

Function Over Form: Toward a Safe Harbor Framework for DeFi Regulation of Utility Tokens

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ABSTRACT

DeFi tokens perform distinct economic roles. These include governance, collateral, stability, and utility access. Existing securities

doctrine often misclassifies non-investment tokens as securities. This error deters development of utility tokens that power decentralized applications.

This Article develops a function-based framework. As a first application, it proposes a narrow statutory safe harbor for utility tokens. Eligibility depends on three safeguards. First, technical resilience, supported by independent security audits and incident-response protocols. Second, accountable control, with defined upgrade authority and defined obligations for keyholders. Third, calibrated oversight, with consumer-protection and operational requirements for access tokens, not investor-protection regimes for capital raising.

The safe harbor preserves core principles of U.S. securities law for bona fide investment instruments. At the same time, it offers a predictable compliance path for pay-for-use services. A durable, uniform rule is needed to distinguish true utilities from investment contracts. Only Congress can enact such a rule. Agency guidance or case-by-case settlements cannot. The same function-first method can guide future tailored rules for other DeFi token functions.

Keywords: DeFi; Safe Harbor Framework; Regulatory Compliance; Financial Innovation; Blockchain Technology; Smart Contracts; Financial Regulation; Cryptocurrency; Financial Stability; Investor Protection

JEL Classifications: G23; G28; K22; O33; O34.

INTRODUCTION

Decentralized finance (DeFi) is expanding rapidly,¹ while the United States' share of the talent building it is shrinking.² The U.S. is losing DeFi market share because of regulatory uncertainty³ and outdated doctrine.⁴ This Article offers a concrete step toward resolving both problems: Congress should enact a narrowly tailored, function-based safe harbor for genuine “utility tokens” to correct a doctrinal misclassification regarding what is a “security.” As explained here, this is the first application of a more general, function-first framework for digital-asset regulation.

The Securities and Exchange Commission (SEC) derives regulatory authority over most cryptocurrencies based on its interpretation of a 1946 Supreme Court decision defining a “security” as (1) an investment of money, (2) in a common enterprise, (3) with a reasonable expectation of profits, (4) to be derived from the efforts of others.⁵ This “*Howey* test” famously instructs courts to focus on “economic reality,” not labels, so, for example, contracts styled as land sales for orange groves could be deemed securities.⁶ However, this ostensibly functional analysis has

¹ The \$150 billion DeFi industry is project to exceed \$450 billion by 2032. Fortune Business Insights, *Decentralized Finance Technology Market Size, Share & Industry Analysis ... 2025–2032* (Aug. 11, 2025), <https://www.fortunebusinessinsights.com/decentralized-finance-technology-market-107823> [<https://perma.cc/7JM2-ZSW3>] (projecting DeFi market growth from \$86.53 billion in 2025 to \$457.35 billion by 2032). Pietro Saggese, Michael Fröwis, Stefan Kitzler, Bernhard Haslhofer & Raphael Auer, *Towards Verifiability of Total Value Locked (TVL) in Decentralized Finance*, BIS Working Paper No. 1268 (May 2005), <https://www.bis.org/publ/work1268.pdf> [<https://perma.cc/HRP5-G5WZ>] (explaining how to measure the aggregate value of cryptoassets deposited in DeFi protocols in terms of “total value locked” or “TVL”); DefiLlama, *Total Value Locked* (last accessed Aug. 31, 2025) <https://defillama.com> (reporting \$154.604 TVL as of Aug. 31, 2025). <https://defillama.com/> [<https://perma.cc/RR6B-LPVV>].

² The U.S. share of open-source crypto developers fell from roughly 38% in 2015 to about 19% in 2024—a fifty percent relative decline—during the same period that global DeFi activity and market forecasts rose sharply. Electric Capital, *Asia Leads in Crypto Developers While the U.S. Continues to Lose Ground*, DEVELOPER REPORT (Oct. 31, 2024), <https://www.developerreport.com/developer-report-geography> [<https://perma.cc/LKA5-7CPN>] (reporting U.S. share decline from approximately 38% in 2015 to 19% in 2024).

³ See, e.g., Ben Strack, *U.S. Losing Ground on Blockchain Developer Share: Study*, *Blockworks* (Mar. 29, 2023), <https://blockworks.co/news/blockchain-developer-market-share-study> [<https://perma.cc/CVH7-X2TK>].

⁴ See *infra* Part II.

⁵ *SEC v. W.J. Howey Co.*, 328 U.S. 293, 298–99 (1946)

⁶ *Id.* at 298 (“form is disregarded for substance and the emphasis is on economic reality”).

ossified into a formalist approach, where the SEC now treats many tokens as investment contracts—especially where sales are pre-functional and team-led—and, thus, the SEC claims many digital assets are securities under their jurisdiction.⁷

The SEC’s aggressive approach toward regulating digital assets as securities is particularly problematic regarding “utility tokens.” Utility tokens are something you buy to use specific products or features, such as cloud storage for files,⁸ compute time for artificial intelligence programs,⁹ access to decentralized cellular networks,¹⁰ or in-game items.¹¹ Utility tokens make tiny, pay-as-you-go purchases possible and automatic in ways credit cards cannot enable. Cards charge a percentage plus a flat per-swipe fee, so very small payments get eaten by fees; utility tokens let businesses meter usage in much less than pennies.¹² Utility tokens also enable programmed access: the moment the token payment arrives, software can unlock a feature, open a file, or allocate network bandwidth, avoiding manual billing, invoices, or chargeback workflow.¹³

⁷ SEC, *Framework for “Investment Contract” Analysis of Digital Assets*, 132(8) HARVARD LAW REVIEW 2418 (June 2019) (identifying factors indicating when a digital asset is likely an investment contract) [<https://perma.cc/AFU9-GCXX>].

⁸ *E.g.*, Sam Williams, Abhav, Kedia, Lev Berman & Sebastian Campos-Groth, *Arweave: The Permanent Information Storage Protocol*, Arweave.org (Dec. 2023), <https://www.arweave.org/files/arweave-lightpaper.pdf> [<https://perma.cc/E9GS-9J54>] (discussing a network that removes utility tokens from circulation every time data is uploaded to create a reserve to pay for data storage over time).

⁹ *E.g.*, Akash.com (last visited Aug. 31, 2025) (“The Decentralized Cloud Build to AI’s Next Frontier: Unlock global GPU power at a fraction of the cost”), <https://akash.network/> [<https://perma.cc/FNK4-FBFA>].

¹⁰ Helium, Data Credit (last visited Aug 31, 2025) (explaining how the utility token known as Data Credits are the mechanism by which automated applications on the Internet of Things accesses mobile networks and internet hotspots), <https://docs.helium.com/tokens/data-credit/> [].

¹¹ *E.g.*, The Sandbox, *SAND: What is SAND?* (last visited Aug. 31, 2025) (explaining how SAND is a utility token that functions as the Sandbox Game’s medium of exchange that allows for a digital economy to exist in The Sandbox ecosystem), <https://docs.sandbox.game/en/owners/sand> [<https://perma.cc/HR8Z-NX79>].

¹² Organisation for Economic Co-operation and Development (OECD), *Online Payment Systems for E-commerce*, OECD Digital Economy Papers No. 117 (Apr. 18, 2006), https://www.oecd.org/content/dam/oecd/en/publications/reports/2006/04/online-payment-systems-for-e-commerce_g17a1bfa/231454241135.pdf [<https://perma.cc/2CLM-5ENK>].

¹³ Dylan Yaga, Peter Mell, Nik Noby & Karen Scarfone, *Blockchain Technology Overview*, National Institute of Standards and Technology (NIST) NISTIR 8202 (Oct. 2018), <https://doi.org/10.6028/NIST.IR.8202> [<https://perma.cc/45CH-5B5W>].

These pay-for-use utility tokens already operate at meaningful scale. One slice of the market powers decentralized physical-infrastructure networks (DePIN), which provide decentralized access to radios, cellular, WiFi, imaging, sensors, storage and compute; DePIN networks are worth roughly \$30–\$50 billion in market value today.¹⁴ Another growing use of utility tokens appears in blockchain-powered games that rely on in-game utility tokens; they recorded about 7.4 million daily active users in 2024.¹⁵ At the broader ecosystem level, consulting firm McKinsey & Company projects that tokenized digital-asset markets will be at least a two-trillion-dollar industry by 2030, with bullish estimates projecting a four-trillion-dollar market.¹⁶ That projection covers categories beyond utility tokens, but it shows that utility tokens are not some fringe fad; they are becoming a common way to meter digital services.

Utility tokens often get caught in the *Howey* trap because of how decentralized networks launch. Many networks require an early “liquidity-bootstrapping” phase, where users buy tokens before the service is fully live. This resembles a Kickstarter pre-purchase: prospective users fund development by prepaying for future access. The intended end is use, not profit, so it should be deemed a “commodity for personal consumption” and thus not a security.¹⁷ Yet the SEC—and some courts—have treated many pre-launch sales as investment contracts.¹⁸

The combination of the SEC’s aggressive posture with the doctrinal misfit contributes to U.S. innovation flight.¹⁹ While other major

¹⁴ Messari, *DePIN Sector: Key Updates and Trends for Q1 2025*, <https://messari.io/copilot/share/depin-sector-q1-2025-updates-1e63f804-cf41-437c-af12-c1067c24e5e9> [<https://perma.cc/N2MZ-3S25>].

¹⁵ Sara Gherghelas, *DappRadar Games Report – 2024 Overview*, DappRadar (Jan. 21, 2025), <https://dappradar.com/blog/dappradar-games-report-2024-overview> [<https://perma.cc/Y47A-YF67>].

¹⁶ <https://perma.cc/K9GQ-UGVY>

¹⁷ See *United Housing Foundation, Inc. v. Forman*, 421 U.S. 837, 858 (1975) (“What distinguishes a security transaction – and what is absent here – is an investment where one parts with his money in the hope of receiving profits from the efforts of others, and not where he purchases a commodity for personal consumption or living quarters for personal use.”).

¹⁸ See, e.g., *SEC v. Telegram Grp. Inc.*, 448 F. Supp. 3d 352 (S.D.N.Y. 2020); *SEC v. Kik Interactive Inc.*, 492 F. Supp. 3d 169 (S.D.N.Y. 2020); *SEC v. LBRY, Inc.*, No. 21-cv-260-PB, 2022 WL 16744741 (D.N.H. Nov. 7, 2022); *SEC v. Ripple Labs Inc.*, No. 20-cv-10832 (AT), 2023 WL 4507900 (S.D.N.Y. July 13, 2023) (institutional sales); *SEC v. Terraform Labs Pte Ltd.*, No. 23-cv-1346 (JSR) (S.D.N.Y. Dec. 28, 2023) (summary judgment on registration claim), final judgment entered, No. 23-cv-1346 (JSR) (S.D.N.Y. July 24, 2024); *Balestra v. ATBCOIN LLC*, 380 F. Supp. 3d 340 (S.D.N.Y. 2019); *SEC v. NAC Found., LLC*, 512 F. Supp. 3d 988 (N.D. Cal. 2021).

¹⁹ See *infra* Part III.

jurisdictions carve out utility tokens from securities regulation,²⁰ the U.S. puts would-be utility-token developers in a Catch-22. To make a utility token actually useful, a team typically needs money and wide distribution or liquidity before launch. But the very steps that raise funds and seed liquidity (such as pre-functional sales, marketing the team's build efforts, and talk of secondary trading) are the facts the SEC and courts use to call the sale an investment contract under *Howey*. Once so deemed, the SEC can intervene, enjoining the product as an unregistered security and levying heavy penalties on the developers. Complying with securities regulation is generally not feasible because the associated restrictions (accredited-investor verification,²¹ transfer-restriction periods,²² ongoing reporting obligations,²³ etc.) severely limit consumer utility. Accordingly, teams must choose between breaking utility or triggering *Howey*: a Catch-22 they often resolve by not operating in the U.S. at all.

This Article offers a way out of the *Howey* trap: a narrow, legislative safe harbor for utility tokens. The safe harbor is not a deregulatory blank check. Instead, it is conditional. Tokens qualify only if they meet substantive safeguards that protect consumers, ensure operational resilience, and hold real humans accountable. These safeguards draw from

²⁰ See, e.g., Regulation (EU) 2023/1114 of the European Parliament and of the Council on Markets in Crypto-Assets (MiCA), 2023 O.J. (L 150) 40, arts. 3(1)(9), 3(2) (defining “utility token” and excluding crypto-assets that qualify as MiFID II financial instruments), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX%3A32023R1114>; Financial Conduct Authority, The Financial Services and Markets Act 2000 (Exemption) (Cryptoasset Promotions) Order 2022, UK SI 2022/1391 (statutory instrument defining regulatory perimeter relating to cryptoassets, including utility tokens outside perimeter unless meeting e-money criteria), <https://www.legislation.gov.uk/uksi/2022/1391/contents>; Swiss Federal Act on Financial Market Infrastructures and Market Conduct in Securities and Derivatives Trading (Financial Market Infrastructure Act, FMIA), SR 958.1, art. 2(d) (2016) (distinguishing utility tokens from securities); Monetary Authority of Singapore Act, (Cap. 186), Securities and Futures Act (Cap. 289), §§ 2(1), 2(4) (2021 Revised Ed.) (governing regulation of capital markets products including distinctions for utility tokens).

²¹ Securities Act of 1933, 15 U.S.C. § 77d(a)(15) (exemptions related to accredited investors); Regulation D, 17 C.F.R. §§ 230.501 et seq. (definition of accredited investor and verification requirements); SEC, Final Rule: Accredited Investor Definition (Aug. 26, 2020), 85 Fed. Reg. 53242 (detailing verification standards).

²² Securities Act of 1933, 15 U.S.C. § 77e(c) (prohibition on general solicitation in certain private offerings); Rule 144, 17 C.F.R. § 230.144 (holding periods and conditions on resale of restricted securities); Rule 144A, 17 C.F.R. § 230.144A (regulation of resale to qualified institutional buyers).

²³ Securities Exchange Act of 1934, 15 U.S.C. §§ 78o, 78m, 78n (registration and ongoing disclosure obligations for registered securities); Exchange Act Rules 12b-20, 13a-1 through 13a-17, 15d-1 through 15d-27, 17 C.F.R. §§ 240.12b-20, .13a-1 et seq., .15d-1 et seq. (periodic reporting requirements for issuers).

existing financial regulation and from international practice in the European Union,²⁴ the United Kingdom,²⁵ Singapore,²⁶ Switzerland,²⁷ and other jurisdictions that already distinguish utility tokens from securities. The proposal is designed to preserve the core of U.S. securities law while carving out space for genuine utilities.

There is, of course, a substantial literature on safe harbors in securities law²⁸ and on administrative discretion more generally.²⁹ This Article does not attempt to resolve those broader debates. Its aim is narrower: to craft a workable statutory safe harbor tailored to the problem of utility tokens.

Institutionally, the argument is straightforward. The SEC has neither the incentives nor the inclination to narrow its own reach.³⁰ Courts are

²⁴ Regulation (EU) 2023/1114 (MiCA) art. 3(1)(9) (defining “utility token”) & art. 4(3)(c) (exempting offers of utility tokens giving access to existing goods/services).

²⁵ FCA, PS19/22: Guidance on Cryptoassets ¶¶ 2.21–2.22 (utility tokens generally outside the regulatory perimeter unless they meet the e-money definition).

²⁶ MAS, A Guide to Digital Token Offerings (May 26, 2020) (tokens are regulated only if they are “capital markets products”; pure access tokens fall outside).

²⁷ FINMA, ICO Guidelines (Feb. 16, 2018) (utility tokens are not securities if their sole purpose is access and they are functional at issuance).

²⁸ See, e.g., Donald C. Langevoort, *Disclosures that “Bespeak Caution”*, 49 BUS. LAW. 481 (1994); Ann M. Olazábal, *False Forward-Looking Statements and the PSLRA’s Safe Harbor*, 86 IND. L.J. 595 (2011); Amanda M. Rose, *SPAC Mergers, IPOs, and the PSLRA’s Safe Harbor*, 64 WM. & MARY L. REV. 1757 (2023); Michael A. Perino, *Did the Private Securities Litigation Reform Act Work?*, 2003 U. ILL. L. REV. 913; Allan Horwich, *Cleaning the Murky Safe Harbor for Forward-Looking Statements: An Inquiry into Whether Actual Knowledge of Falsity Precludes the Meaningful Cautionary Statement Defense*, 35 J. CORP. L. 519 (2010); Wendy Gerwick Couture, *Mixed Statements: The Safe Harbor’s Rocky Shore*, 39 Sec. Reg. L.J. 257 (2011).

²⁹ Cf. Robert A. Anthony, *Interpretive Rules, Policy Statements, Guidances, Manuals, and the Like—Should Federal Agencies Use Them to Bind the Public?*, 41 DUKE L.J. 1311 (1992); Ronald M. Levin, *Rulemaking and the Guidance Exemption*, 70 ADMIN. L. REV. 263 (2018); Nicholas R. Parrillo, *Federal Agency Guidance and the Power to Bind: An Empirical Study of Agencies and Industries*, 36 YALE J. ON REG. 165 (2019); Jacob E. Gersen & Anne Joseph O’Connell, *Hiding in Plain Sight?: Timing and Transparency in the Administrative State*, 76 U. CHI. L. REV. 1157 (2009).

³⁰ Public choice predicts that agencies tend to expand—bureaucrats maximize budgets and discretion, and regulation is often shaped by organized interests; the SEC, in particular, has incentives to preserve relevance and jurisdiction as markets evolve, consistent with reputation-seeking behavior in bureaucracies. See William A. Niskanen, *BUREAUCRACY AND REPRESENTATIVE GOVERNMENT* (1971); George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971); Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J.L. & ECON. 211 (1976); Jonathan R. Macey, *Administrative Agency Obsolescence and Interest Group Formation: A Case Study of the SEC at Sixty*, 15 CARDOZO L. REV. 909 (1994); Daniel P. Carpenter, *REPUTATION AND POWER:*

unlikely to deliver timely relief, given existing doctrine and litigation posture.³¹ That leaves Congress as the only institution capable of creating a narrow safe harbor for utility tokens. For that reason, this Article offers a concrete legislative fix to an urgent and important problem that agencies and courts are ill-suited to resolve.

The contribution of this Article, then, is both doctrinal and practical. Doctrinally, it develops criteria—drawing from technical, governance, and market safeguards already in use abroad—for distinguishing genuine utility tokens from investment contracts. Practically, it shows how those safeguards can be codified in U.S. law to give projects advance notice of how to comply, while preserving securities regulation for true investments.

The rest of the Article proceeds as follows. Part I introduces decentralized finance, the regulatory challenges it poses, and the function-based framework. Part II explains why current U.S. law is inadequate and develops the statutory safe harbor. Part III addresses specific risks and sets out the safeguards. Part IV considers enforcement in decentralized settings. Part V examines potential drawbacks and mitigation strategies. Part VI outlines implementation, including coordination with foreign regimes. The Article concludes that a narrow statutory safe harbor for utility tokens, enacted by Congress and implemented with substantive safeguards, can resolve misclassification while preserving core securities-law principles.

PART I. DECENTRALIZED FINANCE

The rise of Decentralized Finance (DeFi)—a financial system that enables direct peer-to-peer transactions without traditional intermediaries like banks or brokerages—has introduced groundbreaking innovations that challenge the traditional financial services landscape. DeFi platforms have the potential to revolutionize financial markets by offering more accessible, transparent, and inclusive financial products. From decentralized exchanges to lending protocols and synthetic assets, DeFi

ORGANIZATIONAL IMAGE AND PHARMACEUTICAL REGULATION AT THE FDA (2010).

³¹ See, e.g., John C. Coffee Jr., *Litigation and Corporate Governance: The Role of the Securities Class Action*, 102 COLUM. L. REV. 1308, 1314–16 (2002) (noting that complex securities cases often span several years from filing to resolution); Jonathan Stempel, *SEC ends lawsuit against Ripple, company to pay \$125 million fine*, Reuters (Aug. 8, 2025), <https://www.reuters.com/legal/government/sec-ends-lawsuit-against-ripple-company-pay-125-million-fine-2025-08-08> [<https://perma.cc/VY3W-FAST>] (documenting that the Ripple litigation took nearly five years to reach a final settlement).

has catalyzed new ways of creating and managing value. As the sector continues to expand, however, it faces significant regulatory challenges that threaten to hinder its growth and integration into the broader financial ecosystem.

Traditional regulatory frameworks are struggling to keep pace with the fast-evolving DeFi landscape. Regulatory approaches that were designed for centralized systems fail to account for the decentralized, pseudonymous, and borderless nature of DeFi. The lack of clarity surrounding how existing laws apply to DeFi platforms has resulted in regulatory uncertainty, which can stifle innovation and create barriers to entry for legitimate projects. For example, U.S. securities laws, primarily built around the idea of centralized intermediaries, struggle to address the complexity of DeFi tokens, many of which do not fit neatly into traditional categories like stocks or bonds. This gap has led to a growing call for a new regulatory framework—one that focuses on the economic function of tokens rather than their form.

This Article proposes a function-based safe harbor framework for DeFi regulation, designed to address these challenges by creating a regulatory environment that encourages innovation while protecting users and ensuring market integrity. By focusing on the economic realities of DeFi platforms, the framework offers a flexible and adaptable solution that can evolve with the sector. It proposes that DeFi projects be allowed to operate within a safe harbor if they meet certain requirements, such as conducting regular security audits, adhering to transparency standards, and complying with certain governance and consumer protection measures. This safe harbor would incentivize responsible development in DeFi while reducing regulatory uncertainty for innovators and investors alike.

The framework also addresses key enforcement challenges in the decentralized context, proposing mechanisms for self-regulation through Decentralized Autonomous Organizations (DAOs) and encouraging international collaboration to overcome jurisdictional barriers. By focusing on tokens' economic function rather than relying on rigid definitions, the framework aims to create a more efficient and forward-looking regulatory approach that better aligns with the evolving nature of the digital economy.

A. The Rise of DeFi

DeFi represents a paradigm shift in how financial systems operate. Built on blockchain technology, DeFi platforms aim to replace traditional financial intermediaries—such as banks, exchanges, and insurers—with

decentralized, open-source protocols.³² These platforms enable users to borrow, lend, trade, and invest in a wide array of financial products without relying on central authorities.³³ The decentralized nature of these systems means that they operate without a central governing body, instead relying on code and community governance through smart contracts and DAOs.³⁴

DeFi's innovative solutions hold significant potential to revolutionize financial markets.³⁵ Global accessibility, lower transaction costs, and enhanced transparency are some of the advantages that DeFi platforms offer over traditional financial systems.³⁶ For example, users across the world can access DeFi protocols to borrow or lend assets without needing a credit score or being subject to the fees and restrictions traditional banks impose.³⁷ Decentralized exchanges (DEXs) enable individuals to trade cryptocurrencies directly with one another, bypassing centralized exchanges, which have been targets for hacks and regulatory scrutiny.³⁸ Moreover, yield farming and liquidity mining protocols offer innovative ways for users to earn returns on their digital assets, further democratizing access to wealth-building opportunities.³⁹

32. Ronghua Xu et al., *Decentralized finance (DeFi): a paradigm shift in the Fintech.*, 18 ENTER. INFO. SYS., NO. 9, 1170–1200 (2024), doi:10.1080/17517575.2024.2397630.

33. *Id.* at 1171.

34. Raphael Auer et al., *The Technology of Decentralized Finance (DeFi)*, 6 DIGIT. FIN. 55, 55–95 (2024).

35. Shubham Garg, *Decentralized Finance (DeFi): Revolutionizing the Financial Landscape through Blockchain Technology*, THE PAYMENTS ASS'N (Sep. 12, 2023), <https://thepaymentsassociation.org/article/decentralized-finance-defi-revolutionizing-the-financial-landscape-through-blockchain-technology/> [<https://perma.cc/5CZ5-J4PQ>].

36. Coursera Staff, *What Is DeFi? A Guide to Decentralized Finance*, COURSERA, <https://www.coursera.org/articles/what-is-defi> [<https://perma.cc/7JEK-5ZCU>] (updated Oct. 31, 2024).

37. Brave Software, *What is DeFi?*, BRAVE, <https://brave.com/web3/what-is-defi/> [<https://perma.cc/2SPG-GWQ4>] (updated July 17, 2024).

38. Kadan Stadelmann & Shilpa Lama, *A Complete Guide to P2P Decentralized Exchanges (DEXs)*, BEINCRYPTO, <https://beincrypto.com/learn/p2p-dex-explained/> [<https://perma.cc/D2LF-FWTA>] (updated Dec. 18, 2024, 3:06 PM).

39. Joshua Soriano, *Yield Farming vs. Liquidity Mining: A Comparative Guide*, HELA LABS (Mar. 1, 2024), <https://helalabs.com/blog/yield-farming-vs-liquidity-mining-a-comparative-guide/> [<https://perma.cc/YH3Z-5B7K>].

