated value while remaining within the crypto ecosystem. This ability to "park" funds in stablecoins prevents capital from leaving the ecosystem entirely, maintaining liquidity and enabling rapid re-entry when market conditions improve.

The stability of well-collateralized stablecoins like USDC and USDT during market crises has reinforced their role as a trusted store of value. Even during the collapse of TerraUSD in 2022, which triggered a broader market selloff, USDC and USDT largely maintained their pegs, demonstrating their resilience and reinforcing user confidence.

Stablecoins are the primary bridge connecting traditional financial systems with the decentralized world. By tokenizing fiat currency, they enable seamless transfer of value between legacy banking infrastructure and blockchain networks. This bridge facilitates institutional participation in DeFi, as traditional asset managers can now deploy capital into yield-generating protocols without exiting the fiat system.

The growth of tokenized real-world assets (RWAs) has further strengthened this bridge. Protocols like MakerDAO now hold US Treasury bonds as collateral, enabling the issuance of DAI backed by traditional assets. BlackRock's BUIDL fund and other institutional products have brought legitimate, regulated financial instruments onto the blockchain, creating new opportunities for stablecoin holders to earn yield on low-risk assets (Khan et al., 2019; Liang et al., 2021). This integration between TradFi and DeFi represents a convergence that Hayek could not have anticipated, yet it aligns with his vision of competitive financial services evolving to meet user needs (Hoque and Low, 2022; Jackson, 2021; Kenourgios et al., 2020).

In emerging economies with high inflation, unstable national currencies, or restrictive capital controls, stablecoins serve as a lifeline. Citizens of Argentina, Turkey, Nigeria, and other countries use stablecoins to preserve their savings, make international transfers at minimal cost, and access global financial markets through DeFi protocols. This bypasses inefficient, expensive, or corrupt banking systems, giving users direct control over their wealth.

Stablecoins also enable cross-border remittances at a fraction of the cost charged by traditional money transfer services. Workers sending money home to their families can now do so in minutes rather than days, with transparent fees and no intermediary banks taking a cut. This practical implementation of borderless, permissionless finance is perhaps the most powerful demonstration of Hayek's vision in action.

The composability of DeFi, the ability of protocols to interact with and build upon one another, depends on stablecoins as a common language. When a user deposits stablecoins into Aave, the receipt token (aUSDC) can be used as collateral in another protocol or traded on Uniswap. This interoperability creates a vibrant financial ecosystem far more complex than Hayek envisioned, yet is entirely consistent with his ideas about spontaneous order and emergent complexity (Machalek et al., 2021; Makholm, 2021; Mikhaylov, 2023; Mutalimov et al., 2021).

The proliferation of stablecoin variants across blockchains (USDC on Ethereum, Solana, Avalanche, Polygon, Base) has further enhanced composability by enabling cross-chain liquidity and arbitrage. Users can now move stablecoins seamlessly between ecosystems, taking advantage of yield opportunities wherever they arise (Raugei et al., 2020; Rizwan et al., 2022; Rizwan et al., 2020). This fragmentation across chains, while introducing technical complexity, ultimately strengthens the market by creating more competitive conditions and more options for users (Muzic and Grzeta, 2022; Neagu et al., 2020; Qin, 2020).

While stablecoins are essential to Sustainable DeFi, their centrality creates systemic risks. If a major stablecoin, particularly a centralized one like USDC or USDT, were to lose its peg, the ripple effects would be catastrophic. Lending protocols would face cascading liquidations as collateral values collapsed. AMM pools would experience impermanent loss and reduced liquidity. Yield-bearing strategies would unwind, causing further market disruption (Chang et al., 2026; Chen et al., 2025; Wang et al., 2024).

This dependency means that the stability of the DeFi ecosystem rests on the trustworthiness and solvency of stablecoin issuers. For centralized stablecoins, this is the classic counterparty risk of traditional finance. For decentralized stablecoins like DAI, it is the risk of collateral volatility and governance failure. Managing these risks is the central challenge facing DeFi as it matures (Elliott et al., 2021; Flannery and Protopapadakis, 2002; Frattolillo et al., 2020).