Despite the significant potential, the rise of DeFi has also highlighted numerous challenges—particularly regarding regulation.⁴⁰ Traditional financial systems are subject to well-established regulatory frameworks that ensure consumer protection, market integrity, and financial stability.⁴¹ The decentralized and borderless nature of DeFi, however, presents a unique challenge for regulators.⁴² The assets and protocols used in DeFi do not fit neatly into existing categories, and many platforms operate without a clear regulatory framework, leaving participants exposed to legal ambiguity.⁴³ This challenge has led to calls for a regulatory model that is adaptable and able to meet the unique needs of decentralized technologies without stifling innovation.⁴⁴

Retail and institutional investors' increasing adoption of DeFi only underscores the need for a comprehensive regulatory solution.⁴⁵ As the DeFi sector continues to grow, so does the potential for systemic risk, especially if the sector remains largely unregulated.⁴⁶ In the face of this growing challenge, regulators worldwide are grappling with how to

40. Vincent Gramlich et al., *A Multivocal Literature Review of Decentralized Finance: Current Knowledge and Future Research Avenues*, 33 ELEC. MKTS. (2023), <https://link.springer.com/article/10.1007/s12525-023-00637-4> [<https://perma.cc/GR3M-PPKV>].

41. *Id.*

42. Ngozi Samuel Uzougbo et al., *Regulatory Frameworks for Decentralized Finance (DeFi): Challenges and opportunities*, 19 GSC ADVANCED RES. & REV. 116, 116–29 (2024), <https://doi.org/10.30574/gscarr.2024.19.2.0170> [<https://perma.cc/WJV5-NGC3>].

43. Pablo D. Azar et al., *The Financial Stability Implications of Digital Assets*, FED. RSRV. BANK OF N.Y. STAFF REP., NO. 1034, at 2 (Sep. 2022), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr1034.pdf [<https://perma.cc/J4HE-VGM6>].

44. Claude Brown, *Regulators Broaden Definitions of Regulated Trading and DeFi Platforms*, REED SMITH LLP (Feb. 17, 2022), <https://www.reedsmith.com/en/perspectives/2022/02/regulators-broaden-definitions-of-regulated-trading-and-defi-platforms> [<https://perma.cc/Z34W-SP4V>].

45. Jason Ekberg et al., *It's Time to Explore Institutional DeFi*, OLIVER WYMAN F., DBS, ONYX BY J.P. MORGAN, & SBI DIGIT. ASSET HOLDINGS (2022), <https://www.oliverwymanforum.com/future-of-money/2022/Nov/institutional-defi.html> [<https://perma.cc/V3SB-BUVJ>].

46. Financial Policy Committee, *Financial Stability in Focus: Cryptoassets and decentralised Finance*, BANK OF ENG. (Mar. 24, 2022), <https://www.bankofengland.co.uk/financial-stability-in-focus/2022/march-2022> [<https://perma.cc/8ZK3-KWK8>].

balance promoting innovation with the need for investor protection, market integrity, and financial stability.⁴⁷ This Article proposes a function-based safe harbor framework to address these concerns, providing a regulatory structure that supports innovation while mitigating the risks inherent in the rapidly evolving DeFi space.

1. Innovative Solutions and Economic Empowerment

DeFi offers a suite of innovative solutions that are reshaping the global financial landscape.⁴⁸ At its core, DeFi removes traditional intermediaries—banks, brokers, and payment processors—enabling peer-to-peer financial transactions that are transparent, efficient, and borderless.⁴⁹ By utilizing blockchain technology and smart contracts, DeFi platforms allow individuals to access a wide range of financial services that were previously available only to those with established relationships with financial institutions.⁵⁰

One of the most significant benefits of DeFi is its ability to provide economic empowerment to underserved populations.⁵¹ Traditional banking systems often impose barriers to financial inclusion, such as high fees, geographical limitations, and requirements for credit histories.⁵² In

47. Miles Kruppa & Gary Silverman, *Regulators Begin to Grapple with DeFi*, FIN. TIMES (June 26, 2021), <https://www.ft.com/content/e6e7d9d6-7778-4286-ba6f-e5831fcbc538> [PAYWALLED].

48. Carlo de Meijer, *2024: A Transformative and Innovative Year for DeFi*, TREASURYXL (Oct. 9, 2024), <https://treasuryxl.com/blog/2024-a-transformative-and-innovative-year-for-defi/> [<https://perma.cc/A4XF-2TB4>].

49. Sean Lee, *Democratizing Finance: How Web3 Bridges The Gap For The Underbanked*, FORBES, <https://www.forbes.com/sites/digital-assets/2024/10/07/democratizing-finance-how-web3-bridges-the-gap-for-the-underbanked/> [<https://perma.cc/W9ZZ-D6TU>] (updated Oct. 7, 2024, 11:10 AM).

50. Abdulgaffar Muhammad et al., *Decentralized Finance (DeFi) and Traditional Banking: A Convergence or Collision*, 5(1) ECON. POL'Y & REG'L DEV. AT *3-4 (2024), <https://doi.org/10.48550/arXiv.2312.01018> [<https://perma.cc/D36A-J7WN>].

51. Block Telegraph Staff, *The Role of DeFi in Financial Inclusion*, BLOCK TEL. (May 2, 2024), <https://blocktelegraph.io/role-of-defi-in-financial-inclusion/> [<https://perma.cc/28HQ-VHGP>].

52. Lumin Digital, *Banking the Unbanked Population: Building Financial Inclusion Through Fintech*, LUMIN DIGIT. INSIGHTS (Apr. 28, 2021), <https://lumindigital.com/insights/banking-the-unbanked-population-building-financial-inclusion-through->

contrast, DeFi platforms are accessible to anyone with an internet connection, providing a level playing field for individuals who might otherwise be excluded from the global economy.⁵³ Whether it is for remittances, lending, borrowing, or even investing, DeFi opens financial markets' doors to individuals in emerging markets, rural areas, or those without access to conventional banking services.⁵⁴

DeFi also enables greater financial autonomy.⁵⁵ With DEXs and lending protocols, users can manage their assets without relying on a third-party intermediary.⁵⁶ This direct control over one's financial transactions and assets reduces the friction, cost, and delay typically associated with traditional financial systems.⁵⁷ For example, lending platforms such as Compound or Aave allow users to earn interest on their digital assets or borrow funds without a credit check.⁵⁸ Similarly, platforms like Uniswap and SushiSwap offer decentralized exchanges where users can trade assets freely without relying on centralized entities to facilitate the process.⁵⁹

fintech/#:~:text=Fortunately%2C%20advances%20in%20fintech%20are,bridge%20the%20financial%20inclusion%20divide [https://perma.cc/PQU5-BSQN].

53. Rakesh Sharma, *What Is Decentralized Finance (DeFi) and How Does It Work?*, INVESTOPEDIA, <https://www.investopedia.com/decentralized-finance-defi-5113835> [https://perma.cc/MQL5-G4Y8] (updated Oct. 25, 2024).

54. *The Rise of Decentralised Finance (DeFi) Platforms in Emerging Markets*, FINTECH REV. (July 10, 2024), <https://fintechreview.net/decentralised-finance-defi-platforms-emerging-markets/> [https://perma.cc/LN6V-8U4B].

55. Eye of Unity, *Decentralized Finance: The Key to Financial Inclusion and Empowerment*, MEDIUM (Oct. 13, 2023), <https://medium.com/@eyesofunity/decentralized-finance-the-key-to-financial-inclusion-and-empowerment-3c2d75132b5> [https://perma.cc/4WYQ-DUTT].

56. *What Is a DEX? A Comprehensive Guide to Decentralized Exchanges*, RUBIC (Oct. 28, 2024), <https://rubic.exchange/blog/what-is-a-dex-a-comprehensive-guide-to-decentralized-exchanges/> [https://perma.cc/5XFY-4PHU].

57. Kaushal Shah et al., *A Systematic Review of Decentralized Finance Protocols*, 4 INT'L J. INTELLIGENT NETWORKS 171, 174–76 (2023), <https://doi.org/10.1016/j.ijin.2023.07.002> [https://perma.cc/3XBG-7CKH].

58. Thomas Adam, *Aave vs Compound: Which DeFi Lending Platform is Better?*, COINWIRE, <https://coinwire.com/aave-vs-compound> [https://perma.cc/54GY-96H4] (updated Jan. 1, 2024).

59. Esat Dedezeade, *The Top Decentralized Exchanges (DEXs) in 2021*, DECRYPT (June 16, 2021), <https://decrypt.co/73356/top-decentralized-exchanges-dex-uniswap-sushiswap> [https://perma.cc/Q4FV-AXQC].

Moreover, DeFi innovations have led to the creation of novel financial products that provide better risk management, enhanced liquidity, and increased accessibility to complex financial services.⁶⁰ Yield farming and liquidity mining offer individuals ways to earn rewards on their cryptocurrency holdings, incentivizing people to participate in decentralized protocols while contributing liquidity to the ecosystem.⁶¹ These innovations represent a fundamental shift toward more equitable financial systems, where anyone with digital assets can participate and benefit.⁶²

In addition to promoting financial inclusion, DeFi has the potential to create entirely new economic ecosystems that incentivize participation, collaboration, and network effects.⁶³ By allowing for the creation of tokenized economies, DeFi encourages users to contribute to the growth and success of projects, often rewarding them through governance tokens or dividends.⁶⁴ This value tokenization enables disruptive innovation, where individuals, communities, and organizations can create value that transcends traditional financial models.⁶⁵

While the potential for economic empowerment is vast, the regulatory challenges surrounding DeFi's growth present significant barriers to its

60. *DeFi 2.0: The Next Wave of Financial Innovation*, OPENWARE (July 30, 2024), <https://www.openware.com/news/articles/defi-2.0-the-next-wave-of-financial-innovation> [<https://perma.cc/8JMP-EYQE>].

61. Asset Hodler Staff, *Yield Farming and Liquidity Mining: Opportunities and Risks in DeFi*, ASSET HODLER (July 15, 2024), <https://asset-hodler.com/yield-farming-and-liquidity-mining-opportunities-and-risks-in-defi/> [<https://perma.cc/VK4E-34UW>].

62. Jakub Lazurek, *Staking, Yield Farming, and Liquidity Mining: Key DeFi Differences*, COINPAPRIKA (Oct. 30, 2024), <https://coinpaprika.com/news/staking-yield-farming-and-liquidity-mining-key-defi-differences/> [<https://perma.cc/YZW4-WFHF>].

63. Jackson Wood, *Understanding DeFi and Its Importance in the Crypto Economy*, COINDESK, <https://www.coindesk.com/tech/2022/01/20/understanding-defi-and-its-importance-in-the-crypto-economy/> [<https://perma.cc/24T2-2N2S>] (updated Apr. 9, 2024, 9:02 PM).

64. *The Role of Community in Shaping the Future of Decentralized Finance (DeFi) in Recent Years*, *Decentralized Finance (DeFi)*, LENOUS (Oct. 9, 2024), <https://www.lenous.io/post/role-of-community-in-shaping-future-of-defi> [<https://perma.cc/59NJ-6WTB>].

65. Cathrine Williams, *Top 10 Trends Reshaping the Future of Decentralized Finance (DeFi) in 2024*, COINMONKS (Apr. 2, 2024), <https://medium.com/coinmonks/top-10-trends-reshaping-the-future-of-decentralized-finance-defi-in-2024-8b73b2e4b8ae>.

continued success and mass adoption.⁶⁶ As such, developing a framework that fosters innovation while addressing the inherent risks is essential to fully realize DeFi's transformative potential.⁶⁷

2. Challenges to Traditional Regulatory Frameworks

While the innovations brought about by DeFi are transformative, they also create significant challenges for traditional regulatory frameworks.⁶⁸ These frameworks were designed with centralized financial institutions in mind, and as such, they struggle to address the decentralized, borderless, and pseudonymous nature of DeFi platforms.⁶⁹ The core features that make DeFi so innovative also complicate its regulation, requiring a fundamental rethinking of how laws and regulations should be applied.⁷⁰

A primary challenge is the lack of a central authority in DeFi ecosystems.⁷¹ In traditional finance, regulatory bodies such as the Securities and Exchange Commission (SEC) or the Commodity Futures Trading Commission (CFTC) oversee financial markets through central entities.⁷² In contrast, DeFi platforms operate on blockchain networks where governance is decentralized, often through DAOs.⁷³ These organizations can function without a central figure or entity that could be held accountable.⁷⁴ Without a clear point of contact or authority,

66. Rubén Leal Buenfil & Alexander Hernández Romanowski, *Implications of Decentralized Finance for Competition, Antitrust Policy and Economic Growth*, MCNAIR CTR. FOR ENTREPRENEURSHIP AND ECON. GROWTH (Dec. 1, 2022), <https://doi.org/10.25613/9sgw-q030> [<https://perma.cc/2LKR-VXG5>].

67. Uzougbo, *supra* note 11, at 117–20.

68. *Id.*

69. *Id.*

70. Jesse Anglen, *The Global Landscape of DeFi Regulations: What You Need to Know in 2024*, RAPID INNOVATION (2024), <https://www.rapidinnovation.io/post/the-global-landscape-of-defi-regulations-what-you-need-to-know-in-2024> [<https://perma.cc/D59A-AJCT>].

71. *Id.*

72. Debbie Carlson, *Financial Regulators: The Market Police*, BRITANNICA MONEY, <https://www.britannica.com/money/financial-market-regulators> [<https://perma.cc/K7PW-WY3U>] (last visited July 2, 2024).

73. Kevin Werbach, *What is decentralized finance? An expert explains*, WORLD ECON. F. (Aug. 10, 2021), <https://www.weforum.org/stories/2021/08/what-is-decentralized-finance/> [<https://perma.cc/59P6-8GNR>].

74. Iliana Mavrou, *DeFi vs. CeFi in 2025: Rivalry or Collaboration?*, TECHOPEDIA, <https://www.techopedia.com/defi-vs-cefi-regulation-security-and-innovation> [<https://perma.cc/7RP2-H9J4>] (updated Mar. 14, 2024).

enforcement of regulations becomes difficult.⁷⁵ For example, the DAO hack of 2016, in which \$60 million was stolen from a decentralized investment fund, highlighted the challenges in holding decentralized entities accountable and enforcing laws in a decentralized environment.⁷⁶

Another significant challenge is the classification of digital assets within DeFi platforms.⁷⁷ Traditional securities laws, such as the *Howey* Test—which defines what constitutes a security—struggle to accommodate the diversity of assets within the DeFi ecosystem.⁷⁸ DeFi tokens can serve multiple purposes—acting as governance tokens, liquidity incentives, or even as collateral—all of which make them difficult to categorize under existing legal classifications.⁷⁹ For instance, governance tokens often provide holders with the right to vote on the future direction of a project, but this function does not fit easily into the model of traditional securities, which are designed to offer ownership or claims on profits.⁸⁰ This multifunctionality of tokens means that applying traditional tests, such as the *Howey* Test or the *Reves* Test, can result in inconsistent and inadequate regulatory guidance.⁸¹

75. *Id.*

76. Shilpa Lama & May Woods, *What Was the DAO Hack? A Guide to Ethereum Classic's Origin*, BEINCRYPTO, <https://beincrypto.com/learn/dao-hack-explained/> [<https://perma.cc/WB6B-8F7Q>] (updated Dec. 10, 2024).

77. Svetlana V. Muradyan, *Digital Assets: Legal Regulation and Estimation of Risks*, 1 J. DIG. TECHS. & L. 123, 127–28 (2023), <https://doi.org/10.21202/jdtl.2023.5> [<https://perma.cc/T8RB-KJ8Q>].

78. Robert Whitaker, *Understanding the Howey Test for Digital Assets and Securities*, MERKLE SCI. (Sep. 9, 2024), <https://blog.merklescience.com/general/understanding-the-howey-test-for-digital-assets-and-securities> [<https://perma.cc/7R3B-38TZ>].

79. Multi.io Research, *Explained: DeFi Governance Tokens*, MEDIUM (Nov. 17, 2020), <https://medium.com/multi-io/explained-defi-governance-tokens-23a76e4df543> [<https://perma.cc/6D9R-AHCZ>].

80. Jon Ganor, *What Are Governance Tokens and How Do They Work?*, CHAINPORT LEARN (Sep. 10, 2024), <https://blog.chainport.io/what-are-governance-tokens#:~:text=Governance%20tokens%20are%20a%20type,a%20blockchain%20project%20or%20dApp> [<https://perma.cc/9E7A-GGBV>].

81. Laura Anthony, Esq., *What Is A Security? The Howey Test And Reves Test*, SECS. L. BLOG (Nov. 25, 2014), <https://securities-law-blog.com/2014/11/25/what-is-a-security-the-howey-test-and-reves-test/> [<https://perma.cc/52RA-PKKY>]; SEC v. W.J. Howey Co., 328 U.S. 293 (1946); *Reves v. Ernst & Young*, 494 U.S. 56 (1990).

Furthermore, the cross-border nature of DeFi platforms complicates jurisdictional enforcement.⁸² DeFi projects are inherently global, enabling transactions and participation from users in virtually any jurisdiction.⁸³ In contrast, traditional regulatory systems are often geographically bound, leading to conflicts between national laws and the lack of consistent international standards.⁸⁴ For example, if a DeFi project based in one jurisdiction violates a regulation, enforcing penalties or imposing fines may be impossible if the platform's participants and code reside in different jurisdictions.⁸⁵ The lack of clear rules and coordination among regulatory bodies across borders only amplifies this problem.⁸⁶ In recent years, countries such as China and India have attempted to implement stricter regulatory measures against cryptocurrency and DeFi, while other nations, like Switzerland and Singapore, have adopted more supportive frameworks.⁸⁷ This regulatory fragmentation creates uncertainty, potentially deterring innovation or pushing projects to seek jurisdictions with more favorable laws—a phenomenon known as regulatory arbitrage.⁸⁸

82. Biyan Mienert, *Managing Cross-Border DeFi DAOs in the EU: Legal Complexities and Regulatory Perspectives (Ensuring Sufficient Decentralization under MiCA)*, SSRN (2024), <http://dx.doi.org/10.2139/ssrn.4852000>.

83. Igor Makarov & Antoinette Schoar, *Cryptocurrencies and Decentralized Finance (DeFi)*, 2022 BROOKINGS PAPERS ON ECON. ACTIVITY, NO. 1, at 141, 142–44, <https://doi.org/10.1353/eca.2022.0014> [<https://perma.cc/24N8-KP6P>].

84. *Id.* at 189–90.

85. International Organization of Securities Commissions, *Final Report with Policy Recommendations for Decentralized Finance (DeFi)*, at 14 (Dec. 2023), <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD754.pdf> [<https://perma.cc/6N3U-2LM8>].

86. Georg Lorenz, *Regulating Decentralized Financial Technology: A Qualitative Study on the Challenges of Regulating DeFi with a Focus on Embedded Supervision*, STAN. J. OF BLOCKCHAIN L. & POL'Y (June 28, 2024), <https://stanford-jblp.pubpub.org/pub/regulating-defi/release/1> [<https://perma.cc/358J-FHPW>].

87. Ian Shine, *Cryptocurrency regulations are changing across the globe. Here's what you need to know*, WORLD ECON. F. (May 2, 2024), <https://www.weforum.org/stories/2024/05/global-cryptocurrency-regulations-changing/> [<https://perma.cc/P7DT-DVR2>].

88. Coryanne Hicks, *Cryptocurrency Regulations Around the World*, FORBES ADVISOR (Apr. 3, 2023, 9:01 AM), <https://www.forbes.com/advisor/investing/cryptocurrency/cryptocurrency-regulations-around-the-world/> [<https://perma.cc/98EA-CT8E>].

Finally, the pseudonymous nature of participants in DeFi platforms exacerbates the difficulty of compliance with traditional regulations such as Know Your Customer (KYC) and Anti-Money Laundering (AML) requirements.⁸⁹ While financial institutions are required to collect detailed customer information to prevent illicit activities like money laundering, the anonymity offered by DeFi platforms complicates these requirements.⁹⁰ Users can transact pseudonymously, and smart contracts may not have any direct identification requirements, making it harder for regulators to track illicit activity or ensure compliance with existing laws.⁹¹

The result of these challenges is a regulatory gap where traditional frameworks are either too rigid to address the unique characteristics of DeFi or outright inapplicable to its decentralized nature. This gap not only leaves participants vulnerable to fraud, market manipulation, and systemic risks, but also creates significant uncertainty for investors and innovators, ultimately hindering DeFi's potential to reach its full impact. The need for a regulatory framework that is both flexible and adaptable to the decentralized, multifaceted nature of DeFi is urgent.

B. The Function-Based Safe Harbor Framework

As the DeFi ecosystem continues to expand, the need for a regulatory framework that is both flexible and adaptive to its unique characteristics has never been more critical.⁹² A function-based safe harbor framework offers a promising solution by focusing on the economic functions of DeFi platforms and tokens, rather than attempting to force them into outdated or ill-fitting legal classifications.⁹³ This framework is designed to

89. *How DeFi Platforms Can Overcome Compliance Challenges*, MERKLE SCI. (Sep. 17, 2024), <https://blog.merklescience.com/general/how-defi-platforms-can-overcome-compliance-challenges> [<https://perma.cc/SQK6-VP9D>].

90. Muradyan, *supra* note 46, at 141.

91. Marc Truchet & Jeff Bandman, *Decentralized Finance (DeFi): opportunities, challenges, and policy implications*, EUROFI REGUL. UPDATE, at 73 (Feb. 2022), https://www.eurofi.net/wp-content/uploads/2022/05/eurofi_decentralized-finance-defi_opportunities-challenges-and-policy-implications_paris_february-2022.pdf [<https://perma.cc/U3WA-YT2Y>].

92. Iwa Salami, *Challenges and Approaches to Regulating Decentralized Finance*, 115 AJIL UNBOUND 425, 425–29 (2021), <https://doi.org/10.1017/aju.2021.66> [<https://perma.cc/N6MD-TLMB>].

93. *Understanding Regulatory Frameworks for DeFi in the U.S. and Beyond*, MERKLE SCI. (June 25,

incentivize compliance with necessary safeguards while fostering innovation, ultimately ensuring that the DeFi space can continue to evolve while protecting users and maintaining market integrity.⁹⁴

A function-based approach differs from traditional regulatory frameworks that are often built around rigid definitions of financial products—such as securities, commodities, or currencies.⁹⁵ Instead, it prioritizes the economic role that a given platform or token plays within the DeFi ecosystem.⁹⁶ For example, rather than labeling tokens based on their form—for example as a “security” or “commodity”—regulators would examine their function—whether they facilitate governance, incentivize liquidity provision, or act as collateral in lending protocols.⁹⁷ By focusing on the tokens’ functional purpose, this approach offers greater clarity for regulators and projects alike, ensuring that regulatory oversight is more aligned with real-world economic activity.⁹⁸

Under this framework, DeFi platforms that meet certain compliance criteria could qualify for a safe harbor, protecting them from enforcement actions or excessive regulation. Key requirements for participation in the safe harbor would likely include transparent governance structures, regular security audits, and robust user protection measures such as KYC and AML practices.⁹⁹ These requirements are designed to ensure that

2024), <https://blog.merklescience.com/regwatch/understanding-regulatory-frameworks-for-defi-in-the-u.s.-and-beyond> [<https://perma.cc/3DQK-KT4Z>].

94. *Id.*

95. Steven L. Schwarcz, *The Functional Regulation of Finance*, HARV. L. SCH. F. ON CORP. GOVERNANCE (June 16, 2014), <https://corpgov.law.harvard.edu/2014/06/16/the-functional-regulation-of-finance> [<https://perma.cc/5Z7H-3ZLE>].

96. Andry Alamsyah & Ivan Farid Muhammad, *Unraveling the crypto market: A journey into decentralized finance transaction network*, 4 DIGIT. BUS. 100074, at 4 (2024), <https://doi.org/10.1016/j.digbus.2024.100074> [<https://perma.cc/K6TM-8RH6>].

97. Lin William Cong & Claire Wilson, *Cryptocurrency Regulation and an Economic Classification of Tokens*, COMPETITION POL’Y INT’L, at 3 (Feb. 2022), <https://www.competitionpolicyinternational.com/wp-content/uploads/2022/02/4-Cryptocurrency-Regulation-and-an-Economic-Classification-of-Tokens-Lin-William-Cong-Claire-Wilson.pdf> [<https://perma.cc/QJ5B-E64E>]; Team LEXR, *Token Classification: Stable coins, NFTs and governance tokens*, LEXR, <https://www.lexr.com/en-ch/blog/common-token-classification-models/> [<https://perma.cc/LB2Q-8Y32>] (updated May 22, 2025).

98. Cong, *supra* note 66, at 7–8.

99. *Navigating AML Compliance Requirements: A Comprehensive Overview*, FIN. CRIME ACAD. (June 27,

platforms operate in a secure and fair manner, while still allowing the flexibility needed to encourage innovation and entrepreneurial risk-taking.¹⁰⁰

One of the most significant advantages of this framework is its ability to incentivize responsible development.¹⁰¹ By offering a clear regulatory path for DeFi platforms, the safe harbor reduces the uncertainty that many innovators face, which can often drive projects to either avoid regulation altogether or operate in jurisdictional arbitrage.¹⁰² Instead, by complying with the requirements of the safe harbor, platforms can demonstrate their commitment to market integrity, investor protection, and consumer rights, ensuring that they are not only innovative but also responsible and sustainable.

Furthermore, the function-based approach allows for a dynamic regulatory model that can evolve alongside the DeFi space. As the technology and market conditions shift, the framework can be adjusted to reflect the changing landscape without requiring major legislative overhauls.¹⁰³ For instance, new financial products and use cases that emerge within DeFi could be evaluated based on their function within the ecosystem, allowing regulators to respond flexibly to the rapid pace of innovation in the space.¹⁰⁴

By introducing a safe harbor based on functional criteria, this framework aims to achieve a balance between regulation and innovation.¹⁰⁵ It creates a regulatory environment where DeFi projects can thrive without the risk of undue interference, while simultaneously ensuring that consumer protections and market integrity are maintained.¹⁰⁶

2025), <https://financialcrimeacademy.com/aml-compliance-requirements> [<https://perma.cc/YFE9-5T7W>].

100. *Id.*

101. *Id.*

102. Caroline A. Crenshaw, *Statement on DeFi Risks, Regulations, and Opportunities*, U.S. SEC. & EXCH. COMM'N (Nov. 9, 2021), <https://www.sec.gov/newsroom/speeches-statements/crenshaw-defi-20211109> [<https://perma.cc/Q3RZ-8UWX>].

103. La Rédaction C., *Future of DeFi: Trends and Forecasts*, COINTRIBUNE, <https://www.cointribune.com/en/future-of-defi-trends-and-forecasts> [<https://perma.cc/Y8C2-Y5LV>] (last visited Oct. 28, 2024).

104. Matteo Aquilina et al., *Decentralized Finance (DeFi): A Functional Approach*, 10 J. FIN. REG. 1, 4 (2024).

105. Crypto Council for Innovation, *Key Elements of an Effective DeFi Framework* 48–52 (Oct. 5, 2023), https://media.cryptoforinnovation.org/2023/10/Key_Elements_Effective_DeFi_Framework-_report_2023.pdf [<https://perma.cc/A5RD-2P67>].

106. *Id.*

The safe harbor would not only encourage innovation but would also ensure that DeFi platforms are held to certain standards of accountability, reducing systemic risk and preventing abuses that could harm the broader financial ecosystem.¹⁰⁷

1. *Shifting from Form to Function*

The traditional approach to financial regulation has largely been centered around the form of a financial product: its classification into categories such as securities, commodities, or currencies.¹⁰⁸ This form-based approach, which has served well for decades, was designed to regulate centralized financial systems with clear intermediaries.¹⁰⁹ This framework is ill-suited to the decentralized and multifaceted nature of DeFi, where tokens and platforms often serve multiple functions that do not fit neatly into these established categories.¹¹⁰

In DeFi, the same token may have a governance role, providing holders with the right to vote on important decisions related to the protocol, while also acting as a liquidity incentive, rewarding users for providing assets to a decentralized exchange.¹¹¹ These multifunctional tokens cannot be easily categorized as securities or commodities under existing regulatory models.¹¹² As a result, applying traditional frameworks such as the *Howey Test*—which is designed to evaluate whether an asset constitutes a security based on its investment purpose—often leads to

107. Hester Peirce, *Proposed Safe Harbor: Time-Limited Exemption for Tokens*, GITHUB (Apr. 13, 2021), <https://github.com/CommissionerPeirce/SafeHarbor2.0> [<https://perma.cc/PU7L-SDRJ>].

108. Stephen Morris & Hyun Song Shin, *Financial Regulation in a System Context*, 2 BROOKINGS PAPERS ON ECON. ACTIVITY 229 (2008) https://www.brookings.edu/wp-content/uploads/2008/09/2008b_bpea_morris.pdf [<https://perma.cc/PPS7-LPUN>].

109. Dirk A. Zetzsche et al., *Decentralized Finance*, 6 J. FIN. REG. 172, 175 (2020), <https://doi.org/10.1093/jfr/fjaa010> [<https://perma.cc/E3DC-37HT>] (“Traditional finance is thus characterized by major intermediaries, which centralize functions and financial resources.”).

110. Salami, *supra* note 61, 425–26.

111. Shah, *supra* note 26 at 172, 174, 177.

112. Matthew T. Burgoyne et al., *IOSCO unveils consultation report on global DeFi regulation*, OSLER (Sep. 12, 2023), <https://www.osler.com/en/insights/updates/iosco-unveils-consultation-report-on-global-defi-regulation/> [<https://perma.cc/K8GQ-2HZX>].

confusion and misclassification of DeFi assets.¹¹³ The *Howey* Test, with its focus on the expectation of profit from a common enterprise, does not account for the diverse roles that DeFi tokens may serve, from governance to utility within decentralized applications (dApps).¹¹⁴

By shifting from a form-based regulatory approach to a function-based model, regulators can better address the unique characteristics of DeFi. A function-based framework emphasizes the economic role that a token or platform serves in the broader ecosystem, rather than its legal classification.¹¹⁵ For instance, instead of categorizing a DeFi token solely as a security because it can be traded on an exchange, the function-based approach would assess its economic utility—whether it facilitates governance, provides access to decentralized finance services, or acts as collateral within lending protocols.¹¹⁶ This shift allows regulators to move beyond traditional categories and focus on the actual use and behavior of the assets within the DeFi ecosystem.¹¹⁷

A function-based approach provides much-needed flexibility for DeFi platforms and regulators alike.¹¹⁸ It allows platforms to define their economic purpose while giving regulators a clearer understanding of the real-world impact of tokens and platforms.¹¹⁹ Rather than relying on rigid legal tests that were never designed for decentralized technologies, this approach can provide tailored regulation that evolves with the rapidly

113. Ananda Banerjee, *What Is the Howey Test and How Does It Impact Crypto?*, BEINCRYPTO, <https://beincrypto.com/learn/howey-test/> [<https://perma.cc/FM4L-UT2K>] (updated Jan. 2, 2025).

114. Nathan Reiff, *Howey Test Definition: What It Means and Implications for Cryptocurrency*, INVESTOPEDIA (July 31, 2023), <https://www.investopedia.com/terms/h/howey-test.asp> [<https://perma.cc/CQ4Y-KEWK>]; Steven Holm, *Understanding the Howey Test: A Comprehensive Guide*, MORPHER BLOG (June 25, 2024), <https://www.morpher.com/blog/howey-test> [<https://perma.cc/5WYB-D48N>].

115. Aaron Wright & Primavera De Filippi, *Decentralized Finance (DeFi): A Functional Approach*, at 3, 4, 20–21, SSRN (Feb. 1, 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4325095 [<https://perma.cc/JY8H-N2W8>]; International Organization of Securities Commissions, *supra* note 54.

116. Denise Garcia Ocampo et al., *Crypto, Tokens and DeFi: Navigating the Regulatory Landscape*, FSI INSIGHTS ON POL'Y IMPLEMENTATION NO. 49, at 5 (May 2023), <https://www.bis.org/fsi/publ/insights49.htm> [<https://perma.cc/F36V-BYRC>].

117. *Id.*

118. Aquilina, *supra* note 73, at 8.

119. *Id.*

changing DeFi space.¹²⁰ Additionally, it encourages the creation of new financial products that better reflect the innovative spirit of DeFi, without being stifled by outdated regulatory classifications.¹²¹

Ultimately, shifting from form to function offers a more adaptive and precise regulatory tool, enabling a framework that can evolve alongside DeFi, fostering innovation while ensuring that user protection, market integrity, and financial stability are maintained.¹²²

2. Benefits: Flexibility, Innovation, and Market Stability

One of the most significant advantages of a function-based safe harbor framework is its inherent flexibility, which allows it to adapt to the rapidly evolving DeFi ecosystem.¹²³ Unlike traditional regulatory approaches that are confined by outdated definitions of financial products, a function-based framework focuses on the economic role of tokens and platforms, enabling regulators to create guidelines that are more responsive to the diverse uses of blockchain technology.¹²⁴ This flexibility empowers regulators to accommodate a wide variety of DeFi products—whether they are tokens used for governance, liquidity provision, or collateralization—without requiring major revisions to the regulatory structure as the sector grows.¹²⁵

This flexibility is essential in the context of DeFi, where innovation is constant.¹²⁶ DeFi projects regularly introduce novel financial products and

120. Jared Ronis, *DeFi 101: The Good, the Bad, and the Regulatory*, WILSON CTR. (Sep. 29, 2023), <https://www.wilsoncenter.org/article/defi-101-good-bad-and-regulatory> [<https://perma.cc/47HS-EHBY>].

121. Lennart Ante & Ingo Fiedler, *The New Digital Economy: How Decentralized Finance (DeFi) and Non-Fungible Tokens (NFTs) Are Transforming Value Creation, Ownership Models, and Economic Systems*, 4 DIGIT. BUS. 100094 (2024), <https://doi.org/10.1016/j.digbus.2024.100094> [<https://perma.cc/EU4C-JJGT>].

122. Crypto Council for Innovation, *supra* note 74.

123. Hester M. Peirce, *Token Safe Harbor Proposal 2.0*, U.S. SECS. AND EXCH. COMM'N (Apr. 13, 2021), <https://www.sec.gov/newsroom/speeches-statements/peirce-statement-token-safe-harbor-proposal-20> [<https://perma.cc/TE56-NE2D>].

124. Aquilina, *supra* note 73, at 13.

125. Galaxy Digital Research, *Governance in DeFi*, GALAXY DIGIT. RSCH. (Nov. 4, 2022), <https://www.galaxy.com/insights/research/governance-in-defi/> [<https://perma.cc/C4C9-D687>].

126. La Rédaction C., *supra* note 72.

business models that do not align with traditional financial categories.¹²⁷ For example, concepts like yield farming, liquidity mining, and staking have created new ways for users to earn returns on their digital assets.¹²⁸ With a function-based framework, these innovations can be regulated in real-time, allowing for more dynamic and efficient oversight.¹²⁹ Rather than forcing new innovations into existing regulatory categories, the function-based approach allows regulators to consider each product's purpose and impact, ensuring that the regulation remains relevant as new ideas emerge.¹³⁰

This adaptability not only benefits DeFi platforms but also fosters a thriving environment for innovation. Entrepreneurs and developers in the DeFi space often face significant regulatory uncertainty, which can stifle creativity and discourage investment.¹³¹ A function-based safe harbor offers clear regulatory guidelines that reduce this uncertainty, enabling developers to focus on building innovative solutions without the fear of running afoul of ambiguous or outdated regulations. By providing safe harbor provisions for compliant projects, this framework encourages platforms to adhere to best practices in security, transparency, and governance, all while continuing to innovate within the regulatory boundaries. This balance between regulatory certainty and creative flexibility encourages sustainable growth within the DeFi space.

In addition to fostering innovation, a function-based framework promotes market stability by introducing clear, consistent rules for platforms to follow. With the right safeguards in place—such as regular security audits, transparent governance practices, and user protection measures—DeFi platforms are incentivized to operate in a secure and

127. Cryptopedia Staff, *What Is DeFi (Decentralized Finance)?*, GEMINI, <https://www.gemini.com/cryptopedia/what-is-defi-crypto-decentralized-finance-projects> [<https://perma.cc/4KG6-YLUR>] (updated Oct. 3, 2023) (“DeFi projects introduce new financial instruments and services, such as staking, borrowing, lending, investing, and derivatives trading, that diverge from traditional finance by operating on decentralized blockchain protocols.”).

128. Diego Geroni, *Staking vs. Yield Farming vs. Liquidity Mining – Key Differences*, 101 BLOCKCHAINS (Nov. 18, 2021), <https://101blockchains.com/staking-vs-yield-farming-vs-liquidity-mining> [<https://perma.cc/PE8K-J6YJ>].

129. Financial Stability Board, *FSB Global Regulatory Framework for Crypto-Asset Activities*, at 3 (2023), <https://www.fsb.org/uploads/P170723-1.pdf> [<https://perma.cc/4EH3-DXU8>].

130. Aquilina, *supra* note 73, at 11.

131. DELOITTE, *DeFi Deciphered: Navigating Disruption Within Financial Services* 6, 10–13 (Deloitte Development LLC, Mar. 2022).

stable manner. This approach helps mitigate systemic risks that might otherwise arise from poorly regulated or non-compliant projects. For instance, ensuring that platforms disclose information about their financial health, governance structures, and security practices can help prevent fraud, market manipulation, and other illicit activities that have plagued some areas of the cryptocurrency market.¹³²

Moreover, the safe harbor framework ensures that DeFi platforms are held to high accountability standards. By requiring platforms to meet certain compliance milestones—such as performing security audits or implementing effective dispute resolution processes—this regulatory approach promotes market integrity. These standards not only protect users but also enhance the broader credibility of the DeFi sector, ensuring that investors and stakeholders can trust the systems in place.

Overall, the function-based safe harbor framework provides a win-win scenario for both innovation and market stability. It allows DeFi to flourish by promoting flexibility and fostering the development of cutting-edge financial products, all while ensuring that these innovations do not come at the expense of investor protection or financial system integrity.

PART II. THE NEED FOR A NEW REGULATORY FRAMEWORK

As DeFi continues to mature, it is becoming increasingly clear that the existing regulatory frameworks are ill-equipped to address the unique challenges posed by this rapidly evolving sector.¹³³ Traditional financial regulations were designed for centralized systems, where intermediaries such as banks and brokers serve as central points of control and accountability.¹³⁴ DeFi platforms operate without such intermediaries, relying instead on blockchain technology and smart contracts to execute financial transactions in a decentralized and transparent manner.¹³⁵ This

132. John Okoro, *Exploring the Regulatory Landscape of Decentralised Finance: Current Status and Future Implications*, ALPHA DEV., <https://www.alphadevelopment.com> [<https://perma.cc/BHK6-S6AT>] (last visited July 30, 2025).

133. Empire Global, *The Rise of Decentralized Finance (DeFi): Opportunities and Regulatory Challenges*, MEDIUM (Oct. 31, 2024), <https://medium.com/empire-global-partners/the-rise-of-decentralized-finance-defi-opportunities-and-regulatory-challenges-fa4e095b5e38> [<https://perma.cc/26HQ-QW8X>].

134. Zetzsche, *supra* note 78.

135. David Johnson, *Decentralized Finance (DeFi): What Startups Need to Know*, ROOLED (Aug. 13, 2024), <https://rooled.com/resources/decentralized-finance-defi-what-startups-need-to-know/> [<https://perma.cc/7KHY-2L7V>].

fundamental shift introduces a host of challenges that traditional regulatory models cannot adequately address, creating a pressing need for a new regulatory framework that can effectively support DeFi's innovation while safeguarding investors, maintaining market integrity, and promoting broader financial stability.¹³⁶

A. Limitations of Current U.S. Regulatory Frameworks

The U.S. regulatory environment is built around a patchwork of rules designed to oversee traditional financial institutions and markets.¹³⁷ These existing frameworks often fail to account for the decentralized nature of DeFi, where control is distributed among users and smart contracts rather than centralized entities.¹³⁸ The core issue lies in the categorization of DeFi tokens and platforms, which do not fit neatly into the traditional financial categories that U.S. regulators use, such as securities, commodities, or currencies.¹³⁹ As a result, regulators are often left to apply outdated legal tests, resulting in regulatory ambiguity and uncertainty for DeFi projects.¹⁴⁰

1. The Howey Test and its Inadequacies for DeFi

The *Howey* Test, developed by the United States Supreme Court in 1946, is used to determine whether an asset qualifies as a security under U.S. law.¹⁴¹ The test focuses on whether there is an investment of money in a common enterprise with an expectation of profits derived from the

136. Salami, *supra* note 61, at 429; Betsy Vereckey, *Decentralized Finance: 4 Challenges to Consider*, MIT SLOAN SCH. MGMT. (July 11, 2022), <https://mitsloan.mit.edu> [<https://perma.cc/G8CY-KMCT>].

137. Zetzsche, *supra* note 78.

138. Tom Momberg & Angela Angelovska-Wilson, *Regulating the Unseen: Limiting the Potential for Negative Externalities from MEV Realization*, DLX L. LEADERSHIP BLOG (Oct. 22, 2024), https://dlxlaw.com/leaderships_blog/regulating-the-unseen-limiting-the-potential-for-negative-externalities-from-mev-realization/ [<https://perma.cc/2SHB-XNV3>].

139. Jai Massari & Christian Catalini, *DeFi, Disintermediation, and the Regulatory Path Ahead*, THE REGUL. REV. (May 10, 2021), <https://www.theregreview.org/2021/05/10/massari-catalini-defi-disintermediation-regulatory-path-ahead/> [<https://perma.cc/ZJW5-T7RP>].

140. Prashant Jha, *DeFi Regulations: Where US Regulators Should Draw the Line*, COINTELEGRAPH (Sep. 6, 2022), <https://www.cointelegraph.com> [<https://perma.cc/H3GZ-77ZN>].

141. SEC v. W.J. Howey Co., 328 U.S. 293 (1946).

efforts of others.¹⁴² While this framework has served as a cornerstone of U.S. securities law, it struggles to address the complexity of DeFi tokens, many of which serve multifunctional purposes such as governance, liquidity provision, and collateralization in dApps.¹⁴³ For example, governance tokens allow holders to vote on protocol changes, a power that does not fit neatly into the profit expectation central to the *Howey* Test.¹⁴⁴ The *Howey* Test's reliance on centralized enterprises also overlooks the decentralized, pseudonymous, and community-governed structures of DeFi platforms, leading to inconsistent and confusing regulatory outcomes.¹⁴⁵

The *SEC v. Ripple Labs* case demonstrates the *Howey* Test's limitations in addressing the complexities of decentralized financial instruments.¹⁴⁶ The bifurcated ruling in 2023, distinguishing between institutional sales and programmatic retail sales of the cryptocurrency XRP, underscores the challenges regulators face when applying the *Howey* Test to multifunctional assets.¹⁴⁷

Under this decision, XRP's classification as a security depended on the transaction context.¹⁴⁸ Institutional sales were deemed securities because of investors' reasonable expectation of profit derived from

142. U.S. SECS. AND EXCH. COMM'N, *Framework for "Investment Contract" Analysis of Digital Assets*, <https://www.sec.gov/about/divisions-offices/division-corporation-finance/framework-investment-contract-analysis-digital-assets> [<https://perma.cc/JN4Y-GNNK>] (last updated July 5, 2024).

143. U.S. SECS. AND EXCH. COMM'N, *Framework for "Investment Contract" Analysis of Digital Assets*, <https://www.sec.gov/files/dlt-framework.pdf> [<https://perma.cc/VD3Q-RB47>] (last visited Nov. 28, 2024).

144. *Id.*

145. Whitaker, *supra* note 47.

146. Alex Drylewski et al., *Ripple Effects: Developments Following Groundbreaking Decision in SEC v. Ripple Labs*, SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP (Dec. 5, 2023), <https://www.skadden.com/-/media/files/publications/2023/12/rippleeffectsdevelopmentsfollowinggroundbreakingdecisioninsecvripplelabs.pdf> [<https://perma.cc/A2MF-UFFC>].

147. Daniel Fuke & Julie He, *Ripple Scores Partial Win in SEC Court Fight Over XRP*, FASKEN (Sep. 13, 2023), <https://www.fasken.com/en/knowledge/2023/09/ripple-scores-partial-win-in-sec-court-fight-over-xrp> [<https://perma.cc/8WDP-YASD>].

148. Alex Drylewski et al., *Ripple Effects: Developments Following Groundbreaking Decision in SEC v. Ripple Labs*, REUTERS (Dec. 5, 2023), <https://www.reuters.com/legal/legalindustry/ripple-effects-developments-following-groundbreaking-decision-sec-v-ripple-labs-2023-12-05/> [<https://perma.cc/46WF-UPAM>].

Ripple's efforts.¹⁴⁹ In contrast, retail sales through exchanges were not classified as securities, as retail buyers were less likely to view Ripple's efforts as determinative of their returns.¹⁵⁰ This distinction highlights a key limitation of form-based regulatory models: they fail to account for the overlapping economic roles that tokens like XRP play across different market contexts.¹⁵¹

XRP's dual functionality—as a medium for cross-border payments and as an investment vehicle—illustrates the inadequacy of a one-size-fits-all approach to regulation.¹⁵² A function-based regulatory framework could address these issues by assessing XRP's distinct economic roles in various transactions, enabling regulators to tailor oversight without conflating XRP's uses.¹⁵³ For instance, institutional sales could be subject to securities regulations because of their investment-driven nature, while retail transactions could fall under consumer protection laws or payment systems oversight.

The *Ripple* case also highlights the dangers of regulatory uncertainty.¹⁵⁴ Ripple Labs argued that the SEC's delayed enforcement

149. Jessica B. Magee & Craig McCarron Turner, *SEC v. Ripple: When a Security Is Not a Security—Summary Judgment Battle Results in Split Decision, Blow to SEC Enforcement*, HOLLAND & KNIGHT (July 20, 2023), <https://www.hklaw.com/en/insights/publications/2023/07/sec-v-ripple-when-a-security-is-not-a-security> [<https://perma.cc/9MWC-2ZJP>].

150. Cooley LLP, *SDNY Rules Ripple's XRP Token Was – and Was Not – a Security*, COOLEY ALERT (July 27, 2023), <https://www.cooley.com/news/insight/2023/2023-07-27-sdny-rules-ripples-xrp-token-was-and-was-not-a-security#:~:text=On%20July%2013%2C%202023%2C%20US,when%20used%20for%20service%20providers> [<https://perma.cc/D4CB-9BND>].

151. Rakesh Sharma, *Ripple Ecosystem: What Is the Role of XRP?*, INVESTOPEDIA (May 31, 2024), <https://www.investopedia.com/news/what-role-xrp-ripples-products/> [<https://perma.cc/XAG5-JJAP>].

152. Jorgeacevedoarnaldo, *Revolutionizing Global Transactions: How XRP and XLM Are Poised to Lead the Cross-Border Payments Revolution*, MEDIUM (Jan. 30, 2024), <https://medium.com/@jorgeacevedoarnaldo/revolutionizing-global-transactions-how-xrp-and-xlm-are-poised-to-lead-the-cross-border-payments-5d66c1800b12> [<https://perma.cc/6EVX-X545>].

153. Bitcoin Store, *What is Ripple (XRP) and How Does It Work?* (May 25, 2025), <https://www.bitstore.net/en/blog/what-is-ripple-xrp-cryptocurrency/> [<https://perma.cc/D6PQ-DPW4>] (explaining how XRP is a utility token for global payment and money transfer systems).

154. Sebastian Sinclair, *Ripple Challenges Regulatory Uncertainty in Crypto, Files Appeal in Case Against SEC*, DECRYPT (Oct. 25,

actions created a lack of clarity, stifling innovation and subjecting market participants to unpredictable compliance burdens.¹⁵⁵ A function-based approach would alleviate such uncertainty by providing clearer, context-specific guidelines that align with the real-world applications of digital assets.

Beyond XRP, the precedent set in *Ripple* has broader implications for DeFi platforms and multifunctional tokens.¹⁵⁶ As tokens increasingly serve as governance tools, utility mechanisms, and investment vehicles, a function-based regulatory framework offers the flexibility needed to accommodate these overlapping roles while maintaining robust investor protections.¹⁵⁷

a. Decentralization and Multifunctionality

DeFi's decentralized nature, where protocols operate without central intermediaries, challenges the *Howey* Test's focus on centralized entities and traditional investment structures.¹⁵⁸ Additionally, many DeFi tokens have multifunctional properties that defy categorization as simple investment contracts.¹⁵⁹ They may simultaneously serve as governance tokens, granting voting rights in a protocol's governance, and as utility tokens, providing access to specific DeFi services.¹⁶⁰

2024), <https://decrypt.co/288250/ripple-sec-continue-legal-sparring-as-appeals-target-xrp-sales-rulings> [<https://perma.cc/4A67-GJ9T>].

155. H. Gregory Baker & Peter Vogel, *SEC v. Ripple Labs: Analysis of Summary Judgment Opinion*, PATTERSON BELKNAP SECS. ENF'T & LITIG. INSIDER (July 26, 2023), <https://www.pbwt.com/securities-enforcement-litigation-insider/sec-v-ripple-labs-analysis-of-summary-judgment-opinion> [<https://perma.cc/VC34-5G9K>].

156. Amaka Nwaokocha, *SEC vs. Ripple: One Year on Since Landmark Ruling*, COINTELEGRAPH (July 13, 2024), <https://cointelegraph.com/news/xrp-ruling-anniversary-crypto-regulation> [<https://perma.cc/7AEL-TRAM>].

157. John Pawlak, *The SEC vs. Ripple: Implications for XRP*, NETCOINS BLOG (July 13, 2024), <https://blog.netcoins.com/the-sec-vs-ripple-implications-for-xrp/> [<https://perma.cc/93Q5-E8SM>].

158. Katrin Schuler, Ann Sofie Cloots & Fabian Schär, *On DeFi and On-Chain CeFi: How (Not) to Regulate Decentralized Finance*, 10 J. FIN. REG. 213 (2024), <https://doi.org/10.1093/jfr/fjad014> [<https://perma.cc/7XG7-8949>].

159. Jay Jackson, *DeFi Tokens: A Simple Guide for Beginners*, FINDER (Sep. 7, 2021), <https://www.finder.com/cryptocurrency/defi/defi-tokens> [<https://perma.cc/TN7N-3WJG>].