4.5. Limitations of the Hayekian interpretation

Having analyzed how Sustainable DeFi implements Hayek's mechanisms, we now turn to the limitations and challenges that paint a grayer picture of the Hayekian interpretation.

A fundamental challenge to the Hayekian interpretation of crypto assets is the extent to which ownership is concentrated among large holders. Halaburda et al. (2022) documented that the distribution of many crypto assets is highly skewed, with a small number of "whales" holding a disproportionate share of total supply. For example, the top 1% of Bitcoin addresses control approximately 30% of all Bitcoin, and similar patterns exist across major cryptocurrencies. This concentration raises questions about whether the market is genuinely competitive or whether it is subject to manipulation and control by a few large actors.

The implications for Hayek's competition mechanism are significant. If a small number of holders can influence prices through large transactions, the price signals that Hayek viewed as aggregating dispersed information may instead reflect the preferences of a few dominant players. Similarly, in proof-of-stake systems, governance votes can, in principle, be manipulated by large stakeholders, undermining the decentralized decision-making that is supposed to replace central planning (Conteh et al., 2021; Tamashiro et al., 2023). This paints a much grayer picture of whether crypto assets describe what Hayek had in mind, at least as of today (Kicova et al., 2025; Ko and Kuo-Shing, 2025; Napari, 2026).

Another strong theme in Hayek is the combination of free enterprise and rule of law. Hayek did not envision markets operating outside legal frameworks; rather, he saw the rule of law as essential for markets to function effectively. However, the pseudonymous nature of crypto assets, where accounts are identified by numbers rather than names, creates significant tension with this requirement.

The lack of transparency in crypto has been shown to be at odds with rule of law in several respects. Amiram et al. (2022) demonstrated that on-chain transfers can predict terrorist attacks, suggesting that crypto assets can serve as an outlet for resources to illegal groups. Similarly, Bertomeu et al. (2024a) showed that crypto can serve as an outlet for misuse of government subsidies, enabling fraud and abuse. These findings indicate that while crypto assets may offer benefits in terms of privacy and censorship resistance, they also create opportunities for activities that undermine the rule of law.

This presents a fundamental challenge to the Hayekian interpretation. Hayek's competition mechanism relies on the ability of market participants to make informed decisions based on transparent information. If the identities of transactors are hidden, it becomes difficult to assess credibility, enforce contracts, or hold parties accountable.

A central question is whether DeFi should be the focus of the analysis or whether it should be understood as one component of a broader monetary ecosystem. We acknowledge that our original manuscript may have overemphasized DeFi relative to centralized platforms.

In reality, the crypto monetary ecosystem comprises decentralized protocols (Aave, Compound, Uniswap, Curve) and centralized platforms (Binance, Coinbase). Users interact with both, and the distinction is not always clear-cut. Centralized platforms provide fiat on-ramps, custody services, and liquidity that DeFi protocols rely on. Similarly, DeFi protocols provide decentralized lending, borrowing, and trading that complement centralized services.

However, DeFi and centralized platforms present challenges from a Hayekian perspective. The lack of formal regulation in DeFi, discussed by Bertomeu et al. (2024b) and Bourveau et al. (2024),

prevents a clean separation between high-quality actors and lower-quality ones. The fragilities of the system suggest that these are the result of lack of maturity and imperfect rule of law. Centralized platforms, while subject to some regulation, have also experienced major bankruptcies (FTX, Celsius) that indicate systemic weaknesses.

This is, of course, not unique to DeFi. Centralized platforms have similarly faced major bankruptcies, and even well-established protocols like Aave have required rescue packages after major hacks (Bourveau et al., 2024). These events suggest that the current ecosystem, whether decentralized or centralized, has not achieved the level of institutional maturity that Hayek's vision requires.

Hayek viewed regulation as a complement to well-functioning markets; that is, regulations are "demanded" by market participants rather than imposed from the top. This is not where the current banking system in crypto currencies is. Market participants may demand clarity and stability, but the regulatory framework remains fragmented, uncertain, and often reactive rather than proactive.

4.6. Fundamental limitations of the crypto ecosystem

A comprehensive assessment of crypto assets through Hayek's lens must acknowledge fundamental limitations of the current ecosystem.

A fundamental limitation of the current crypto ecosystem is that there is no active lending system for crypto in the traditional sense. While actors can use crypto as collateral to "borrow," this only works as a margin investment account that needs to be over-collateralized. In other words, it is necessary to post 100% as collateral (or nearly so) to borrow.

This is different from standard borrowing where one uses real assets (like a house) as collateral and can borrow a fraction of the asset's value. In traditional finance, a borrower might put 20% down on a house and borrow the remaining 80%. In crypto, the borrower must put up 100%+ collateral to borrow even 50% of its value. This is not lending in the economic sense; it is margin trading.

Hayek envisioned a monetary system where money serves three functions: medium of exchange, store of value, and unit of account. For money to serve as a store of value, it must be possible to lend it; to transfer purchasing power from the present to the future in exchange for interest. Over-collateralized lending does not achieve this; it merely enables leveraged speculation on crypto assets.

It is not clear how this will evolve in the direction of genuine lending. For crypto to serve as collateral comparable to real assets, there would need to be a mechanism to assess creditworthiness, enforce contracts, and recover value in default; functions that require legal institutions and physical assets. This is a fundamental limitation of the current crypto ecosystem and represents a significant gap between reality and Hayek's vision.

A fundamental question is whether stablecoins have any meaningful role in Hayek's framework. The whole point of Hayek's argument was to protect individuals against states printing more money, thus devaluing the currency. This is the case for Bitcoin and Ether, as well as many cryptocurrencies; they are designed to have limited supply and resist inflationary devaluation.

Stablecoins, by contrast, are mirrors for state currencies. They are pegged to the US dollar (or other fiat currencies) and are designed to maintain a stable value. This means they are economically equivalent to state fiat; 1 USDC is economically the same as $1. They do not provide protection against state devaluation; they are a digital wrapper for the same state currency.

The role of stablecoins in Hayek's framework is therefore limited. They serve a transactional function and facilitate trading, provide liquidity, and enable efficient exchange within the crypto ecosystem. They are a bridge between volatile crypto assets and stable state currencies. However, they do not represent an alternative to state money in the way that Bitcoin or Ether do.

One could argue that stablecoins play a role in Hayek's competition framework by providing a stable medium of exchange that facilitates the use of other crypto assets. Without stablecoins, it would be difficult to trade crypto assets efficiently or to move in and out of positions without exposing oneself to volatility. In this sense, stablecoins are complementary to the unpegged assets that Hayek would view as true alternatives to state money.

5. Conclusions

While Sustainable DeFi implements many of Hayek's mechanisms, competition among issuers, voluntary choice, market selection of the best money, significant gaps remain between Hayek's ideal and reality. Ownership concentration in many crypto assets suggests that competition may be less genuine than it appears. The pseudonymous nature of crypto creates tension with Hayek's emphasis on rule of law and transparency. Additionally, the fragmented, reactive regulatory framework does not represent the complement to well-functioning markets that Hayek envisioned.

These limitations do not invalidate the Hayekian framework but suggest that Sustainable DeFi is best understood as an ongoing experiment rather than a completed realization of Hayek's vision. The competition is real in some dimensions but constrained in others. The discovery process is at work but has not produced the institutional maturity that Hayek's theory requires. The future of this experiment will depend on whether the ecosystem can address these challenges and move closer to the ideal of a transparent, rule-of-law-based competitive monetary system.

However, the digital environment has created new challenges: Technological risks, regulatory opposition, and the problem of ensuring real stability. The future of Sustainable DeFi will depend on the ability of the community to find a balance between Hayek's ideals of decentralized competition and the practical requirements of security, stability, and legitimacy in the eyes of society and regulators.

Author contributions

Alexey Mikhaylov: Writing–original paper, methodology, software, validation, and formal analysis.

AI use statement

During the preparation of this manuscript, the authors used AI-assisted tools solely for language refinement. No AI tools were used for data analysis, interpretation, or generation of scientific content. All outputs were critically reviewed and edited by the authors. The authors take full responsibility for the integrity and accuracy of the work.

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