160. Kyle Bersani, *Separating Governance Tokens from Securities: How the Utility Token May Fall Short of the Investment Contract*, 43(3) CARDOZO L. REV. 1035 (2022) [<https://perma.cc/YED4-XF36>].

b. The Ripple Case: Exposing the Limits of Howey

The recent SEC lawsuit against Ripple Labs, alleging that its XRP token is an unregistered security, highlights the *Howey* Test's limitations in the DeFi context.¹⁶¹ The case revolves around whether XRP's functionality and distribution align with the *Howey* Test's criteria, underscoring the challenges of applying traditional securities laws to DeFi tokens.¹⁶²

2. Fragmented Jurisdictional Authority

U.S. financial regulation is divided across multiple agencies, including the SEC, the CFTC, and the Financial Crimes Enforcement Network (FinCEN), among others.¹⁶³ This fragmented oversight often results in conflicting or overlapping regulations, which further complicates the regulation of decentralized platforms that do not conform to traditional institutional structures.¹⁶⁴ The absence of clear and coordinated rules leaves DeFi projects at risk of regulatory arbitrage, where platforms might choose jurisdictions with more favorable rules, creating uneven oversight that hampers the integrity of the financial ecosystem.¹⁶⁵

This fragmented structure, while effective for traditional financial institutions that fit neatly into well-established regulatory categories, is

161. SEC v. Ripple Labs, Inc., 2021 WL 1814771 (S.D.N.Y. May 6, 2021). Mustafa Mulla, *Ripple vs SEC Update: Court Speeds Up Final Judgement in XRP Lawsuit*, COINPEDIA (Nov. 28, 2024), <https://coinpedia.org/news/ripple-vs-sec-update-key-win-for-ripple-as-court-speeds-up-xrp-lawsuit-judgment/> [<https://perma.cc/P47C-2VSM>].

162. SEC Charges Ripple and Two Executives with Conducting \$1.3 Billion Unregistered Securities Offering, U.S. SEC. & EXCH. COMM'N (Dec. 22, 2020), <https://www.sec.gov/newsroom/press-releases/2020-338> [<https://perma.cc/A5RU-DEX3>].

163. *Who Regulates Whom? An Overview of the U.S. Financial Regulatory Framework*, CONG. RSCH. SERV., R44918, at 1, <https://crsreports.congress.gov/product/pdf/R/R44918/8> [<https://perma.cc/4Q6D-QZC4>] (updated Mar. 10, 2020).

164. *Financial Regulation: Complex and Fragmented Structure Could Be Streamlined to Improve Effectiveness*, U.S. GOV'T ACCOUNTABILITY OFF., GAO-16-175, at 1 (Feb. 25, 2016), <https://www.gao.gov/products/gao-16-175> [<https://perma.cc/QY28-43XH>].

165. Sandeepa Kaur et al., *Risk Analysis in Decentralized Finance (DeFi): A Fuzzy-AHP Approach*, 25 RISK MGMT. 13, 12–13 (2023), <https://doi.org/10.1057/s41283-023-00118-0> [<https://perma.cc/S6FC-6BN7>].

less equipped to address the decentralized and borderless nature of DeFi platforms, often resulting in regulatory overlap and enforcement gaps.¹⁶⁶

As mentioned above, the *Ripple* decision underscores the urgent need for clearer regulatory guidelines.¹⁶⁷ The case exposed significant gaps in the SEC's approach, particularly the lack of preemptive clarity regarding which assets qualify as securities.¹⁶⁸ This regulatory uncertainty creates inefficiencies, forcing both market participants and courts to rely on case-by-case litigation to resolve ambiguities—a process that stifles innovation and burdens the judiciary.¹⁶⁹

3. Post-Loper Bright Challenges: Restrictions on Agency Adaptability

The *Loper Bright Enterprises v. Raimondo* decision further illustrates U.S. regulatory agencies' challenges in adapting to rapidly evolving technologies.¹⁷⁰ By overturning the *Chevron* deference doctrine, which allowed courts to defer to federal agencies' interpretations of ambiguous statutes, *Loper Bright* has shifted the balance of interpretive authority from agencies to the judiciary.¹⁷¹ This shift introduces greater uncertainty for

166. *Blockchain in Finance: Legislative and Regulatory Actions Are Needed to Ensure Comprehensive Oversight of Crypto Assets*, U.S. GOV'T ACCOUNTABILITY OFF., GAO-23-105346, at 2, 41 (2023).

167. Jacquelyn Melinek, *Ripple's XRP Case 'Underscores the Need for Regulatory Clarity'*, TECHCRUNCH (July 19, 2023), <https://techcrunch.com/2023/07/19/ripple-xrp-court-ruling/> [<https://perma.cc/T6LJ-RDMQ>].

168. James Lockwood et al., *Decentralised Finance (DeFi): Litigation Risk and Safeguards*, NORTON ROSE FULBRIGHT BLOG (Sep. 24, 2024), <https://www.nortonrosefulbright.com/en/inside-disputes/blog/202409-decentralised-finance-defi-litigation-risk-and-safeguards> [<https://perma.cc/AK87-NMRH>].

169. Jennifer J. Schulp, *Dazed and Confused: Breaking Down the SEC's Politicized Approach to Digital Assets*, CATO INST. TESTIMONY (Sep. 17, 2024), <https://www.cato.org/testimony/dazed-confused-breaking-down-secs-politicized-approach-digital-assets#> [<https://perma.cc/F2WY-YUDX>].

170. *Loper Bright Enter. v. Raimondo*, 603 U.S. 369 (2024). Sean Marotta & Danielle Desaulniers Stempel, *Loper Bright Enterprises v. Raimondo: Decision Summary*, HOGAN LOVELLS BLOG (July 11, 2024), <https://www.hoganlovells.com/en/publications/loper-bright-enterprises-v-raimondo-decision-summary> [<https://perma.cc/CG5E-XSJK>].

171. Amy Howe, *Supreme Court Strikes Down Chevron, Curtailing Power of Federal Agencies*, SCOTUSBLOG (June 28, 2024), <https://www.scotusblog.com/2024/06/supreme-court-strikes-down->

DeFi platforms, as courts may now independently interpret statutes without relying on agency expertise.¹⁷² The absence of a clear regulatory framework could lead to inconsistent judicial decisions, creating a fragmented legal environment that hinders innovation and compliance within the DeFi sector.¹⁷³

In this context, establishing a function-based safe harbor framework becomes increasingly vital. Such a framework would provide DeFi platforms with clear guidelines, reducing the risk of unpredictable judicial interpretations. By focusing on the economic functions of DeFi activities rather than their form, this approach offers a more adaptable and precise regulatory structure.

Moreover, a function-based safe harbor aligns with the Court's emphasis on judicial independence by offering a structured basis for courts to assess DeFi activities.¹⁷⁴ This alignment ensures that regulatory oversight remains consistent and predictable, even as interpretive authority shifts from agencies to the judiciary.

The *Loper Bright* ruling underscores the limitations on agencies' authority to create or adapt regulations without clear congressional delegation.¹⁷⁵ Such a framework would mitigate the uncertainties

chevron-curtailling-power-of-federal-agencies/ [<https://perma.cc/F6KW-LX8G>].

172. Matthew Daly, *What It Means for the Supreme Court to Throw Out Chevron Decision, Undercutting Federal Regulators*, ASSOCIATED PRESS (June 28, 2024), <https://apnews.com/article/supreme-court-chevron-regulations-environment-4ac73d5a79cabadff4da8f7e16669929> [<https://perma.cc/W7MN-59WB>].

173. Deborah Sivas, *Stanford's Deborah Sivas on SCOTUS Loper Decision Overturning Chevron's 40 Years of Precedent and Its Impact on Environmental Law*, STAN. REP. (June 28, 2024), <https://news.stanford.edu/stories/2024/06/stanfords-deborah-sivas-on-scotus-loper-decision-overturning-chevrons-40-years-of-precedent-and-its-impact-on-environmental-law> [<https://perma.cc/5C26-HN4C>].

174. Danielle Braff, *Landmark Chevron Decision Was Overturned; What Happens Now?*, ABA J. (Oct. 14, 2024), <https://www.abajournal.com/web/article/chevron-was-overturned-now-what> [<https://perma.cc/PFK8-S4Y2>].

175. Stuart M. Gerson & Robert E. Wanerman, *Supreme Court Alters the Administrative State: Loper and Relentless Decision Shifts Authority from Administrative Agencies and Creates Uncertainty*, EPSTEIN BECKER & GREEN INSIGHTS (July 25, 2024), <https://www.ebglaw.com/insights/publications/supreme-court-alters-the-administrative-state-loper-and-relentless-decision-shifts-authority-from->

introduced by the Court's ruling, fostering a stable environment that encourages innovation while ensuring compliance.¹⁷⁶ In the context of DeFi, this ruling presents a significant barrier to effective regulation, as regulatory agencies may lack the agility needed to keep pace with the fast-moving DeFi space.¹⁷⁷ This stagnation leaves DeFi projects in a state of regulatory uncertainty, which can hinder innovation and prevent the development of a robust regulatory framework that addresses the unique risks associated with DeFi.¹⁷⁸

B. Establishing a Function-Based Safe Harbor Framework

Given the shortcomings of traditional regulatory frameworks in addressing the decentralized and multifaceted nature of DeFi, a new, more adaptable approach is necessary.¹⁷⁹ This Article proposes the creation of a function-based safe harbor framework that moves away from rigid legal classifications and focuses on the economic functions of tokens and platforms. Instead of categorizing DeFi tokens based on their form—such as securities or commodities—this framework would assess the role of the tokens within the ecosystem, such as whether they facilitate governance, incentivize liquidity provision, or act as collateral for decentralized lending.¹⁸⁰

This shift from form-based regulation to function-based regulation has several key advantages. It allows regulators to approach DeFi in a more nuanced way, enabling them to focus on the economic activity taking place

administrative-agencies-and-creates-uncertainty [<https://perma.cc/685B-4YRR>].

176. Andrew Singer, *Supreme Court Ruling 'Changes the Game' for US Crypto Firms*, COINTELEGRAPH (July 11, 2024), <https://cointelegraph.com/news/supreme-court-us-crypto-chevron> [<https://perma.cc/2GM3-SWMK>].

177. *Id.*

178. Jonathan Obeda, *Redefining Boundaries in Administrative Law: How the Loper Bright Decision Could Reshape Crypto Regulation*, DEFI EDUC. FUND BLOG (Jan. 26, 2024), <https://www.defieducationfund.org/post/redefining-boundaries-in-administrative-law-how-the-loper-bright-decision-could-reshape-crypto-regu> [<https://perma.cc/LB85-XZ4W>].

179. Simon Nwagbala & Peter Nwankwo, *Decentralized Finance (DeFi) Risks and Regulation: An Investigative Analysis*, 8 ADV. J. BNK. FIN. & INV. 20, 21–22 (2024).

180. Grayscale Investments, *A Report on Decentralized Finance (DeFi)*, GRAYSCALE RSCH. (Oct. 27, 2021), <https://www.grayscale.com/research/reports/a-report-on-decentralized-finance-defi> [<https://perma.cc/E8CD-P5B2>].

within the ecosystem rather than trying to apply outdated legal categories. Moreover, this approach would allow for greater flexibility, ensuring that DeFi platforms are regulated in a way that is responsive to their evolving nature while still ensuring investor protection, market integrity, and financial stability.

The safe harbor aspect of the framework provides a mechanism for compliance incentives. DeFi platforms that meet certain standards, such as conducting regular security audits, implementing user protection measures, like KYC and AML protocols, and providing transparent governance structures, would qualify for safe harbor protection. These measures ensure that the regulation does not stifle innovation but instead fosters an environment where DeFi can grow responsibly within a secure regulatory environment.

1. From Form to Function: Addressing the Economic Realities of DeFi

The traditional regulatory approach has long relied on defining financial products by their form—categorizing them as securities, commodities, currencies, or derivatives based on certain characteristics or legal precedents.¹⁸¹ While this system provides clarity and structure for conventional financial markets, it fails to accommodate the complex, multifaceted nature of DeFi platforms.¹⁸² The rise of DeFi, with its tokenized ecosystems and smart contract-powered platforms, demands a shift in regulatory thinking, one that focuses less on rigid categories and more on the economic functions these platforms perform within the broader financial system.¹⁸³

The core of DeFi platforms lies in their economic utility, which often spans multiple financial roles within a single platform.¹⁸⁴ For example, a

181. Marc Labonte, *Introduction to Financial Services: The Regulatory Framework*, CONG. RSCH. SERV., IF11065, at 1 (updated Jan. 5, 2023), <https://crsreports.congress.gov/product/pdf/IF/IF11065> [<https://perma.cc/735K-9XJP>].

182. Zetzsche, *supra* note 78, at 172–203.

183. Alim Al Ayub. Ahmed, *The Rise of DeFi: Transforming Traditional Finance with Blockchain Innovation*, PREPRINTS (Feb. 13, 2024), <https://doi.org/10.20944/preprints202402.0738.v1> [<https://perma.cc/D8ER-FZ37>].

184. Unidef, *Decentralization: A Paradigm Shift in the Financial Landscape*, MEDIUM (July 27, 2023), <https://blog.unidef.org/decentralization-a-paradigm-shift-in-the-financial-landscape-f51371d32020> [<https://perma.cc/TV7S-6MJY>].

DeFi token might serve as a governance token that allows holders to vote on proposals affecting the protocol, but it could also act as collateral in decentralized lending platforms or function as a liquidity incentive for users who contribute to DEXs.¹⁸⁵ These tokens often do not fit neatly into traditional financial classifications like equities or derivatives, leading to confusion and regulatory uncertainty.¹⁸⁶

In contrast to the traditional form-based approach, the function-based safe harbor framework proposed recognizes that the economic reality of a token should guide its regulatory treatment. Rather than forcing DeFi platforms into pre-existing categories, regulators would assess the actual economic function a token performs within the ecosystem. If the primary role of a token is to facilitate governance in a decentralized protocol, the regulatory focus would be on ensuring the platform's transparency and fair governance rather than imposing traditional securities laws. If the token is used to incentivize liquidity provision, the focus would shift to how liquidity is managed and whether the platform ensures fair access and market stability.

This focus on functionality allows for a more tailored and adaptive regulatory approach. In the traditional model, a token might be considered a security simply because it can be traded on secondary markets or generate profit for holders, even if its primary purpose is governance or facilitating dApps.¹⁸⁷ The function-based framework, however, focuses on the token's purpose and how it interacts with the broader DeFi ecosystem. This shift would enable regulators to examine whether the token supports innovation and economic activity, rather than whether it meets specific legal definitions of a security, commodity, or currency.

A function-based approach not only aligns more closely with the economic realities of DeFi but also ensures that regulation evolves in

185. Sankrit K, *What Are Governance Tokens and How Do They Work?*, MOONPAY (Dec. 17, 2023), <https://www.moonpay.com/learn/defi/what-are-governance-tokens> [<https://perma.cc/LE7E-J8CN>].

186. Jack Solowey & Jennifer J. Schulp, *Regulatory Clarity for Crypto Marketplaces Part I: Decentralized Exchanges*, CATO INST. BRIEFING PAPER NO. 154 (May 10, 2023), <https://www.cato.org/briefing-paper/regulatory-clarity-crypto-marketplaces-part-i-decentralized-exchanges> [<https://perma.cc/U2KL-2QC2>].

187. Marco Cavicchioli, *A US Judge Rules in Favor of the SEC: Some Cryptos Would Be Security Tokens*, CRYPTONOMIST (Mar. 7, 2024), <https://en.cryptonist.ch/2024/03/07/a-us-judge-rules-in-favor-of-the-sec-some-cryptos-would-be-security-tokens/> [<https://perma.cc/YJ33-EFL6>].

tandem with innovation.¹⁸⁸ DeFi platforms are rapidly evolving, and the constant emergence of new financial products—such as synthetic assets, yield farming, and stablecoins—makes it difficult for regulatory authorities to apply outdated legal categories.¹⁸⁹ By focusing on the economic role of the asset or platform, regulators can more effectively address emerging technologies without stifling innovation.

Furthermore, shifting to a function-based framework allows regulators to focus on a platform's intended outcomes rather than its legal structure. This shift is crucial in a space where the lines between traditional finance and new dApps are increasingly blurred.¹⁹⁰ Platforms that are designed to promote financial inclusion or peer-to-peer lending should be regulated based on the economic impact they create rather than whether they fit into traditional financial paradigms. The safe harbor aspect of this framework ensures that DeFi projects that meet these functional criteria—such as conducting regular security audits, ensuring user protections, and adhering to transparency standards—are not penalized for their innovative models but instead incentivized to comply with basic regulatory safeguards.

Ultimately, the shift from form-based to function-based regulation provides the flexibility needed to accommodate the fast-paced changes within the DeFi space. It allows regulators to focus on economic utility and ensure that DeFi platforms operate in ways that protect users, maintain market stability, and foster innovation, all while remaining adaptable to future technological advancements.

2. The Safe Harbor Concept: Incentivizing Compliance and Innovation

The concept of a safe harbor has long been used in legal contexts to provide a protected space within which entities can operate without the threat of enforcement or regulatory penalties, as long as they meet certain

188. Eric W. Hess, *Bridging Policy and Practice: A Pragmatic Approach to Decentralized Finance, Risk, and Regulation*, 128 PENN ST. L. REV. 347, 355 (2024).

189. Petar Radanliev, *The Rise and Fall of Cryptocurrencies: Defining the Economic and Social Values of Blockchain Technologies, Assessing the Opportunities, and Defining the Financial and Cybersecurity Risks of the Metaverse*, 10 FIN. INNOVATION 3 (2024), <https://doi.org/10.1186/s40854-023-00537-8> [<https://perma.cc/ZY8P-JFTQ>].

190. Natalie Luu, *DeFi-ing the Rules of Traditional Finance*, LIGHTSPEED VENTURE PARTNERS (June 23, 2021), <https://medium.com/lightspeed-venture-partners/defi-ing-the-rules-of-traditional-finance-39176e785947> [<https://perma.cc/FDV6-UNHR>].

established criteria.¹⁹¹ In the context of DeFi, the introduction of a function-based safe harbor framework offers a powerful mechanism for incentivizing compliance while promoting responsible innovation.¹⁹² This concept allows DeFi projects to continue developing groundbreaking financial technologies without fear of stifling regulation, provided the projects adhere to a set of clear standards that prioritize user protection, market stability, and security.¹⁹³

A core element of the function-based safe harbor framework is the recognition that DeFi projects are unique and often operate outside traditional financial systems.¹⁹⁴ In light of this element, the safe harbor concept offers a regulatory path that is both flexible and aligned with the unique characteristics of decentralized platforms.¹⁹⁵ By focusing on the economic function that a DeFi platform or token serves, rather than forcing these entities into rigid legal classifications, the framework encourages innovation while ensuring that platforms operate responsibly and in a way that is transparent and secure for users.¹⁹⁶

One of the most compelling aspects of the safe harbor concept is its ability to incentivize compliance by offering tangible benefits to platforms that meet certain regulatory benchmarks.¹⁹⁷ These benchmarks could include regular security audits, transparency in governance, compliance with KYC and AML practices, and clear disclosures regarding risks to users and investors. By offering regulatory certainty, DeFi platforms can engage in long-term planning, knowing that they will not be subjected to

191. *Safe Harbor - Meaning in Law and Legal Documents, Examples and FAQs*, LEGALBRIEF AI, <https://www.legalbriefai.com/legal-terms/information> [<https://perma.cc/EK2R-M7NS>] (last visited Nov. 30, 2024).

192. J. (Jay) T. Westermeier, *Recent “Safe Harbor” Rulings in the United States*, COMPUT. & TELECOMM. L. REV., <https://www.finnegan.com/en/insights/articles/recent-safe-harbor-rulings-in-the-united-states.html> [<https://perma.cc/DK8Q-XR4V>] (2011).

193. See Hester M. Pierce, *Token Safe Harbor Proposal 2.0*, SEC (Apr. 13, 2021), <https://www.sec.gov/newsroom/speeches-statements/pierce-statement-token-safe-harbor-proposal-20> [<https://perma.cc/PM93-CCW4>] (expressing that safe harbors can facilitate participation in the development of a pre-functional network).

194. Campbell R. Harvey & Daniel Rabetti, *International Business and Decentralized Finance*, 55 J. INT’L BUS. STUD. 840 (2024).

195. Peirce, *supra* note 92.

196. Crypto Council for Innovation, *supra* note 74.

197. *The Clock Is Ticking: DOJ Announces New, Department-Wide Mergers & Acquisitions Safe Harbor Policy, Advisory*, ALSTON & BIRD LLP (Oct. 9, 2023), <https://www.alston.com/en/insights/publications/2023/10/doj-new-mergers-acquisitions-safe-harbor-policy> [<https://perma.cc/CS8K-6UBV>].

arbitrary enforcement actions as long as they remain in compliance with the guidelines set forth by the safe harbor.¹⁹⁸ This certainty is vital for fostering a sustainable and trusted DeFi ecosystem.¹⁹⁹

The safe harbor framework also ensures that DeFi projects are not unduly burdened by regulatory requirements that are out of sync with operational realities.²⁰⁰ Traditional financial regulations, such as those applied to centralized financial institutions, may be ill-suited to DeFi's decentralized and rapidly evolving nature.²⁰¹ Instead of applying one-size-fits-all rules, the function-based safe harbor allows for tailored regulation based on the specific activities of each DeFi platform. This approach ensures that regulatory oversight is both appropriate and proportional, providing clear guidelines while allowing DeFi platforms the flexibility to innovate and grow.

For example, DeFi platforms that adhere to strong governance protocols, demonstrate security best practices, and implement user protections would be eligible for safe harbor protection.²⁰² This protection would allow them to operate with confidence, knowing that they are compliant with regulatory expectations, and avoid the regulatory burden that might otherwise slow innovation.²⁰³ By contrast, projects that fail to meet these standards would not be afforded safe harbor protection, thus incentivizing platforms to adopt sound practices that ensure market integrity and user security. This incentivization structure makes the safe harbor framework both a carrot and a stick, encouraging compliance without undermining the incentives for innovation.

198. FM Contributors, *DeFi's Legal and Regulatory Challenges: Navigating the Gray Areas*, FIN. MAGNATES (July 7, 2023), <https://www.financemagnates.com/cryptocurrency/regulation/defis-legal-and-regulatory-challenges-navigating-the-gray-areas/> [<https://perma.cc/Z4DE-4ZBR>].

199. Matt Powell, *DeFi Developments: A Comprehensive Overview*, CPO MAG. (Apr. 22, 2024), <https://www.cpomagazine.com/digital/defi-developments-a-comprehensive-overview/> [<https://perma.cc/TEL9-CADC>].

200. *As DeFi Matures, U.S. Financial Regulatory Questions Loom Large*, CLIFFORD CHANCE (Sep. 2020), <https://www.cliffordchance.com/briefings/2020/09/as-defi-matures--us-financial-regulatory-questions-loom-large.html> [<https://perma.cc/TC7C-DHXV>]; Uzougbo, *supra* note 11.

201. *Id.*

202. Cryptopedia Staff, *DeFi Governance in Action*, GEMINI CRYPTOPEDIA (Mar. 10, 2022), <https://www.gemini.com/cryptopedia/defi-solutions-decentralized-governance-meaning> [<https://perma.cc/SR7L-CFV2>].

203. *Id.*

Another key benefit of the safe harbor is that it provides clear guidelines for DeFi platforms that are often navigating uncertain regulatory environments.²⁰⁴ As DeFi continues to grow, clarity is essential for the industry's sustainability.²⁰⁵ Uncertainty about what is considered legal or illegal can drive projects to relocate to jurisdictions with more lenient regulations, potentially causing a fragmentation of the ecosystem.²⁰⁶ The safe harbor concept encourages uniform standards while allowing flexibility in how those standards are met, which can help avoid regulatory arbitrage and promote the global growth of the DeFi space.²⁰⁷

Finally, the safe harbor concept also provides long-term sustainability for the DeFi ecosystem by encouraging platforms to self-regulate and be proactive in their compliance efforts.²⁰⁸ Instead of relying solely on government agencies for oversight, DeFi platforms that participate in the safe harbor framework would be actively incentivized to establish their own internal compliance measures and take responsibility for their legal and ethical obligations.²⁰⁹ This self-regulation aligns with the decentralized ethos of the DeFi space, where the community takes on a greater role in ensuring that the ecosystem remains robust, secure, and innovative.²¹⁰

204. IndustryTrends, *Decentralised Finance (DeFi): Opportunities, Challenges and Policy Implications*, ANALYTICS INSIGHT (Nov. 5, 2024, 1:26 AM), <https://www.analyticsinsight.net/defi/decentralised-finance-defi-opportunities-challenges-and-policy-implications> [<https://perma.cc/49TX-SJG3>].

205. Robert D. Knight, *Key Industry Figures Predict the Future of DeFi in 2024*, COINTELEGRAPH (Dec. 23, 2023), <https://cointelegraph.com/news/key-predictions-future-of-defi-2024> [<https://perma.cc/F7EE-AE7P>].

206. Szymon Białas, *MiCA Regulations and Their Impact on the Crypto Industry*, ULAM LABS BLOG (Nov. 7, 2024), <https://www.ulam.io/blog/mica-regulations-and-their-impact-on-the-crypto-industry> [<https://perma.cc/X8MM-99J4>]; *Crypto Regulation: How the Governments Are Shaping the Future of Digital Currencies*, COIN360 (Sep. 12, 2024), <https://coin360.com/learn/global-crypto-regulation> [<https://perma.cc/6WU2-LCXV>].

207. Białas, *supra* note 182.

208. *Safe Harbor Law: Everything You Need to Know*, UPCOUNSEL, <https://www.upcounsel.com/safe-harbor-law> [<https://perma.cc/99MX-4EWQ>] (updated Sep. 19, 2022).

209. *Id.*

210. Luc Muhizi, *Decentralized Governance: How Community Drives DeFi*, MEDIUM (Dec. 9, 2023), https://medium.com/@luc_muhizi/decentralized-governance-how-community-drives-defi-216f4c39ab50 [<https://perma.cc/AC8Z-Z9ZC>].

In sum, the safe harbor concept is not only a tool for providing regulatory clarity but also a mechanism for incentivizing DeFi platforms to operate responsibly while continuing to push the boundaries of financial innovation.²¹¹ It allows for a regulatory approach that fosters innovation, market stability, and investor protection, ensuring that DeFi projects can thrive in a secure and sustainable environment.²¹²

3. *How the Framework Addresses DeFi-Specific Risks*

The function-based safe harbor framework is not only designed to incentivize responsible development and regulatory compliance, but it also offers an effective approach to managing the unique risks associated with DeFi platforms.²¹³ By addressing these risks directly, the framework ensures that innovation within the DeFi space can occur within a structure that promotes security, transparency, market stability, and user protection.²¹⁴ DeFi's decentralized nature, rapid evolution, and reliance on smart contracts present several distinct risks that need to be mitigated for the broader ecosystem to thrive.²¹⁵ This section discusses how the framework addresses three of the most critical DeFi-specific risks: technical vulnerabilities, enforcement challenges, and cross-border regulatory issues.

211. Josias N. Dewey & Samir Patel, *Blockchain & Cryptocurrency Laws and Regulations 2025: USA*, GLOB. LEGAL INSIGHTS (2024), <https://www.globallegalinsights.com/practice-areas/blockchain-cryptocurrency-laws-and-regulations/usa> [<https://perma.cc/X53G-22C9>].

212. Jeanna M. Wacker et al., *Navigating the Murky Waters of the Hatch-Waxman 'Safe Harbor'*, N.Y. L.J. (Sep. 13, 2022), <https://www.kirkland.com/publications/article/2022/09/navigating-the-murky-waters-of-the-hatch-waxman-safe-harbor> [<https://perma.cc/CHG9-9U24>]; see also 17 U.S.C. § 512 (establishing DMCA safe harbor provisions, which have successfully fostered innovation in digital platforms by balancing liability protection with copyright enforcement).

213. Tim Weingärtner et al., *Deciphering DeFi: A Comprehensive Analysis and Visualization of Risks in Decentralized Finance*, 16 J. RISK & FIN. MGMT. 454 (2023), <https://doi.org/10.3390/jrfm16100454> [<https://perma.cc/6QB5-CBVQ>].

214. *Id.*

215. Joseph Abadi, *Making Sense of Decentralized Finance: What Is DeFi? And How Does It Differ from Traditional Finance?*, FED. RSRV. BANK OF PHILA., ECON. INSIGHTS, at 18 (Q1 2024), <https://www.philadelphiafed.org/-/media/frbp/assets/economy/articles/economic-insights/2024/q1/eiq124-making-sense-of-decentralized-finance.pdf> [<https://perma.cc/6VTR-5J8J>].

a. Technical Risks

One of the most significant risks facing the DeFi ecosystem lies in the technical vulnerabilities of smart contracts—the code that governs transactions on blockchain platforms.²¹⁶ While smart contracts are designed to automatically execute based on predefined conditions, bugs or vulnerabilities in the code can lead to devastating consequences, including loss of funds, hacks, and exploits.²¹⁷ DeFi platforms are particularly vulnerable to these risks because of the decentralized nature of the protocols, which may lack traditional oversight mechanisms like human intermediaries or centralized auditing processes.²¹⁸

The function-based safe harbor framework directly addresses this risk by incorporating mandatory security audits as a key requirement for DeFi platforms seeking safe harbor protection.²¹⁹ These audits, performed by independent third parties, help identify potential vulnerabilities in smart contracts and ensure that platforms secure their code against common exploits, such as reentrancy attacks or integer overflows.²²⁰ In addition to audits, the framework encourages the implementation of bug bounty programs, incentivizing the broader developer community to actively search for and report security flaws.²²¹ By creating a clear regulatory path for platforms that conduct regular audits and engage in security practices, the framework encourages proactive risk management that safeguards users and the ecosystem.²²²

216. Shafaq Naheed Khan et al., *Blockchain Smart Contracts: Applications, Challenges, and Future Trends*, 14 PEER-TO-PEER NETWORKING & APPLICATIONS 2901, 2901–25 (2021), <https://doi.org/10.1007/s12083-021-01127-0> [<https://perma.cc/JU39-8SEW>].

217. Metla Team, *Smart Contracts Explained: Easy Guide*, METLA BLOG, <https://metla.com/blog/smart-contracts-explained-easy-guide> [<https://perma.cc/J7CY-LZR4>] (last visited July 30, 2025).

218. Vimal Mani, *Assessing the Shortfalls of DeFi Platforms*, 5 ISACA J. (Sep. 27, 2023), <https://www.isaca.org/resources/isaca-journal/issues/2023/volume-5/assessing-the-shortfalls-of-defi-platforms> [<https://perma.cc/ED4V-HZUG>].

219. Thomas Bourveau et al., *Decentralized Finance (DeFi) assurance: early evidence*, 29 REV. ACCT. STUD. 2209, 2216–19 (2024).

220. *Id.*

221. Christos A. Makridis, *Crypto Audits and Bug Bounties Are Broken: Here's How to Fix Them*, COINTELEGRAPH MAG. (Apr. 6, 2023), <https://cointelegraph.com/magazine/defi-security-audits-bug-bounties-broken-heres-how-fix/> [<https://perma.cc/VR4M-TTVL>].

222. Khan, *supra* note 192.

Moreover, the framework encourages user education as an additional safeguard, ensuring that users are aware of the risks involved in interacting with decentralized platforms and that they are equipped to make informed decisions. This safeguard, in turn, promotes a more secure and trustworthy DeFi environment where users are less likely to fall victim to scams or poorly designed smart contracts.

b. Enforcement Risks

The decentralized nature of DeFi presents a unique challenge for enforcement.²²³ Unlike traditional financial institutions, DeFi platforms do not have a central entity or identifiable individual to hold accountable in the event of a violation.²²⁴ Furthermore, the pseudonymous or anonymous nature of blockchain transactions adds an additional layer of complexity to enforcement, making it difficult for regulators to trace illicit activities or ensure compliance with regulatory requirements.²²⁵ This complexity creates significant challenges for traditional regulatory authorities, which are accustomed to interacting with clearly defined entities and centralized institutions.²²⁶

The function-based safe harbor framework addresses these enforcement challenges by incentivizing self-regulation through DAOs.²²⁷ DAOs provide a mechanism for the community of DeFi users, developers, and stakeholders to govern and enforce rules within a platform.²²⁸ This

223. Ngozi Samuel Uzougbo et al., *International Enforcement of Cryptocurrency Laws: Jurisdictional Challenges and Collaborative Solutions*, 11 MAGNA SCIENTIA ADVANCED RSCH. & REVS. 68, 68–83 (2024).

224. Olawale Adisa et al., *Decentralized Finance (DEFI) in the U. S. Economy: A Review: Assessing the Rise, Challenges, and Implications of Blockchain-Driven Financial Systems*, 21 WORLD J. ADVANCED RES. & REV. 2313, 2313–28 (2024).

225. Jesse Anglen, *DeFi vs. Traditional Finance: A Comprehensive Comparison*, RAPID INNOVATION, <https://www.rapidinnovation.io/post/defi-vs-traditional-finance-comprehensive-comparison> [<https://perma.cc/6FJU-M3NC>] (last visited July 3, 2025).

226. Truchet, *supra* note 60, at 71–75.

227. Jihye Choi, *DAOs: Empowering the Community to Build Trust in the Digital Age*, HEXLANT (Feb. 10, 2022), <https://stanford-jblp.pubpub.org/pub/dao/release/1> [<https://perma.cc/PX9Y-9MJQ>].

228. Jesse Anglen, *DAOs Explained: Ultimate Guide to Decentralized Autonomous Organizations*, RAPID INNOVATION, <https://www.rapidinnovation.io/post/daos-explained-ultimate-guide-to-decentralized-autonomous-organizations> [<https://perma.cc/VHS7-XUE9>] (last visited July 3, 2025).

decentralized governance model not only aligns with the ethos of DeFi but also creates a system where community accountability can complement traditional regulatory oversight.²²⁹ DAOs can be used to establish dispute resolution mechanisms, ensure compliance with the safe harbor's requirements, and address potential violations without the need for centralized authority.²³⁰

Furthermore, the framework encourages international collaboration between DeFi platforms and regulators, fostering cross-border enforcement protocols that ensure compliance across jurisdictions. By promoting this cooperation, the framework mitigates the challenges posed by DeFi's global and decentralized nature, making it easier to enforce regulations and hold bad actors accountable, regardless of where they are located.

c. Cross-Border Risks

DeFi platforms operate in a global landscape, with users and developers spanning multiple jurisdictions.²³¹ This landscape introduces significant jurisdictional challenges for regulators, as DeFi platforms often have no clear geographic boundaries and may operate across multiple countries with different regulatory regimes.²³² This fragmentation of regulatory authority can lead to issues such as regulatory arbitrage, where platforms move to more favorable jurisdictions to avoid compliance with stricter regulations.²³³

The function-based safe harbor framework seeks to address these cross-border challenges by encouraging international regulatory cooperation and the development of harmonized standards for DeFi platforms. Rather than relying solely on national or regional regulatory bodies, the framework supports the creation of global standards that can be adopted and implemented by jurisdictions worldwide. Through these

229. André Guskow Cardoso, *Decentralized Autonomous Organizations - DAOs: The Convergence of Technology, Law, Governance, and Behavioral Economics*, PUB, (Nov. 20, 2023), <https://law.mit.edu/pub/decentralizedautonomousorganizations/release/1> [<https://perma.cc/A9DS-W2YH>].

230. *Id.*

231. Roomy Khan, *DeFi – Financial Alchemy in a Trillion-Dollar Market*, FORBES (Aug. 7, 2024), <https://www.forbes.com/sites/roomykhan/2024/08/07/defi--financial-alchemy-in-a-trillion-dollar-market/> [<https://perma.cc/ZA8J-ZVXM>].

232. Salami, *supra* note 61.

233. *Id.*

standards, DeFi platforms can adhere to consistent compliance and security measures that apply across borders, reducing the risk of fragmented oversight and regulatory arbitrage.²³⁴

Moreover, the framework's focus on functionality rather than form allows regulators to evaluate DeFi platforms based on their economic roles rather than their geographic location or legal structure.²³⁵ This framework makes it easier for platforms to comply with international regulations, while also ensuring that the platforms meet the same core regulatory standards, regardless of where they operate.²³⁶

C. Integrating These Safeguards into a Comprehensive Framework

The function-based safe harbor framework effectively integrates these safeguards—technical audits, self-regulation via DAOs, and international cooperation—to create a cohesive system that addresses DeFi-specific risks.²³⁷ By focusing on the functionality of DeFi platforms and ensuring that they meet essential compliance requirements, this framework offers a balanced approach that encourages innovation while mitigating the risks that could undermine market stability and user trust. The proposed safeguards align with the goal of promoting a secure, transparent, and accountable DeFi ecosystem, ensuring that platforms are incentivized to adopt best practices without stifling their ability to innovate.

PART III. ADDRESSING SPECIFIC RISKS IN DEFI

DeFi has emerged as a transformative force within the global financial system, providing unprecedented access to financial services without the need for traditional intermediaries.²³⁸ Alongside its potential for

234. Jakob Brezigar, *Regulatory Challenges in Crypto: Issues and Solutions*, ORCABAY BLOG (Nov. 19, 2024), <https://orcabay.io/blog/regulatory-challenges-in-crypto/> [<https://perma.cc/5S2S-RY7S>].

235. Alexandra Born et al., *Decentralised Finance – A New Unregulated Non-Bank System?*, EUROPEAN CENT. BANK MACROPRUDENTIAL BULLETIN (July 2022), https://www.ecb.europa.eu/press/financial-stability-publications/macprudential-bulletin/focus/2022/html/ecb.mpbu202207_focus1.en.html [<https://perma.cc/7X3F-Y9ZJ>].

236. *Id.*

237. *The Financial Stability Risks of Decentralised Finance*, FINANCIAL STABILITY BD. (Feb. 16, 2023), <https://www.fsb.org/wp-content/uploads/P160223.pdf> [<https://perma.cc/W56R-YRXF>].

238. Patrick Schueffel, *DeFi: Decentralized Finance – An Introduction and Overview*, 9 J. INNOVATION MGMT. NO. 3 I, I–II

innovation and economic empowerment, however, DeFi presents unique risks that require careful attention and effective mitigation strategies.²³⁹ These risks, which span from technical vulnerabilities to market instability, threaten both individual users and the broader DeFi ecosystem.²⁴⁰ This section explores some of the most pressing risks inherent in DeFi—including blockchain vulnerabilities, systemic market risks, and specific risks associated with stablecoins—while proposing targeted mitigation strategies that are aligned with the function-based safe harbor framework.²⁴¹

A. Mitigating Blockchain Vulnerabilities and Broader Market Risks

DeFi platforms are built on blockchain technology and smart contracts, which are often presented as immutable, transparent, and secure alternatives to traditional financial systems.²⁴² While these features have their advantages, they also introduce technical vulnerabilities that, if left unaddressed, can lead to significant losses or disruptions.²⁴³ Additionally,

(2021), https://doi.org/10.24840/2183-0606_009.003_0001

[<https://perma.cc/XW4F-V9M4>].

239. Francesca Carapella et al., *Decentralized Finance (DeFi): Transformative Potential and Associated Risks*, FED. RESRV. BANK OF ATLANTA POL'Y HUB NO. 14–2022, (Oct. 2022), <https://www.atlantafed.org/-/media/documents/research/publications/policy-hub/2022/10/18/14--decentralized-finance-defi--transformative-potential-and-associated-risks.pdf> [<https://perma.cc/C8CD-TF8U>].

240. KHOULA AL HARTHY & APARNA AGARWAL, DECENTRALIZED FINANCE: THE IMPACT OF BLOCKCHAIN-BASED FINANCIAL INNOVATIONS ON ENTREPRENEURSHIP, *DeFi Cybersecurity Technical and Nontechnical Risks*, 133–49 (Sami Basly ed., Springer, Cham 2024), https://doi.org/10.1007/978-3-031-49515-1_8 [<https://perma.cc/X2VH-DYHX>].

241. *The financial stability risks of decentralised finance – Executive Summary*, BANK FOR INT'L SETTLEMENTS (Aug. 31, 2023), <https://www.bis.org/fsi/fsisummaries/defi.htm> [<https://perma.cc/CTN4-L285>].

242. *What Is Decentralized Finance (DeFi)?*, BINANCE ACADEMY, <https://academy.binance.com/en/articles/the-complete-beginners-guide-to-decentralized-finance-defi> [<https://perma.cc/ZGZ2-42LS>] (updated July 8, 2024).

243. Siddhant Kejriwal, *DeFi 101: What is Decentralized Finance and Why It's Important*, COINBUREAU (Feb. 15, 2024), <https://coinbureau.com/education/what-is-defi/> [<https://perma.cc/MWH5-27A3>].

DeFi's interconnected nature creates broader market risks that extend beyond individual platforms.²⁴⁴

1. Technical Vulnerabilities in DeFi

Technical vulnerabilities lie at the heart of DeFi risks, particularly in the smart contracts that underpin these platforms.²⁴⁵ Unlike traditional financial systems where centralized entities maintain operational control, DeFi platforms rely on self-executing code to govern transactions, manage assets, and execute agreements.²⁴⁶ While this decentralized structure fosters transparency and innovation, it also introduces significant risks, as the smallest flaw in a smart contract can have catastrophic consequences.²⁴⁷

Smart contracts are immutable once deployed, meaning vulnerabilities in their code cannot be easily corrected after launch.²⁴⁸ Exploits such as reentrancy attacks, logic errors, and unchecked inputs are common vectors for attacks.²⁴⁹ The decentralized and pseudonymous nature of these platforms further complicates mitigation efforts, as enforcement mechanisms are limited and often reactive.²⁵⁰ Two high-profile

244. Wenkai Li et al., *A Survey of DeFi Security: Challenges and Opportunities*, 34 J. KING SAUD U. COMPUT. & INFO. SCIS. 10380 (2022).

245. QuillAudits Team, *Smart Contract Vulnerabilities, Risks and How to Mitigate Them*, QUILLAUDITS BLOG (Sep. 20, 2024), <https://www.quillaudits.com/blog/smart-contract/smart-contract-vulnerabilities> [<https://perma.cc/9H48-4DP4>].

246. *Decentralized Finance vs. Traditional Finance: A Technical Comparison*, UNVEST (Aug. 25, 2023), <https://www.unvest.io/blog/decentralized-finance-vs-traditional-finance-a-technical-comparison> [<https://perma.cc/KV8J-Y79K>].

247. Fabian Schär, *Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets*, FED. RSRV. BANK ST. LOUIS REV. (Apr. 15, 2021), <https://www.stlouisfed.org/publications/review/2021/02/05/decentralized-finance-on-blockchain-and-smart-contract-based-financial-markets> [<https://perma.cc/JZ2V-DWHU>].

248. Usman Arda, *What Are Smart Contracts? Everything You Need to Know*, HACKEN BLOG, <https://hacken.io/discover/what-are-smart-contracts/> [<https://perma.cc/W4US-G8Q8>] (updated Nov. 2024).

249. Bin Wang et al., *DeFiScanner: Spotting DeFi Attacks Exploiting Logic Vulnerabilities on Blockchain*, 11 IEEE TRANSACTIONS ON COMPUTATIONAL SOC. SYS. 1577 (2024), <https://doi.org/10.1109/TCSS.2022.3228122> [<https://perma.cc/D5KV-UM4X>].

250. Sasha Shilina, *The Future of Social Networking: Decentralization for User Empowerment, Privacy, and Freedom from Censorship*, PARADIGM

incidents—the DAO hack in 2016 and the Poly Network exploit in 2021—serve as stark illustrations of these vulnerabilities.²⁵¹

The DAO hack exposed the dangers of insufficient testing and inadequate governance, with a single reentrancy vulnerability allowing an attacker to siphon \$150 million in Ether.²⁵² Similarly, the Poly Network exploit revealed how flaws in cross-chain interoperability contracts could be exploited to transfer over \$600 million in assets.²⁵³ These incidents underscore not only DeFi’s technical risks but also the systemic fragility of interconnected platforms and the enforcement challenges posed by decentralized systems.²⁵⁴

These vulnerabilities highlight the urgent need for a function-based regulatory framework.²⁵⁵ Such a framework would prioritize proactive measures like mandatory security audits, robust governance protocols, and incident response plans to address risks before the issues escalate. By focusing on the specific functions and risks of DeFi operations, regulators can foster innovation while safeguarding these platforms’ integrity.²⁵⁶

The technical risks inherent in DeFi platforms are vividly illustrated by two landmark incidents: the 2016 DAO hack and the 2021 Poly

(Nov. 6, 2023), <https://medium.com/@sshshln/the-future-of-social-networking-decentralization-for-user-empowerment-privacy-and-freedom-from-a0a8f74790cb> [<https://perma.cc/3K6X-EPCE>].

251. Tommaso Gagliardoni, *The Poly Network Hack Explained*, KUDELSKI SEC. RSCH. (Aug. 12, 2021), <https://research.kudelskisecurity.com/2021/08/12/the-poly-network-hack-explained/> [<https://perma.cc/6VEE-JXKP>].

252. Zubin Pratap, *Reentrancy Attacks and The DAO Hack*, CHAINLINK BLOG (Aug. 31, 2022), <https://blog.chain.link/reentrancy-attacks-and-the-dao-hack/> [<https://perma.cc/63U4-ACX7>].

253. Gertrude Chavez-Dreyfuss & Michelle Price, *How Hackers Stole \$613 Million in Crypto Tokens from Poly Network*, REUTERS, <https://www.reuters.com/technology/how-hackers-stole-613-million-crypto-tokens-poly-network-2021-08-12/> [<https://perma.cc/VYD2-A7VN>] (updated Aug. 12, 2021).

254. *Id.*

255. *Id.*

256. Tara Chang et al., *A Risk Classification Framework for Decentralized Finance Protocols: Exploring Emerging Risks for Insurers and Reinsurers*, SOC’Y OF ACTUARIES RES. INST. (Sep. 2022), <https://www.soa.org/4aa5bb/globalassets/assets/files/resources/research-report/2022/decentralized-finance-protocols.pdf> [<https://perma.cc/9GR6-2PWC>].

Network exploit.²⁵⁷ These case studies reveal not only the potential for devastating financial losses but also the systemic fragility and enforcement challenges unique to decentralized systems.²⁵⁸

a. The DAO Hack: Lessons in Governance and Smart Contract Security

The DAO hack marked one of the earliest and most significant breaches in the history of DeFi.²⁵⁹ The DAO was a pioneering experiment in blockchain-based governance, enabling token holders to collectively vote on investment decisions through smart contracts.²⁶⁰ Unfortunately, the DAO's code contained a critical reentrancy vulnerability that allowed an attacker to repeatedly withdraw funds before the contract could update its balances.²⁶¹ The exploit resulted in the theft of approximately \$50 million worth of Ether.²⁶²

This incident highlighted multiple weaknesses.²⁶³ First, it demonstrated the dangers of insufficient smart contract testing and auditing.²⁶⁴ The immutability of blockchain systems meant that the flaw could not be corrected once the DAO was deployed, leaving the platform vulnerable to exploitation.²⁶⁵ Second, the DAO's decentralized

257. Kraken Security Labs, *Abusing Smart Contracts to Steal \$600 Million: How the Poly Network Hack Actually Happened*, KRAKEN BLOG (Sep. 22, 2021), <https://blog.kraken.com/product/security/abusing-smart-contracts-to-steal-600-million-how-the-poly-network-hack-actually-happened> [<https://perma.cc/BE6R-7SEW>].

258. *Id.*

259. Artem Minaev, *The DAO Hack: Understanding the Infamous Attack*, CRYPTODOSE, <https://cryptodose.net/learn/the-dao-hack/> [<https://perma.cc/6UZS-6323>] (updated June 13, 2023).

260. Carlos Santana & Laura Albareda, *Blockchain and the Emergence of Decentralized Autonomous Organizations (DAOs): An Integrative Model and Research Agenda*, 182 *TECH. FORECASTING & SOC. CHANGE* 121806, 2–5 (2022).

261. *Id.*

262. Clint Finley, *A \$50 Million Hack Just Showed That the DAO Was All Too Human*, WIRED (June 18, 2016, 4:30 AM), <https://www.wired.com/2016/06/50-million-hack-just-showed-dao-human/> [<https://perma.cc/F7UL-7X2B>].

263. *Id.*

264. *Id.*

265. *What is blockchain immutability?*, BITSTAMP (Aug. 18, 2022), <https://www.bitstamp.net/learn/security/what-is-blockchain-immutability/> [<https://perma.cc/DM69-K9C2>].

governance structure complicated responses to the breach.²⁶⁶ With no central authority to act decisively, the Ethereum community ultimately implemented a contentious hard fork to reverse the hacker's transactions, creating a split between Ethereum (ETH) and Ethereum Classic (ETC).²⁶⁷ This decision raised significant questions about the immutability of blockchain technology and the role of community governance in addressing crises.²⁶⁸

b. The Poly Network Exploit: Interconnected Risks and Cross-Chain Vulnerabilities

In 2021, the Poly Network exploit demonstrated how vulnerabilities in cross-chain interoperability contracts could threaten not just a single platform but the broader DeFi ecosystem.²⁶⁹ Poly Network, designed to enable asset transfers across multiple blockchains, suffered a breach in which an attacker exploited a flaw in the logic of its EthCrossChainManager contract.²⁷⁰ This vulnerability allowed the attacker to manipulate contract permissions and transfer over \$600 million in assets across ETH, Binance Smart Chain, and Polygon.²⁷¹

266. Sen Li & Yan Chen, *Governing Decentralized Autonomous Organizations as Digital Commons*, 2024 J. BUS. VENTURING INSIGHTS (forthcoming), <https://doi.org/10.2139/ssrn.4684441> [<https://perma.cc/55JT-JU9Q>].

267. Andy Rosen, *Ethereum What It Is and How It Works*, NERDWALLET: INVESTING (Mar. 25, 2025), <https://www.nerdwallet.com/article/investing/ethereum> [<https://perma.cc/2VKY-95LY>].

268. Joon Ian Wong & Ian Kar, *Everything You Need to Know About the Ethereum "Hard Fork"*, QUARTZ (July 18, 2016), <https://qz.com/730004/everything-you-need-to-know-about-the-ethereum-hard-fork> [<https://perma.cc/92VJ-5LPT>].

269. Gagliardoni, *supra* note 227.

270. *Poly Network Improves Interoperability by Expanding Support for zkSync Asset Bridging*, GLOBENEWSWIRE (Mar. 2, 2023), <https://www.globenewswire.com/news-release/2023/03/02/2620488/0/en/Poly-Network-Improves-Interoperability-by-Expanding-Support-for-zkSync-Asset-Bridging.html> [<https://perma.cc/75PE-YFBQ>].

271. Turner Wright, *Hackers Stole at Least \$600M in Poly Exploit Across Three Chains*, COINTELEGRAPH (Aug. 10, 2021), <https://cointelegraph.com/news/hackers-stole-at-least-600m-in-poly-exploit-across-three-chains> [<https://perma.cc/N5UB-HHRE>].

Unlike the DAO hack, the Poly Network exploit showcased the risks of interconnected DeFi platforms.²⁷² By targeting a cross-chain contract, the attacker exposed the systemic fragility of an ecosystem where platforms rely heavily on one another for functionality.²⁷³ The incident had the potential to destabilize the broader DeFi market, eroding user trust and liquidity.²⁷⁴ Poly Network's decentralized structure also highlighted the enforcement challenges of DeFi: rather than relying on legal or regulatory mechanisms, the protocol was to appeal directly to the hacker, who ultimately returned most of the stolen funds.²⁷⁵

c. The Need for Proactive Safeguards

Both the DAO hack and Poly Network exploit underscore the critical need for proactive measures to address technical vulnerabilities in DeFi.²⁷⁶ Mandatory security audits could have identified the reentrancy flaw in the DAO's smart contract or the logic vulnerability in Poly Network's cross-chain system, preventing these exploits from occurring.²⁷⁷ Similarly, governance standards and incident response protocols could have provided clearer pathways for addressing breaches, reducing reliance on ad hoc or

272. Scott Chipolina & Liam J. Kelly, *What the Poly Network Hack Reveals About DeFi*, DECRYPT (Aug. 12, 2021), <https://decrypt.co/78275/what-the-poly-network-hack-reveals-about-defi> [<https://perma.cc/4P7F-X99G>].

273. André Beganski, *Poly Network Attack Conjures Billions of Dollars in Tokens That 'Did Not Exist'*, DECRYPT (July 2, 2023), <https://decrypt.co/147059/poly-network-attack-conjures-billions-of-dollars-in-tokens-that-did-not-exist> [<https://perma.cc/X9SW-Z5A9>].

274. Martin Young, *Poly Network urges users to withdraw after exploit affects 57 crypto assets*, COINTELEGRAPH (July 2, 2023), <https://cointelegraph.com/news/poly-network-users-withdraw-bridge-exploit-affects-57-crypto> [<https://perma.cc/7Z4E-DSKU>].

275. Tom Wilson et al., *Hackers return \$260 mln to cryptocurrency platform after massive theft*, REUTERS, <https://www.reuters.com/technology/defi-platform-poly-network-reports-hacking-loses-estimated-600-million-2021-08-11/> [<https://perma.cc/LQ4S-GHZ7>] (updated Aug. 12, 2021).

276. Jordan Cole, *Case Studies of Blockchain Security Breaches and Lessons Learned*, BLOCKAPPS BLOG (Apr. 17, 2024), <https://blockapps.net/blog/case-studies-of-blockchain-security-breaches-and-lessons-learned/> [<https://perma.cc/2U8R-MFDU>].

277. AstraKode, *What is a Reentrancy Attack in Smart Contracts and How to Prevent It?*, BLOCKCHAIN HACKS (Feb. 21, 2024), <https://medium.com/blockchain-hacks/what-is-reentrancy-attack-in-smart-contracts-and-how-to-prevent-them-d65ad76dce5f> [<https://perma.cc/9XPG-LQYA>].

community-driven responses.²⁷⁸ These case studies also highlight the importance of systemic protections, such as stress testing and liquidity buffers, to ensure that interconnected platforms can withstand crises without cascading failures.²⁷⁹ By integrating these safeguards into a function-based safe harbor framework, regulators can strike a balance between fostering innovation and ensuring platform integrity.

2. Proposed Safeguards: Audits, Bug Bounty Programs, and User Education

The technical vulnerabilities highlighted by the DAO hack and Poly Network exploit demonstrate the urgent need for a structured regulatory approach that not only identifies and mitigates risks but also incentivizes proactive compliance.²⁸⁰ A function-based safe harbor framework offers a solution, providing DeFi platforms with a clear regulatory pathway while requiring the implementation of essential safeguards as a condition of participation.

Under the safe harbor framework, platforms would be incentivized to adopt measures such as mandatory security audits, governance standards, and systemic safeguards to qualify for regulatory protection. This approach balances innovation with accountability, ensuring that platforms address vulnerabilities before they escalate into crises. By linking safe harbor protections to specific operational requirements, the framework creates an ecosystem where platforms internalize best practices, fostering a culture of security and resilience across the DeFi sector.

The following sections outline the core safeguards integral to this framework. These measures aim to address risks at every level—technical vulnerabilities, governance challenges, and systemic fragility—while aligning with the decentralized ethos of DeFi.²⁸¹ Together, the measures

278. Caroline Malcolm, *DeFi Regulation: Practical Next Steps to Make the Industry Safer*, CHAINALYSIS (Feb. 28, 2024), <https://www.chainalysis.com/blog/defi-regulation-practical-next-steps-to-make-the-industry-safer/> [<https://perma.cc/4XQ2-QSDG>].

279. TEDAO, *Beyond Code Flaws: Economic Audits and DeFi Protocol Security*, GATE.IO LEARN (Nov. 25, 2024), <https://www.gate.com/learn/articles/beyond-code-flaws-economic-audits-and-de-fi-protocol-security/73092>.

280. Rob Behnke, *Explained: The Poly Network Hack (July 2023)*, HALBORN (July 4, 2023), <https://www.halborn.com/blog/post/explained-the-poly-network-hack-july-2023> [<https://perma.cc/42CN-ZVGG>].

281. Sharma, *supra* note 22.

provide a roadmap for platforms seeking to build trust and stability within a rapidly evolving regulatory environment.

a. Security Audits

Mandatory security audits are a foundational element of the function-based safe harbor framework, addressing the pervasive risk of smart contract vulnerabilities in DeFi. Incidents like the DAO hack and Poly Network exploit, where flaws in contract code led to multimillion-dollar losses, demonstrate the critical need for rigorous pre-deployment evaluations.²⁸² Under the safe harbor framework, platforms would be required to undergo independent third-party audits to identify and resolve technical vulnerabilities before launch. These audits would assess contract security, access controls, and safeguards against common attack vectors, ensuring platforms meet high standards of technical integrity.

Requiring security audits incentivizes compliance by linking regulatory protection to proactive risk management. Platforms that meet these standards not only reduce the likelihood of breaches but also signal trustworthiness to users and investors. By embedding this requirement, the safe harbor framework promotes a culture of security and resilience in the DeFi ecosystem.

b. Incident Response Protocols

Incident response protocols are critical for managing breaches and minimizing damage in DeFi, where centralized crisis management is often unavailable.²⁸³ High-profile incidents like the DAO hack and the Poly Network exploit reveal the inadequacy of ad hoc responses, highlighting the need for standardized procedures.²⁸⁴ Under the function-based safe harbor framework, platforms must establish clear protocols for detecting, containing, and resolving breaches. Automated alerts and predefined

282. *Hack Track: An Analysis of Poly Network Hack and Latest Related Events*, MERKLE SCI. (Aug. 12, 2021), <https://www.merklescience.com/blog/hack-track-an-analysis-of-poly-network-hack-and-latest-related-events> [<https://perma.cc/J7J9-ZFBU>].

283. AXEL WIEANDT & LAURENZ HEPPDING, *THE FINTECH DISRUPTION: HOW FINANCIAL INNOVATION IS TRANSFORMING THE BANKING INDUSTRY, Centralized and Decentralized Finance: Coexistence or Convergence?*, 11, 25 (Thomas Walker, Elaheh Nikbakht & Maher Kooli eds., Palgrave Macmillan 2023).

284. Gagliardoni, *supra* note 227.

actions can ensure swift responses, reducing reliance on improvised or community-driven approaches, as seen in the DAO's hard fork and Poly Network's public appeals to the hacker.²⁸⁵ By requiring incident response protocols, the safe harbor framework fosters preparedness, enhances trust among users and investors, and ensures that platforms can manage risks effectively while maintaining the integrity of the DeFi ecosystem.

c. Governance Standards

Robust governance standards are essential for accountability and effective decision-making in DeFi. The DAO hack and the Poly Network exploit exposed the dangers of weak governance, where platforms relied on ad hoc solutions like contentious community debates or public appeals to resolve crises.²⁸⁶ Under the function-based safe harbor framework, platforms must adopt governance structures that balance decentralization with accountability. These governance structures include clear voting processes, defined roles, and transparent mechanisms for managing disputes and upgrades. Such standards ensure coordinated and transparent responses to challenges, reducing reliance on improvised measures. By requiring governance standards, the safe harbor framework promotes operational resilience and builds trust among users, investors, and regulators, fostering a more stable and reliable DeFi ecosystem.

d. Automated Compliance Tools

Automated compliance tools address DeFi's inherent enforcement challenges by embedding regulatory safeguards directly into smart contract systems. The pseudonymous nature of blockchain transactions, as seen in the DAO hack and Poly Network exploit, highlights the need for self-executing mechanisms to enforce compliance and prevent unauthorized actions.²⁸⁷ Under the function-based safe harbor framework, platforms would be required to integrate automated tools such as transaction filters, reporting systems, and rule-based alerts. These tools enable proactive enforcement, reducing reliance on external authorities and manual intervention. By mandating automated compliance, the safe harbor framework ensures consistent and scalable enforcement, improving accountability, transparency, and trust across the DeFi ecosystem.

285. *Id.*

286. *Id.*

287. *Id.*

e. Systemic Safeguards

Systemic safeguards are critical for mitigating the interconnected risks inherent in DeFi.²⁸⁸ As platforms increasingly rely on cross-chain interoperability and shared liquidity pools, vulnerabilities within one system can cascade across the broader ecosystem.²⁸⁹ The Poly Network exploit, which leveraged cross-chain vulnerabilities to siphon \$600 million, underscores how a single breach can destabilize multiple platforms and erode market confidence.²⁹⁰

The function-based safe harbor framework addresses these risks by requiring platforms to implement systemic safeguards such as stress testing and liquidity buffers. Stress testing allows platforms to simulate adverse conditions, identifying weaknesses in operations before they result in widespread disruption.²⁹¹ Liquidity buffers provide a financial cushion during crises, ensuring platforms can handle sudden outflows and maintain stability.²⁹² Together, these safeguards enhance resilience and reduce the likelihood of cascading failures.

While these measures are critical for individual platform stability, they also serve a broader purpose: protecting the overall DeFi market. Systemic safeguards ensure that interconnected platforms are not only self-sufficient but also contribute to the resilience of the ecosystem as a whole.²⁹³ Even

288. Sirio Aramonte et al., *DeFi risks and the decentralisation illusion*, BIS Q. REV. 21, 33 (Dec. 2021), https://www.bis.org/publ/qtrpdf/r_qt2112b.pdf [<https://perma.cc/B6KS-VTXR>].

289. Renuka Tahelyani, *10 Reasons Why Cross-Chain Interoperability Matters: A Look at Elys Network's Paradigm Shift in DeFi*, DROOMDROOM, <https://www.droomdroom.com/articles/10-reasons-why-cross-chain-interoperability-matters> [<https://perma.cc/PRC7-FD6F>] (updated Apr. 15, 2025, 12:59 PM).

290. Liam Frost, *Poly Network Suffers Record-Breaking \$600.3 Million Hack*, DECRYPT (Aug. 10, 2021), <https://decrypt.co/78163/polynetwork-suffers-record-breaking-600-3m-hack> [<https://perma.cc/KEB6-PPGA>].

291. *The DeFi Risk Landscape*, MOONDEFI ACAD., <https://moondefi.org/academy/intro-defi/the-defi-risk-landscape/> [<https://perma.cc/PN85-8PA7>] (updated May 17, 2024).

292. *Q&A on the Use of Liquidity and Capital Buffers*, BANK OF ENG., <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/publication/2020/qanda-on-the-use-of-liquidity-and-capital-buffers.pdf> [<https://perma.cc/P9CA-4RRM>] (updated July 6, 2020).

293. Tim Weingärtner et al., *Deciphering DeFi: A Comprehensive Analysis and Visualization of Risks in Decentralized Finance*, J. RISK FIN. MGMT. at 454 (Oct. 20, 2023), <https://doi.org/10.3390/jrfm16100454> [<https://perma.cc/65HL-DUKP>].

with these safeguards, broader market risks—such as volatility, regulatory uncertainty, and systemic shocks—extend beyond the scope of individual platforms.²⁹⁴

The next section examines these broader market risks, exploring how the safe harbor framework can address challenges that affect the entire DeFi ecosystem. By linking platform-specific protections to market-wide resilience, the framework lays the foundation for sustainable growth in the decentralized financial sector.

3. Broader Market Risks

While systemic safeguards address platform-specific vulnerabilities, broader market risks pose challenges that extend beyond individual DeFi platforms.²⁹⁵ The interconnected nature of DeFi exposes the entire ecosystem to external shocks, regulatory uncertainty, and cascading failures.²⁹⁶ These risks threaten not only individual participants but also DeFi's long-term viability as an alternative financial system.²⁹⁷ A function-based safe harbor framework offers tools to mitigate these risks, but effective solutions will also require collaboration among regulators, platforms, and market participants.²⁹⁸

294. *Id.*

295. Eric Anziani et al., *Examining the Rise of Decentralised Finance: Trends, Challenges, and Opportunities*, ASIA-PACIFIC RES. EXCH. (June 15, 2021), <https://www.arx.cfa/en/research/2021/06/soc150621-examining-the-rise-of-decentralised-finance> [<https://perma.cc/2X2B-AGPT>].

296. For a detailed exploration of the economic mechanisms and risks associated with decentralized finance (DeFi), see Anton Badev & Cy Watsky, *Interconnected DeFi: Ripple Effects from the Terra Collapse, Finance and Economics Discussion Series 2023-044*, BD. OF GOVERNORS OF THE FED. RSRV. SYS., <https://doi.org/10.17016/FEDS.2023.044> [<https://perma.cc/X7NX-CGP9>]. The authors analyze how interconnected blockchain networks, especially through bridges, can propagate systemic risks and cause ripple effects, highlighting the fragility within DeFi ecosystems.

297. Thanos Tsavlis, *Decentralized Finance: Risks And Rewards In The DeFi Ecosystem*, FORBES TECH. COUNCIL (Mar. 11, 2024), <https://www.forbes.com/sites/forbestechcouncil/2024/03/11/decentralized-finance-risks-and-rewards-in-the-defi-ecosystem> [<https://perma.cc/WU35-E433>].

298. *Id.*

a. Systemic Interdependence

DeFi's interconnected nature creates risks that transcend individual platforms.²⁹⁹ Protocols often rely on shared liquidity pools, cross-chain bridges, and interoperable smart contracts.³⁰⁰ When a failure occurs in one component, such as a liquidity pool becoming insolvent or a cross-chain bridge being exploited, the effects can ripple through the ecosystem.³⁰¹ The TerraUSD (UST) collapse, which triggered billions in losses across multiple platforms, exemplifies how interdependence amplifies risk.³⁰² The safe harbor framework helps mitigate these risks by encouraging platforms to adopt systemic safeguards, such as stress testing and diversified collateralization. Interdependencies also demand broader market coordination to prevent cascading failures.

b. Regulatory Uncertainty

Regulatory fragmentation itself poses another major challenge to DeFi's stability.³⁰³ Varying rules across jurisdictions create compliance burdens for platforms and encourage regulatory arbitrage, where projects operate in lenient regions while serving global users.³⁰⁴ The absence of

299. Filippo Ferroni, *How Interconnected Are Cryptocurrencies and What Does This Mean for Risk Measurement?*, FED. RSRV. BANK OF CHI.: CHI. FED. LETTER, NO. 466 (Mar. 2022), <https://www.chicagofed.org/publications/chicago-fed-letter/2022/466> [<https://perma.cc/AGJ6-TNG9>].

300. Arpan Mondal, *Blockchain Bridges: A Deep Dive into Cross-Chain Interoperability*, MEDIUM (Mar. 8, 2024), <https://medium.com/@accesstoarpan/blockchain-bridges-a-deep-dive-into-cross-chain-interoperability-67150c12c5ce> [<https://perma.cc/A5E4-HFEF>].

301. Will Kenton, *Understanding Liquidity Risk in Banks and Business, With Examples*, INVESTOPEDIA (Aug. 22, 2024), <https://www.investopedia.com/terms/l/liquidityrisk.asp> [<https://perma.cc/5BWW-B9CY>].

302. Chainalysis Team, *The Trades That Triggered TerraUSD's Collapse*, CHAINALYSIS (June 9, 2022), <https://www.chainalysis.com/blog/how-terrausd-collapsed/#:~:text=Summary,of%20both%20LUNA%20and%20UST> [<https://perma.cc/535W-PVS5>].

303. Uzougbo, *supra* note 11, at 116–29.

304. Naballa Blesson, *Understanding Blockchain Compliance and Regulations Affecting DeFi*, NABALLA (Nov. 27, 2024), <https://naballa.hashnode.dev/understanding-blockchain-compliance-and-regulations-affecting-defi> [<https://perma.cc/ZYP2-WGG2>].

consistent oversight also exacerbates risks, as enforcement mechanisms differ widely and leave gaps in accountability.³⁰⁵

A function-based safe harbor framework provides a pathway to address this uncertainty by offering clear, activity-based standards that platforms can follow regardless of jurisdiction. Aligning this framework with international efforts, such as the EU's Markets in Crypto-Assets Regulation (MiCA), would further promote global regulatory consistency and reduce the risks of fragmentation.

c. Market Volatility

DeFi operates within highly volatile cryptocurrency markets, where rapid price swings can destabilize protocols and undermine user trust.³⁰⁶ Stablecoins, a cornerstone of DeFi, are particularly vulnerable to volatility when they are algorithmically pegged or inadequately collateralized.³⁰⁷ The collapse of algorithmic stablecoins like UST reveals how unchecked volatility can trigger cascading failures across interconnected platforms.

The safe harbor framework addresses these risks by promoting collateralized stablecoins and requiring stress testing to evaluate platform resilience during periods of extreme volatility.³⁰⁸ Encouraging platforms to adopt such measures fosters user confidence and reduces the likelihood of market-wide disruption.³⁰⁹

305. *Id.*

306. Will Daniel, *Cryptocurrencies have had a wild few weeks. Here's how the volatile price swings have affected investors, traders, miners, and DeFi companies*, INSIDER (May 31, 2021, 8:45 AM), <https://markets.businessinsider.com/currencies/news/cryptocurrency-volatility-price-swings-affect-investors-traders-miners-defi-2021-5-1030478847> [<https://perma.cc/G2J9-2UDF>].

307. Cristina Polizu et al., *Stablecoins: A Deep Dive into Valuation and Depegging*, S&P GLOB. (Sep. 7, 2023), <https://www.spglobal.com/en/research-insights/special-reports/stablecoins-a-deep-dive-into-valuation-and-depegging> [<https://perma.cc/6NUX-BXHV>].

308. Sumedha Deshmukh et al., *Crypto Crash: How the Algorithmic Stablecoin UST Failed and What We Can Learn from It*, WORLD ECON. F. (May 25, 2022), <https://www.weforum.org/stories/2022/05/crypto-crash-ust-luna/> [<https://perma.cc/P4TY-2UFQ>].

309. Shengchen Ling et al., *SoK: Stablecoin Designs, Risks, and the Stablecoin LEGO*, ARXIV (Jun. 21, 2025), <https://arxiv.org/html/2506.17622v1> [<https://perma.cc/VFC9-FTZK>] (analyzing how DeFi market stability relies on an effective interplay between market confidence and continuous liquidity).

d. Liquidity Crisis

Liquidity crises occur when platforms are unable to meet withdrawal demands or collateral requirements during market shocks.³¹⁰ Such crises can lead to insolvency, asset freezes, or cascading liquidations, further destabilizing the ecosystem.³¹¹ The Poly Network exploit demonstrated how sudden outflows of funds could undermine a platform's ability to maintain liquidity, while broader market panic exacerbates the problem.³¹² Under the safe harbor framework, platforms would be required to maintain liquidity buffers and adopt mechanisms to manage liquidity crises.³¹³ These measures would help prevent systemic contagion and ensure platforms can continue operating during times of stress.³¹⁴

e. Solving Systemic Problems

Solving systemic market risks requires collective action beyond individual safeguards.³¹⁵ While the function-based safe harbor framework equips platforms with tools to address their own vulnerabilities, broader resilience depends on collaboration between regulators, platforms, and the wider crypto ecosystem. Measures such as shared liquidity insurance,

310. Kate Kurbanova, *Understanding and Mitigating Economic Risks in DeFi Lending Platforms*, THE DAILY HODL (Nov. 20, 2023), <https://dailyhodl.com/2023/11/20/understanding-and-mitigating-economic-risks-in-defi-lending-platforms/> [<https://perma.cc/YV2R-828K>].

311. Liquidity risk refers to losses or operational disruptions arising when a platform cannot meet payment obligations in a timely fashion—or without incurring unacceptable losses—due to insufficient liquid assets or funding sources. In the crypto context, this often manifests through inability to honor withdrawals, asset freezes, or swift liquidations triggered by collateral calls. See Federal Reserve Bank of New York, *The Financial Stability Implications of Digital Assets*, 30:2 ECONOMIC POLICY REVIEW (Nov. 2024), https://www.newyorkfed.org/medialibrary/media/research/epr/2024/EPR_2024_digital-assets_azar.pdf [<https://perma.cc/8X8E-B2X6>].

312. Nina Bambyseva, *Why DeFi's Woes May Be Existential*, FORBES, <https://www.forbes.com/sites/ninabambyseva/2023/08/31/why-defis-woes-may-be-existential/> [<https://perma.cc/W5VV-A6TU>] (updated Aug. 31, 2023).

313. Tarun Chitra et al., *DeFi Liquidity Management via Optimal Control: Ohm as a Case Study*, (Feb. 2022), https://cdn.prod.website-files.com/648bdc0d4b8ce322f27da0af/66d88f6f53a5aa1a8ce45ff7_Research%2012.pdf [<https://perma.cc/PBS6-9Z63>].

314. *Id.*

315. Crenshaw, *supra* note 71.

coordinated stress testing, and international regulatory alignment are crucial to protect the DeFi market from systemic shocks.³¹⁶

The safe harbor framework also creates incentives for platforms to adopt best practices, reducing risks while maintaining DeFi's innovative spirit. By aligning platform-level safeguards with market-wide stability efforts, the framework can help build a resilient decentralized financial ecosystem.

4. Risk Mitigation Strategies

As the DeFi ecosystem continues to grow, it becomes more interconnected and complex, increasing the potential for systemic risks that could affect multiple platforms.³¹⁷ While the function-based safe harbor framework aims to promote innovation and market stability, effective mitigation strategies are necessary to address the inherent risks associated with DeFi's decentralized nature.³¹⁸ A safe-harbor whose protections are conditional on implementing risk mitigation strategies can incentivize safer DeFi systems.³¹⁹

Two critical strategies for managing these risks are stress testing and the establishment of liquidity buffers. These strategies provide a proactive approach to managing risk, ensuring that DeFi platforms remain solvent and resilient in the face of market volatility and potential shocks.³²⁰

316. Felix Bekemeier, *A Primer on the Insurability of Decentralized Finance (DeFi)*, DIG. FIN. 643, 644, 648, 654, 674–76 (2023), <https://doi.org/10.1007/s42521-023-00093-x> [<https://perma.cc/4KNM-AR2T>].

317. *The financial stability risks of decentralised finance – Executive Summary*, *supra* note 217.

318. Sirio Aramonte, Wenqian Huang & Andreas Schrimpf, *DeFi Risks and the Decentralisation Illusion*, BIS Q. REV. (Dec. 2021), https://www.bis.org/publ/qtrpdf/r_qt2112b.pdf.

319. Brendan Cochrane, *Is DeFi Ready for Mass Adoption, or Will Regulation Slow It Down?*, CRYPTOSLATE (Oct. 5, 2024), <https://cryptoslate.com/is-defi-ready-for-mass-adoption-or-will-regulation-slow-it-down/> [<https://perma.cc/YZ65-6TCK>].

320. *Responding to the Evolving Risks that Straddle TradFi, DeFi, and CeFi: Some Lessons and Observations*, DELOITTE (Mar. 2023), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/audit/us-digital-asset-risk-management.pdf> [<https://perma.cc/JR9X-GWBX>].

a. Stress Testing: Assessing Resilience Under Pressure

Stress testing is a widely recognized tool in traditional financial regulation, designed to assess financial institutions' ability to withstand extreme but plausible adverse conditions, such as market crashes or liquidity crises.³²¹ For DeFi platforms, stress testing is equally critical, given the lack of centralized oversight and the potential for cascading effects across interconnected protocols.³²² Stress testing allows DeFi platforms to simulate extreme market scenarios—such as a sharp decline in asset prices, a liquidity freeze, or a large-scale exploit—and assess how these events would impact platforms' solvency, liquidity, and operations.³²³

Under the function-based safe harbor framework, stress testing would be an essential requirement for DeFi platforms seeking safe harbor protection. Platforms that conduct regular stress tests would be incentivized to identify vulnerabilities in their protocols before the vulnerabilities could be exploited in real-world conditions.³²⁴ By evaluating how platforms respond to a range of stress scenarios, regulators can ensure that DeFi projects are prepared for potential market shocks, reducing the likelihood of platform failures that could trigger broader systemic risks.³²⁵

321. Will Kenton, *What Is Stress Testing?*, INVESTOPEDIA (Aug. 31, 2024), <https://www.investopedia.com/terms/s/stresstesting.asp> [<https://perma.cc/N57C-MWPK>].

322. Igor Makarov & Antoinette Schoar, *Cryptocurrencies and Decentralized Finance (DeFi)*, LOND. SCH. OF ECON. & MIT SLOAN, NBER & CEPR (Apr. 24, 2022), https://mitsloan.mit.edu/sites/default/files/2022-06/DeFi_Brookings_Web%20%281%29.pdf [<https://perma.cc/YQ82-B6BX>].

323. Zahara Nisa Fadila, *What Is Stress Testing in Crypto: A Complete Guide to Understanding the Concept and Implementation*, BITTIME HELP CTR. (Apr. 2024), <https://support.bittime.com/hc/en-us/articles/9550211184271-What-Is-Stress-Testing-in-Crypto-A-Complete-Guide-to-Understanding-the-Concept-and-Implementation> [<https://perma.cc/EE2P-ASW4>].

324. *What Are the Security Risks Faced by DeFi Protocols and How to Ensure Protocol Security?*, BLOCKSEC BLOG (June 12, 2024), <https://blocksec.com/blog/what-are-the-security-risks-faced-by-de-fi-protocols-and-how-to-ensure-protocol-security> [<https://perma.cc/G5QZ-HBQM>].

325. Marijo Radman, *Reducing Systemic Risk in DeFi: A Comprehensive Approach*, ALTERSCOPE (Sep. 21, 2023), <https://www.alterscope.org/insights/reducing-systemic-risk> [<https://perma.cc/L4SC-AZ99>].

Moreover, stress testing provides a transparent assessment of platform resilience that can be shared with users and investors.³²⁶ Publicly accessible stress test results help to build trust as users will have confidence that the platform has been rigorously evaluated under challenging conditions.³²⁷ These tests would also allow investors to make more informed decisions by assessing the potential risks associated with particular platforms.³²⁸

b. Liquidity Buffers: Ensuring Stability During Crises

DeFi platforms rely on liquidity to function smoothly, particularly in DEXs and lending protocols.³²⁹ In the event of a market downturn or liquidity crisis, however, platforms may face shortages of available liquidity, making it difficult to meet withdrawal demands or settle transactions.³³⁰ The rapid growth of DeFi and its interconnectedness means that a liquidity crisis in one protocol can cascade through the broader ecosystem, potentially triggering a market-wide crash.³³¹

To mitigate this risk, the function-based safe harbor framework incorporates the requirement for liquidity buffers—reserves of funds set aside to ensure that platforms can meet liquidity needs during periods of

326. *Stress Testing and Scenario Analysis*, AMPLIFIED PROTOCOL, <https://docs.amplified.fi/security-and-risk-assessment-report/stress-testing-and-scenario-analysis> (last updated Dec. 3, 2024).

327. Rachel Lin, *How to Build Trust and Transparency in DeFi — and Why It Matters More Than Ever*, SYN FUTURES (July 10, 2023), <https://medium.com/synfutures/how-to-build-trust-and-transparency-in-defi-and-why-it-matters-more-than-ever-6882d011163c> [<https://perma.cc/THX2-JKD4>].

328. *Id.*

329. Dexa, *DEX Liquidity Pools Explained: How They Work and Why They Matter*, MEDIUM (Oct. 24, 2023), https://medium.com/@dexa_exchange/dex-liquidity-pools-explained-how-they-work-and-why-they-matter-87c0db5fd383 [<https://perma.cc/392L-PY3V>].

330. *Liquidity in Crypto Markets: What It Is and Why It Matters*, CRYPTO.COM UNIV. (May 7, 2024), <https://crypto.com/en/university/liquidity-in-crypto-markets> [<https://perma.cc/UX9E-WSYK>].

331. Amanda Blanco, *In Crypto, DeFi Could Offer 24/7 Access to Financial Services. But Could It Disrupt the Economy?*, FED, RSRV. BANK OF BOS. (Oct. 31, 2022), <https://www.bostonfed.org/news-and-events/news/2022/10/in-crypto-defi-could-offer-24-7-access-to-financial-services-but-could-it-disrupt-the-economy.aspx> [<https://perma.cc/R5P3-2A4P>].

market instability.³³² These buffers can be in the form of collateralized assets, stablecoins, or other liquid assets that are easily accessible when needed.³³³ By ensuring that platforms hold adequate reserves, liquidity buffers serve as a protective cushion, preventing a temporary market disruption from escalating into a broader liquidity crisis.³³⁴

Liquidity buffers also act as a market stabilizer, helping to maintain platform solvency and confidence in times of heightened volatility.³³⁵ DeFi platforms that maintain liquidity buffers demonstrate their commitment to responsible risk management and market integrity, which are essential to the continued growth of the ecosystem. For platforms that adhere to these standards, the safe harbor framework provides clear incentives, rewarding them with regulatory certainty and legal protection.³³⁶

In addition to self-imposed liquidity buffers, the framework suggests the development of community-driven liquidity pools as a means to pool resources across multiple platforms, offering an additional layer of protection against market shocks.³³⁷ These community buffers can be peer-funded, where users voluntarily contribute to a collective reserve, ensuring that liquidity is available to the broader DeFi ecosystem in times of crisis.³³⁸ By aligning platform incentives with community stability, the

332. *Risks in Decentralized Finance: A Founders' Guide to Mitigation*, UNVEST BLOG (Aug. 22, 2023), <https://www.unvest.io/blog/risks-in-decentralized-finance-a-founders-guide-to-mitigation> [<https://perma.cc/2W6X-RVW4>].

333. *Id.*

334. Sankrit K, *What Are Liquidity Pools and Crypto Market Liquidity in DeFi*, COINGECKO, <https://www.coingecko.com/learn/liquidity-pools-crypto-defi> [<https://perma.cc/RA8M-U2NM>] (updated Apr. 22, 2024).

335. Market Maker X, *The Role of Market Makers in Enhancing Liquidity in DeFi*, MEDIUM (Sep. 10, 2024), <https://medium.com/@marketmakerx/the-role-of-market-makers-in-enhancing-liquidity-in-defi-2bc665c5933b> [<https://perma.cc/AQA5-GVJE>].

336. *Id.*

337. Liquidity pools in DeFi—community-sourced pools of funds locked in smart contracts—enable platforms and users to access collective liquidity, reducing reliance on any single reserve and mitigating stress during shocks. See xCritical, *What Are Crypto Liquidity Pools? How Do They Work in DeFi?* (Oct. 16, 2023) [<https://perma.cc/W85N-AG8F>].

338. Antonis Kazoulis & Shilpa Lama, *DeFi Community Building: A Step-by-Step Guide*, BEINCRYPTO, <https://beincrypto.com/learn/defi-community-building-guide/> [<https://perma.cc/QJ82-9DAS>] (updated Dec. 19, 2024).

framework encourages decentralized participants to play an active role in risk mitigation.³³⁹

c. Integrating Stress Testing and Liquidity Buffers within the Framework

The integration of stress testing and liquidity buffers into the function-based safe harbor framework provides a comprehensive approach to risk management that addresses both individual platform vulnerabilities and systemic market risks.³⁴⁰ Stress testing allows platforms to assess their resilience in adverse conditions, while liquidity buffers provide a financial cushion to weather unexpected market downturns.³⁴¹ Together, these strategies contribute to a more stable and secure DeFi ecosystem, reducing the likelihood of market disruptions and fostering trust among users and investors.³⁴²

By making stress testing and liquidity buffers mandatory requirements for platforms seeking safe harbor protection, the framework ensures that these critical safeguards are integrated into the fabric of DeFi.³⁴³ In doing so, the framework aligns innovation with responsibility, ensuring that the DeFi ecosystem can continue to evolve while maintaining market stability and investor protection.³⁴⁴ This proactive approach fosters a sustainable and secure environment where DeFi platforms can thrive without posing a systemic risk to the broader financial ecosystem.³⁴⁵

B. Addressing Stablecoin Risks

Stablecoins play a central role in the DeFi ecosystem by providing a stable medium of exchange that allows for the facilitation of transactions

339. *Building High-Integrity DeFi Markets*, CHAINLINK BLOG (Oct. 23, 2023), <https://blog.chain.link/credibly-neutral-infrastructure/> [<https://perma.cc/EVJ2-S7XK>].

340. Tim Weingärtner et al., *Deciphering DeFi: A Comprehensive Analysis and Visualization of Risks in Decentralized Finance*, J. OF RISK AND FIN. MGMT. 16, NO. 10 (2023): 454, <https://doi.org/10.3390/jrfm16100454> [<https://perma.cc/2AC2-V6A7>].

341. *Id.*

342. *Id.*

343. *DeFi Risk Assessment Guidelines - Version 1*, ENTER. ETHEREUM ALLIANCE (July 17, 2024), <https://entethalliance.org/specs/defi-risks/v1> [<https://perma.cc/AZ62-GUN5>].

344. *Id.*

345. *Id.*

and value storage without the volatility typically associated with cryptocurrencies like Bitcoin (BTC) or Ethereum (ETH).³⁴⁶ These digital assets are typically pegged to a stable reference, such as the U.S. dollar, and are designed to maintain a one-to-one value ratio with the pegged asset.³⁴⁷ While stablecoins provide substantial benefits for DeFi platforms, they also introduce a range of risks that require careful regulatory oversight and management.³⁴⁸ These risks include de-pegging, reserve transparency, and regulatory arbitrage, which could destabilize the broader DeFi ecosystem and undermine trust in stablecoins as a reliable financial instrument.³⁴⁹

The function-based safe harbor framework seeks to address these risks by establishing regulatory incentives that encourage stablecoin issuers to adhere to sound governance, transparency, and accountability practices. By focusing on the functionality of stablecoins, rather than their legal form or classification, the framework offers a more adaptable approach to regulating these digital assets and ensuring their safe use within DeFi applications.

1. The Role of Stablecoins in DeFi

Stablecoins serve as the backbone of many DeFi platforms, providing liquidity, enabling seamless transactions, and offering a stable store of value in volatile markets.³⁵⁰ These coins are critical for DEXs, lending platforms, and liquidity pools, where they allow users to interact with the platform while minimizing exposure to price volatility.³⁵¹ Furthermore, stablecoins facilitate cross-border transactions, enabling users around the world to engage with DeFi without relying on traditional financial

346. Yevhen Rudenko, *Stablecoins in DeFi: Overview, Usage and Risks*, MEDIUM (July 19, 2024), <https://rudenko-yevhen.medium.com/stablecoins-in-defi-overview-usage-and-risks-f365514a5486> [<https://perma.cc/S62G-VDGX>].

347. *Id.*

348. *Id.*

349. *Id.*

350. Andrey Sergeenkov, *What Are Stablecoins and How Can One Use Them for Payments?*, FORBES, <https://www.forbes.com/sites/digital-assets/article/what-are-stablecoins-how-to-use-them/> [<https://perma.cc/3S2Q-DGWM>] (updated June 21, 2025, 3:19 PM).

351. Jesse Anglen, *Stablecoins in DeFi: Everything You Need to Know*, RAPID INNOVATION, <https://www.rapidinnovation.io/post/stablecoins-in-defi-everything-you-need-to-know> [<https://perma.cc/MX4A-CZCH>] (last visited July 3, 2025).

intermediaries or fiat currency systems.³⁵² The risks inherent in stablecoins go beyond their value peg.³⁵³ In some instances, the failure to maintain that peg, the lack of transparency about collateral reserves, and the potential for regulatory arbitrage have exposed vulnerabilities within the system, prompting regulatory scrutiny and raising concerns about stablecoins' long-term viability.³⁵⁴

2. *Specific Risks: De-pegging, Reserve Transparency, and Regulatory Arbitrage*

One of the most significant risks facing stablecoins is the potential for de-pegging, where the stablecoin's value diverges from its intended peg—for example, 1 U.S. dollar.³⁵⁵ This de-pegging can occur because of a variety of factors, including market volatility, insufficient collateral reserves, or loss of investor confidence.³⁵⁶ The UST collapse in 2022, where the algorithmic stablecoin lost its peg to the U.S. dollar, is a stark example of the consequences of a stablecoin de-pegging.³⁵⁷ The failure of UST triggered a broader crisis within the DeFi space, with widespread liquidations and a dramatic loss of investor capital.³⁵⁸

352. Brandon Zemp, *The Power of Stablecoins - Enabling Fast and Efficient Cross-Border Transactions*, FORBES (Apr. 5, 2023, 3:25 PM), <https://www.forbes.com/sites/forbesbooksauthors/2023/04/05/the-power-of-stablecoinsenabling-fast-and-efficient-cross-border-transactions/> [<https://perma.cc/M8MD-A67F>].

353. Reflexivity Research, *General Risks for All Stablecoins*, COINGECKO, <https://www.coingecko.com/learn/general-risks-for-all-stablecoins> [<https://perma.cc/9N5A-3Q92>] (updated Dec. 7, 2023).

354. *Id.*

355. Polizu, *supra* note 283.

356. Garth Baughman et al., *The Stable in Stablecoins*, BD. OF GOVERNORS OF THE FED. RSRV. SYS.: FEDS NOTES (Dec. 16, 2022), <https://doi.org/10.17016/2380-7172.3224> [<https://perma.cc/GRT3-QVUW>].

357. Rahul Rai, *The Death Spiral: How Terra's Algorithmic Stablecoin Came Crashing Down*, FORBES (May 17, 2022, 4:38 PM), <https://www.forbes.com/sites/rahulrai/2022/05/17/the-death-spiral-how-terras-algorithmic-stablecoin-came-crashing-down/> [<https://perma.cc/243Z-JBUR>].

358. *Id.*

Another key concern for stablecoins is the lack of transparency regarding the assets backing these coins.³⁵⁹ While fiat-backed stablecoins like Tether (USDT) and Circle (USDC) claim to be fully collateralized, questions have been raised about the adequacy and transparency of their reserves.³⁶⁰ Without clear and verifiable information about the reserve assets that back stablecoins, users are left uncertain about the actual stability and reliability of the currency.³⁶¹ This uncertainty undermines trust and can contribute to panic during periods of market stress.³⁶²

Stablecoins are often issued by entities based in jurisdictions with looser regulatory requirements, enabling them to bypass stricter financial regulations in other countries.³⁶³ This practice can lead to regulatory arbitrage, where stablecoin issuers relocate to more lenient jurisdictions to avoid compliance with higher standards, creating a fragmented global regulatory landscape.³⁶⁴ This inconsistency makes it difficult to ensure that all stablecoin issuers adhere to the same standards of safety, security, and transparency, thus increasing the risk of regulatory evasion.³⁶⁵

3. Mitigation Strategies: Audits, KYC and AML, and Decentralized Governance

To address these risks, the function-based safe harbor framework proposes a set of mitigation strategies that focus on transparency, security, and accountability.³⁶⁶ Stablecoin issuers would be required to undergo regular third-party audits to verify their collateralization and ensure that

359. Christian Catalini & Jai Massari, *Stablecoins and the Future of Money*, HARV. BUS. REV. (Aug. 10, 2021), <https://hbr.org/2021/08/stablecoins-and-the-future-of-money> [<https://perma.cc/SBN6-FA37>].

360. *Id.*

361. *Id.*

362. *Id.*

363. *Stablecoins: A Global Overview of Regulatory Requirements in Asia Pacific, Europe, the UAE and the US*, CLIFFORD CHANCE (Sep. 2019), <https://www.cliffordchance.com/content/dam/cliffordchance/briefings/2019/09/stablecoins-a-global-overview-of-regulatory-requirements-in-asia-pacific-europe-the-uae-and-the-us.pdf> [<https://perma.cc/U6YM-JUG2>].

364. Joseph Jasperse & Sarah Hammer, *The State of Stablecoin Regulation and Emergence of Global Principles*, AM. BAR ASS'N BUS. L. TODAY (Sep. 20, 2024), https://www.americanbar.org/groups/business_law/resources/business-law-today/2024-september/state-stablecoin-regulation-emergence-global-principles/ [<https://perma.cc/LEZ9-4G4A>].

365. *Id.*

366. *Id.*

their reserves are sufficient to maintain the peg.³⁶⁷ These audits would be publicly disclosed, offering greater transparency and providing assurance to users that the stablecoin is backed by real, verifiable assets.³⁶⁸ Regular audits would also help prevent issues related to over-leveraging or under-collateralization that could jeopardize the peg or the DeFi platform's overall stability.³⁶⁹

As part of the regulatory oversight, stablecoin issuers would be required to implement KYC and AML protocols.³⁷⁰ These measures ensure that stablecoins are not used to facilitate illicit activities, such as money laundering or terrorism financing.³⁷¹ By requiring these compliance procedures, the framework ensures that stablecoin transactions align with global financial standards and enhance user protection within the DeFi space.³⁷²

To further ensure the integrity and reliability of stablecoins, the framework encourages the adoption of decentralized governance structures for stablecoin issuers. This structure would give the community a say in decision-making processes, including how reserves are managed, how the peg is maintained, and how governance decisions are made. Decentralized governance helps to mitigate the risk of the issuer abusing centralized control and ensures that the interests of the broader DeFi community are considered.³⁷³ This governance structure aligns with the decentralized ethos of DeFi, making the system more resilient to regulatory or market shocks.

367. *Stablecoin Regulatory Update and Enhanced Framework*, DELOITTE (Feb. 2022), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/risk/us-stablecoin-feb-2022.pdf> [<https://perma.cc/KY68-YW55>].

368. *Id.*

369. *Id.*

370. Chainalysis Team, *What is AML and KYC for Crypto?*, CHAINALYSIS BLOG (Dec. 14, 2021), <https://www.chainalysis.com/blog/what-is-aml-and-kyc-for-crypto/> [<https://perma.cc/6QXF-E88T>].

371. *Id.*

372. *Id.*

373. Anna Szentgyorgyi-Siklosi, *Centralization vs Decentralization Data Governance: The Key Differences*, LEPIDE BLOG, <https://www.lepide.com/blog/decentralized-vs-centralized-data-governance/> [<https://perma.cc/7GAH-UMAF>] (updated Feb. 4, 2025).

4. Integrating Stablecoin Regulation into the Function-Based Framework

The function-based safe harbor framework integrates these safeguards to ensure that stablecoins continue to serve their essential role in DeFi while minimizing the risks they pose to the broader ecosystem.³⁷⁴ By requiring audits, transparency, and compliance with KYC and AML regulations, the framework creates a regulatory environment that encourages stablecoin issuers to operate responsibly.³⁷⁵ Moreover, the incorporation of decentralized governance mechanisms enhances transparency and accountability, aligning stablecoin issuers with the broader goals of market integrity and user protection.³⁷⁶

This regulatory approach recognizes that stablecoins, like other DeFi assets, must be regulated based on their functionality—as a store of value, medium of exchange, or instrument for value transfer—rather than their legal form. By prioritizing the economic role of stablecoins within the DeFi ecosystem, the framework ensures that stablecoins remain a stable, reliable, and secure tool for decentralized finance while minimizing the risks that could undermine the broader market's stability.³⁷⁷

PART IV. ENFORCEMENT MECHANISMS IN A DECENTRALIZED CONTEXT

Enforcing regulations within the DeFi ecosystem presents unique challenges that are not typically encountered in traditional financial markets.³⁷⁸ Unlike conventional financial institutions, DeFi platforms

374. Roger Mitchell, *DeFi-ing the Rules: Five Opportunities and Five Risks of Decentralized Finance*, CFA INST. ENTERPRISING INV. (June 7, 2022), <https://blogs.cfainstitute.org/investor/2022/06/07/defi-ing-the-rules-five-opportunities-and-five-risks-of-decentralized-finance/> [<https://perma.cc/7EM9-ZV5G>].

375. *Stablecoin Regulation: Addressing Risks and Compliance Challenges*, MERKLE SCI. (June 6, 2024), <https://blog.merklescience.com/general/stablecoin-regulation-addressing-risks-and-compliance-challenges> [<https://perma.cc/MR66-MSFR>].

376. *Id.*

377. *Stablecoins' Role in Crypto and Beyond: Functions, Risks and Policy*, EURO. CENT. BANK (July 2022), https://www.ecb.europa.eu/press/financial-stability-publications/macprudential-bulletin/html/ecb.mpbu202207_2~836f682ed7.en.html [<https://perma.cc/2RHG-2K3G>].

378. Kamlesh Kumar, *The Legal Challenges of Decentralized Finance (DeFi) in 2024*, HACKERNOON (Oct. 4, 2024), <https://hackernoon.com/the-legal->

operate without a central authority, making it difficult for regulators to impose oversight or hold individual actors accountable.³⁷⁹ Furthermore, the pseudonymous or anonymous nature of blockchain transactions adds complexity to identifying bad actors or enforcing compliance with regulatory requirements.³⁸⁰ In light of these challenges, developing effective enforcement mechanisms that are both practical and aligned with the decentralized ethos of DeFi is crucial to ensuring the integrity and security of the ecosystem.³⁸¹

This section explores the challenges of enforcement in a decentralized context and proposes solutions that leverage self-regulation, international collaboration, and specialized regulatory units. By implementing these mechanisms, regulators can more effectively manage DeFi's inherent risks while supporting innovation in a secure, transparent, and accountable manner.

A. Enforcement Challenges in DeFi

Traditional financial enforcement often relies on identifying and targeting centralized entities, such as banks, brokers, or exchanges.³⁸² Regulators can issue subpoenas, conduct on-site inspections, and impose penalties on these entities to ensure compliance.³⁸³ Conversely, DeFi protocols often lack a central authority or a clearly defined legal entity responsible for their operations.³⁸⁴ This lack of authority makes it difficult for regulators to serve legal documents: Who do you serve a subpoena to when a DeFi protocol is governed by a DAO or operates autonomously

challenges-of-decentralized-finance-defi-in-2024 [<https://perma.cc/XW7K-ZKB3>].

379. Michael Flannelly, *CeFi vs DeFi: Similarities and Differences Compared*, SOFI (Mar. 30, 2023), <https://www.sofi.com/learn/content/defi-vs-cefi/> [<https://perma.cc/N49C-V936>].

380. *The Future of Compliance: AML Procedures in DeFi Transactions Unleashed*, FIN. CRIME ACAD. (May 20, 2025), <https://financialcrimeacademy.org/aml-procedures-in-defi-transactions/> [<https://perma.cc/7KLL-YKYU>].

381. *Id.*

382. Lorenz, *supra* note 55.

383. *Annual Report - 2021: Supervision and Regulation*, BD. OF GOVERNORS OF THE FED. RESRV. SYS., <https://www.federalreserve.gov/publications/2021-ar-supervision-and-regulation.htm> [<https://perma.cc/GCC8-9HH9>] (last updated Aug. 12, 2022).

384. Luc Muhizi, *Code is Law in the Wild West of DeFi*, MEDIUM (Dec. 27, 2023), https://medium.com/@luc_muhizi/code-is-law-in-the-wild-west-of-defi-2fd51f5b0f47 [<https://perma.cc/57WR-AQAV>].

through smart contracts?³⁸⁵ This question is addressed in part where states like Wyoming or Tennessee allow LLC's to form as DAOs.³⁸⁶ It is also difficult for enforcement to conduct inspections: How do you conduct an on-site inspection of a protocol that exists as code on a distributed network? And it is difficult to impose fines or penalties: Who is held liable when a DeFi protocol violates regulations—the developers, the token holders, or the users?³⁸⁷

1. Decentralization and Anonymity

One of the central challenges in regulating DeFi platforms is their decentralized nature.³⁸⁸ Unlike centralized financial institutions, which have clearly defined ownership and accountability structures, DeFi platforms operate through smart contracts on blockchains, often with pseudonymous or even anonymous developers and participants.³⁸⁹ The lack of a central entity complicates the identification of responsible parties in the event of fraud, non-compliance, or other illicit activities.³⁹⁰ The absence of identifiable intermediaries or fiduciary actors makes it difficult for regulators to enforce compliance with legal standards, as they traditionally rely on enforcing rules against specific individuals or entities.³⁹¹

Moreover, the anonymity afforded by many blockchain platforms presents an additional barrier to enforcement.³⁹² Although transactions are transparent on the blockchain, the identities of the actors behind these transactions can be difficult to trace, leading to a lack of accountability in the event of a violation.³⁹³ This gap makes it hard for traditional

385. Salami, *supra* note 61.

386. *Id.*

387. *Id.*

388. Daisy Thomas, *Regulatory Challenges in the Age of DeFi: Balancing Innovation and Consumer Protection*, THE GEOPOLITICAL ECONOMIST (July 16, 2024), <https://medium.com/the-geopolitical-economist/regulatory-challenges-in-the-age-of-defi-balancing-innovation-and-consumer-protection-19a4cd071ce7> [<https://perma.cc/L6AX-FQKE>].

389. Nicole Willing, *Centralized Finance (CeFi)*, TECHOPEDIA (Oct. 3, 2023), <https://www.techopedia.com/definition/centralized-finance-cefi> [<https://perma.cc/D285-3QJM>].

390. *Id.*

391. *Id.*

392. Salman Saleem Virani, *Blockchain end user adoption and societal challenges: Exploring privacy, rights, and security dimensions*, IET (May 7, 2024), <https://doi.org/10.1049/blc2.12077> [<https://perma.cc/5EYW-EYNB>].

393. *Id.*

enforcement mechanisms, such as the SEC or FinCEN, to effectively monitor and regulate these platforms.³⁹⁴

2. Jurisdictional Hurdles

DeFi platforms, by their nature, are global and operate across multiple jurisdictions. Participants can engage with DeFi protocols from anywhere in the world, and these protocols do not have a physical headquarters, which makes them difficult to regulate under traditional national legal frameworks.³⁹⁵ Jurisdictional challenges arise when platforms or their users are spread across different countries with varying regulatory approaches to digital assets.³⁹⁶ This disparity complicates efforts to create a unified global regulatory standard for DeFi and can lead to regulatory arbitrage, where actors move operations to jurisdictions with more lenient laws.³⁹⁷

Furthermore, when a DeFi platform experiences a problem, such as a security breach or a fraudulent scheme, it is often unclear which jurisdiction has the legal authority to address the issue.³⁹⁸ This lack of clarity in enforcement jurisdiction poses significant risks to the stability and legitimacy of DeFi platforms and complicates international efforts to address cross-border financial crimes or market manipulation.³⁹⁹

B. Proposed Solutions

To address the enforcement challenges inherent in the decentralized nature of DeFi, several solutions can be implemented, which include self-regulation through DAOs, international collaboration, and specialized regulatory units designed to oversee the DeFi space.⁴⁰⁰

394. *Id.*

395. *A Report on Decentralized Finance (DeFi)*, GRAYSCALE INV., <https://www.grayscale.com/research/reports/a-report-on-decentralized-finance-defi> [<https://perma.cc/M83B-KDZ6>] (updated Oct. 27, 2021).

396. *Id.*

397. *Id.*

398. David Balaban, *The Dark Side of DeFi: Fraud, Hacks, and Regulatory Uncertainty*, FORBES (May 11, 2023, 4:03 AM), <https://www.forbes.com/sites/davidbalaban/2023/05/11/the-dark-side-of-defi-fraud-hacks-and-regulatory-uncertainty/> [<https://perma.cc/CQS3-KDVG>].

399. *Id.*

400. Salami, *supra* note 61.

1. Incentivizing Self-Regulation through DAOs

DAOs represent a promising tool for self-regulation in DeFi.⁴⁰¹ A DAO is a type of organizational structure where decision-making is distributed among participants rather than centralized in a single entity.⁴⁰² Within DeFi, DAOs can be used to manage governance, ensure compliance with legal and ethical standards, and enforce community-driven rules.⁴⁰³ By incentivizing self-regulation, DAOs enable a more community-driven approach to enforcement that aligns with DeFi's decentralized ethos.⁴⁰⁴

For instance, DAOs can implement governance protocols to enforce the platform's rules, including voting on key decisions—such as how funds are allocated—whether to suspend certain activities, or how to deal with any platform breaches.⁴⁰⁵ Moreover, DAOs can be empowered to audit platform activity, enforce dispute resolution, and impose penalties for non-compliance.⁴⁰⁶ This decentralized model places responsibility on the community to monitor and regulate itself, creating a more flexible and self-sustaining system for enforcement.⁴⁰⁷

By integrating self-regulation mechanisms within DeFi protocols, the function-based safe harbor framework fosters accountability within decentralized ecosystems.⁴⁰⁸ This integration would help mitigate

401. Aaron Wright, *The Rise of Decentralized Autonomous Organizations: Opportunities and Challenges*, STAN. J. OF BLOCKCHAIN L. & POL'Y (June 30, 2021), <https://stanford-jblp.pubpub.org/pub/rise-of-daos/release/1> [<https://perma.cc/GAL8-KJX9>].

402. Nathan Reiff, *Decentralized Autonomous Organization (DAO): Definition, Purpose, and Example*, INVESTOPEDIA, <https://www.investopedia.com/tech/what-dao/> [<https://perma.cc/YL8Y-YUGS>] (updated Apr. 14, 2025).

403. Jesse Anglen, *DAO Governance Models Explained: Token-Based vs. Reputation-Based Systems*, RAPID INNOVATION, <https://www.rapidinnovation.io/post/dao-governance-models-explained-token-based-vs-reputation-based-systems> [<https://perma.cc/D9R5-YZ56>] (last visited July 3, 2025).

404. *Id.*

405. Lea Lobanov, *Implementing Governance and DAOs on the Solana Network: The ULTIMATE Guide*, MEDIUM (May 16, 2023), <https://medium.com/coinmonks/implementing-governance-and-daos-on-the-solana-network-the-ultimate-guide-c3d9afb5f7ec> [<https://perma.cc/7DWA-E3VA>].

406. *Id.*

407. *Id.*

408. *Id.*

enforcement challenges, offering a pathway for DeFi platforms to align with regulatory expectations while maintaining decentralization.

2. International Collaboration

Given the global nature of DeFi, it is critical for regulators to cooperate and establish cross-border enforcement protocols that can address jurisdictional hurdles.⁴⁰⁹ International collaboration between regulators can create a more cohesive regulatory framework that ensures DeFi platforms are held accountable regardless of their geographic location.⁴¹⁰ This collaboration could involve the establishment of global standards for compliance, security, and market conduct, which all jurisdictions can agree upon.⁴¹¹

For example, international bodies like the Financial Action Task Force (FATF) or the International Organization of Securities Commissions (IOSCO) could work together to create global guidelines for DeFi platforms.⁴¹² These guidelines could include best practices for ensuring transparency, managing risk, and maintaining legal compliance.⁴¹³ Additionally, international regulators could establish frameworks for information sharing, allowing the regulators to identify and respond to regulatory violations that span multiple jurisdictions.

Cross-border enforcement protocols would reduce the risk of regulatory arbitrage, where DeFi platforms might migrate to jurisdictions with weaker regulatory oversight. By fostering a unified international approach, this solution ensures that DeFi platforms face consistent regulatory standards and enforcement, regardless of where they operate or where their users are located.

409. E. Napoletano, *What Is DeFi? Understanding Decentralized Finance*, FORBES ADVISOR (Apr. 28, 2023, 2:14 PM), <https://www.forbes.com/advisor/investing/cryptocurrency/defi-decentralized-finance/> [<https://perma.cc/VD4Z-5WRL>].

410. Rahul Advani & Caren Tso, *Bridging the Gap: Public-Private Collaboration in Digital Asset Innovation*, RIPPLE INSIGHTS (Sep. 13, 2024), <https://ripple.com/insights/bridging-the-gap-public-private-collaboration-in-digital-asset-innovation/> [<https://perma.cc/KW3V-ZUKA>].

411. *Id.*

412. *IOSCO Crypto-Asset Roadmap for 2022-2023, Executive Summary*, INT'L ORG. OF SECS. COMM'NS (July 7, 2022), <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD705.pdf> [<https://perma.cc/RV79-ESXF>].

413. *Id.*

3. *Specialized Regulatory Units*

Given the unique nature of DeFi, traditional regulatory bodies may struggle to keep pace with the rapid innovation in the space.⁴¹⁴ As such, there is a growing call for the establishment of specialized regulatory units dedicated to overseeing the DeFi ecosystem.⁴¹⁵ These units would be staffed by experts in blockchain technology, smart contract auditing, and cryptocurrency regulations, providing targeted oversight for the unique challenges posed by DeFi platforms.⁴¹⁶

C. Balancing Decentralization with Effective Enforcement

Ultimately, the key challenge for enforcing regulation in the DeFi space is balancing the inherent value of decentralization with the need for effective enforcement.⁴¹⁷ While the decentralization of finance offers many benefits, it can also create risks that, if left unchecked, could threaten the stability of the financial ecosystem. The solutions proposed here—self-regulation through DAOs, international cooperation, and specialized regulatory units—offer a comprehensive approach to enforcement that allows DeFi platforms to maintain their decentralized nature while still adhering to essential regulatory requirements.⁴¹⁸

The function-based safe harbor framework can be a key tool in achieving this balance by incentivizing platforms to implement these self-regulation mechanisms, ensuring cross-border compliance, and fostering collaboration with specialized regulatory bodies. By creating a cohesive, flexible regulatory system, the framework can help safeguard the integrity of DeFi while allowing it to continue evolving and innovating within a secure and well-regulated environment.

414. Ivanontech, *Decentralized Finance: What Is DeFi and Why Do We Need It?*, ACAD. (Jan. 17, 2021), <https://academy.moralis.io/blog/decentralized-finance-what-is-defi-and-why-do-we-need-it> [<https://perma.cc/C6U8-ANU8>].

415. Benjamin Whitby, *How Should We Regulate DeFi?*, TECHCRUNCH (Dec. 8, 2021, 11:30 AM), <https://techcrunch.com/2021/12/08/how-should-we-regulate-defi/> [<https://perma.cc/3KGM-L46T>].

416. *Id.*

417. Victoria Chynoweth, *Decentralization Vs. Regulation: The Crypto Community's Crossroads*, FORBES (Feb. 20, 2024, 11:25 AM), <https://www.forbes.com/sites/digital-assets/2024/02/20/decentralization-vs-regulation-the-crypto-communitys-crossroads/> [<https://perma.cc/B89C-7Y2E>].

418. *Id.*

Specialized units could be created within existing regulatory bodies, such as the SEC or CFTC, or as standalone entities with the sole focus on decentralized finance.⁴¹⁹ These units would be responsible for monitoring the DeFi space, ensuring compliance with the function-based safe harbor framework, and coordinating with international bodies to ensure global consistency in enforcement. Specialized regulators would also be able to provide guidance to DeFi platforms on compliance best practices, helping to avoid unintended legal violations and ensuring that innovation continues within a secure, well-regulated environment.

PART V. DRAWBACKS AND MITIGATION STRATEGIES FOR THE FRAMEWORK

While the function-based safe harbor framework offers an innovative approach to regulating DeFi, it is not without potential drawbacks. As with any regulatory system, there are inherent risks of misapplication, over-simplification, or unintended consequences. Addressing these drawbacks is crucial to ensuring that the framework achieves its goals of fostering innovation, protecting investors, and maintaining market integrity. This section outlines the primary drawbacks of the framework and proposes mitigation strategies that can ensure its continued effectiveness and adaptability.

A. Potential Drawbacks

While the function-based safe harbor framework offers significant advantages for regulating DeFi, it is essential to acknowledge potential drawbacks and propose mitigation strategies to ensure the framework's effectiveness.

1. Abuse or Exploitation

A potential drawback of the safe harbor framework is that some DeFi platforms might exploit the regulatory benefits of the safe harbor without fully committing to the intended safeguards or compliance measures. Platforms could potentially use the safe harbor provision as a loophole,

419. *Statement of Commissioner Christy Goldsmith Romero on CFTC's Digital Assets and Blockchain Technology Subcommittee Release of Decentralized Finance Report*, COMMODITY FUTURES TRADING COMM'N (Jan. 8, 2024), <https://www.cftc.gov/PressRoom/SpeechesTestimony/romerostatement010824b> [<https://perma.cc/3LLE-ERNQ>].

taking advantage of its protections while failing to meet the security, transparency, and governance requirements that are integral to maintaining market integrity. This exploitation could undermine the trust and safety that the framework aims to build. For example, DeFi platforms could circumvent the more stringent requirements for security audits, reserve transparency, or governance standards by claiming safe harbor status without implementing meaningful reforms. Such exploitation could lead to situations where the framework encourages minimum compliance or negligence, instead of fostering innovation responsibly.

2. Over-Simplification of Complex Risks

Another challenge is the oversimplification of the complex risks associated with DeFi. While the framework is designed to address a wide array of DeFi-specific risks, including technical vulnerabilities, market manipulation, and jurisdictional issues, there is a risk that it could fail to fully account for the nuanced and evolving nature of the space. For instance, as new financial products or innovative mechanisms emerge within DeFi, the framework may need to adapt quickly to accommodate novel risks that were not foreseen during development. Moreover, certain risks, such as counterparty risk, platform insolvency, or data breaches, may be inherent to DeFi and difficult to address through regulatory frameworks alone. Attempting to create a one-size-fits-all approach might lead to regulatory oversight gaps or a false sense of security that fails to adequately protect users.

3. Jurisdictional Challenges

DeFi operates in a borderless, global ecosystem, which presents significant jurisdictional challenges for regulators.⁴²⁰ The decentralized nature of DeFi platforms means that they often lack a physical presence in any single jurisdiction, making it difficult to determine which laws or regulatory bodies should have authority.⁴²¹ The absence of centralization allows DeFi to bypass existing national regulatory structures, leading to jurisdictional conflicts and inconsistent enforcement.⁴²²

This decentralized aspect of DeFi could lead to regulatory arbitrage, where platforms or their users move operations to jurisdictions with more lenient regulations, undermining efforts to establish consistent, global

420. Uzougbo, *supra* note 11.

421. *Id.*

422. *Id.*

standards.⁴²³ The framework might not fully address these challenges, as it operates primarily within individual jurisdictions, potentially leading to uneven application across different regions.⁴²⁴

B. Mitigation Strategies

Several strategies are crucial to mitigate the function-based safe harbor framework's potential drawbacks, such as abuse, oversimplification of risks, and jurisdictional challenges. These strategies include implementing mechanisms for periodic reviews and updates to ensure the framework remains relevant and effective. Additionally, promoting transparency and disclosure among participating DeFi platforms can help mitigate abuse and enable regulators to assess compliance. Lastly, fostering international cooperation and regulatory harmonization can address jurisdictional challenges and prevent arbitrage, ensuring accountability regardless of platform location.

1. Periodic Reviews and Updates

To mitigate the potential for abuse or exploitation, the framework should include periodic reviews and updates to ensure that platforms continue to meet the safe harbor's requirements over time. These reviews would assess whether platforms are adhering to security protocols, transparency standards, and governance practices. Regular evaluations would help prevent platforms from exploiting the framework by ensuring that they are consistently improving their practices in line with the evolving risks and challenges in the DeFi space.

Additionally, updates to the framework could incorporate new insights and technological advancements, ensuring that the regulatory approach remains relevant and effective as DeFi continues to innovate. By requiring platforms to undergo annual audits and self-assessments, the framework would ensure continuous alignment with best practices, promoting a culture of ongoing compliance.

2. Enhanced Transparency and Disclosure

To address the risk of oversimplification of complex risks, the framework could require enhanced disclosure and reporting requirements. For example, platforms seeking safe harbor status could be required to

423. Thomas, *supra* note 364.

424. *Id.*

provide detailed risk assessments, disclose smart contract vulnerabilities, and show proof of resilience against potential systemic risks. This disclosure would ensure that the framework reflects the complex nature of DeFi by providing regulators and users with comprehensive insights into a platform's operations. Furthermore, the framework should encourage platforms to engage in self-reporting and third-party audits to verify that they are maintaining high standards of security, liquidity, and governance. By mandating these robust disclosure practices, the framework ensures that platforms remain accountable for the risks they pose to users and the broader ecosystem.

3. International Cooperation and Harmonization

To mitigate the challenges posed by jurisdictional fragmentation, the framework should promote international cooperation and harmonization of DeFi regulations. Regulatory bodies across different jurisdictions should collaborate to establish global standards for DeFi platforms, ensuring that the platforms meet consistent requirements related to security, market conduct, and investor protection. The framework could encourage cross-border regulatory agreements that create unified guidelines for DeFi, making it easier to address jurisdictional challenges and prevent regulatory arbitrage. By fostering collaboration between international regulators, the framework would help align enforcement standards and create a more cohesive, global regulatory environment for DeFi platforms. This collaboration would prevent platforms from exploiting weaker regulatory jurisdictions and ensure that DeFi remains a stable and reliable part of the global financial system.

PART VI. IMPLEMENTATION OF THE SAFE HARBOR FRAMEWORK

The function-based safe harbor framework represents a novel approach to regulating DeFi, offering a balanced solution that encourages innovation while ensuring the stability, transparency, and security of the ecosystem. Its successful implementation requires careful planning and coordinated efforts between DeFi platforms, regulators, and other stakeholders. This section outlines the steps necessary to effectively implement the safe harbor framework, emphasizing the importance of phased rollouts, collaboration with DeFi platforms, and ongoing monitoring and adaptation.

A. Phased Implementation Approach

A gradual phased rollout of the safe harbor framework will allow both regulators and DeFi platforms to evaluate the framework's effectiveness and make necessary adjustments before full implementation. The initial phase could focus on early adopters—DeFi platforms that are already committed to best practices in governance, security, and transparency. By starting with a select group of platforms, regulators can collect valuable feedback and assess how well the framework works in practice.

Initially, pilot programs can launch with a select group of DeFi platforms that volunteer to participate and meet the safe harbor criteria. These pilot programs will provide valuable insights into the practical implementation of the framework and allow for adjustments based on real-world experience.

Pilot programs can also be launched to test key components of the framework, such as security audits, stress testing, and liquidity buffer requirements. These programs would allow regulators to identify challenges and refine the framework's provisions before scaling it to the broader DeFi ecosystem. Moreover, these pilots could serve as a proof of concept, demonstrating the feasibility and benefits of the safe harbor framework to the broader industry.

B. Collaboration with DeFi Platforms

The success of the function-based safe harbor framework depends on the cooperation of DeFi platforms. To incentivize compliance, regulators should engage in collaborative partnerships with DeFi platforms, fostering an environment of trust and mutual understanding. Platforms seeking safe harbor protection will need to meet specific standards for security, governance, and transparency, and regulators can help guide platforms through this process by providing clear guidelines, educational resources, and technical support.

As the pilot programs demonstrate success and regulatory confidence grows, the safe harbor framework can gradually expand to include a broader range of DeFi platforms. This gradual expansion will allow regulators to monitor the framework's impact on the DeFi ecosystem and make any necessary adjustments along the way. Moreover, regulators and DeFi platforms should work together to develop best practices for security audits, risk management, and compliance reporting. This partnership will help create a framework for continuous improvement, where DeFi platforms can proactively address risks while benefiting from regulatory certainty and reduced legal exposure.

C. Incentivizing Compliance and Participation

To encourage widespread participation in the safe harbor framework, DeFi platforms should be provided with clear incentives for compliance. These incentives can include legal certainty and regulatory clarity, which allow platforms to operate within a defined legal framework and avoid the risk of enforcement actions. Additionally, platforms that comply with the safe harbor requirements could be eligible for expedited approval from regulators or receive market recognition through certification or branding that demonstrates the platform's commitment to regulatory standards.

Incentives can also take the form of reduced regulatory burden for platforms that meet high compliance standards. For example, platforms that demonstrate strong governance practices, transparent financial reporting, and effective risk mitigation strategies might be exempt from certain regulatory requirements or enjoy faster approval processes for new products and services.

D. Continuous Monitoring and Adaptation

The DeFi ecosystem is evolving rapidly, with new technologies and financial products emerging regularly. As such, the safe harbor framework must remain adaptive to new developments and challenges. Continuous monitoring and adaptation will be crucial to ensure that the framework remains relevant and effective in the face of ongoing innovation.

To facilitate this evolution, the framework should include mechanisms for regular reviews and updates. This process could involve periodic assessments of the effectiveness of the framework's provisions, taking into account feedback from industry participants, regulators, and other stakeholders. These reviews could also analyze emerging risks and assess how the framework can adapt to address new challenges.

Moreover, regulators should stay informed about technological advancements and market trends, ensuring that the framework evolves alongside the DeFi space. This dynamic regulatory approach will help DeFi platforms continue to innovate while maintaining the safeguards needed to protect users and maintain market integrity.

E. Collaboration with Existing Regulatory Bodies

While the function-based safe harbor framework represents a significant step forward in regulating DeFi, it should not be implemented in isolation. Collaboration with existing regulatory bodies such as the

SEC, CFTC, and FinCEN is essential to ensuring that DeFi platforms are held to consistent standards across different areas of regulation.

To address these challenges, an inter-agency task force could provide a unified approach to DeFi regulation, coordinating enforcement actions and harmonizing regulatory standards. This model would align with the function-based safe harbor framework, enabling agencies to assess DeFi platforms based on their economic roles while minimizing jurisdictional conflicts.

Regulators from different sectors—securities, commodities, banking, and AML—must work together to create a cohesive regulatory approach for DeFi. This collaboration could involve cross-agency task forces or interdisciplinary panels to coordinate enforcement efforts and address complex regulatory issues. International cooperation will also be crucial, as many DeFi platforms operate globally, transcending national borders.

Given the global nature of DeFi, international regulatory cooperation is essential. Drawing inspiration from frameworks like the EU’s MiCA, the U.S. could work with global regulators to establish consistent standards for DeFi platforms, reducing regulatory arbitrage and fostering a stable, trustworthy ecosystem.

F. Stakeholder Engagement and Education

For the safe harbor framework to be effective, stakeholder engagement and education will be key. Regulators must engage with DeFi platforms, investors, and users to ensure they understand the framework’s requirements and benefits. This education can be achieved through programs, webinars, and guidance documents that clarify the compliance process and promote best practices in governance, transparency, and security.

In addition to educating platforms, it is equally important to raise awareness among users of DeFi protocols. Users must understand the risks and protections afforded by the safe harbor framework, enabling them to make more informed decisions when interacting with DeFi platforms. By engaging with both industry participants and end-users, regulators can ensure that the framework is widely understood and embraced.

Public-private collaboration can play a pivotal role in bridging the gap between DeFi’s decentralized ethos and the centralized oversight required for market integrity. Industry stakeholders, regulators, and developers could co-create guidelines that align with the principles of the safe harbor framework, ensuring that regulation remains adaptable and innovation-friendly.

CONCLUSION

The emergence of DeFi presents both immense opportunities and unprecedented challenges for the future of finance. While DeFi offers the potential for greater financial inclusion, innovation, and economic empowerment, it also necessitates a regulatory approach that can effectively address DeFi's unique characteristics and mitigate its inherent risks. As the DeFi ecosystem evolves rapidly, the need for a dynamic, flexible regulatory framework becomes increasingly clear.

This Article has proposed a function-based safe harbor framework as a solution to the regulatory challenges posed by DeFi. By shifting the focus from the form of DeFi instruments to their economic function, this framework offers greater clarity and certainty for both regulators and market participants. The safe harbor provision incentivizes compliance and fosters innovation, while the framework's focus on technical safeguards, enforcement mechanisms, and cross-border considerations addresses the specific risks associated with DeFi.

To ensure the successful implementation of this framework, a phased approach is crucial. The initial phase should involve pilot programs with select DeFi platforms, followed by gradual expansion as experience and confidence grow. These pilot programs would allow regulators to fine-tune the framework, gather feedback, and establish a clear understanding of its practical impact. Collaboration between regulators, DeFi platforms, and industry stakeholders will be essential, fostering open dialogue, providing clear guidance, and establishing robust feedback mechanisms to ensure the framework remains adaptable to the rapidly evolving DeFi landscape.

Additionally, the framework's success hinges not only on domestic efforts but also on international cooperation. Global harmonization of regulatory approaches is critical to preventing regulatory arbitrage and ensuring consistent standards across borders. This collaborative effort will foster a level playing field for DeFi platforms while promoting responsible innovation on a global scale. Addressing jurisdictional challenges in this decentralized environment requires that regulators from different nations actively engage in creating standards that both protect consumers and ensure that DeFi platforms can scale globally.

While the function-based safe harbor framework provides a robust regulatory solution, challenges remain. These challenges include the risk of abuse of the safe harbor provisions, the oversimplification of complex DeFi risks, and the inherent jurisdictional challenges of applying traditional regulatory approaches to decentralized platforms. To mitigate these risks, ongoing periodic reviews, enhanced transparency, and

international cooperation are essential. These strategies ensure that the framework remains responsive and adaptable to emerging risks, balancing the freedom to innovate with the need to protect investors and ensure market stability.

Looking forward, the function-based safe harbor framework offers a promising path to regulate DeFi in a manner that balances innovation, market integrity, and investor protection. This framework is not a static solution but a dynamic tool that must evolve with the ecosystem. Continuous dialogue and collaboration between regulators, DeFi platforms, and international bodies will be essential to fine-tune the framework, address emerging risks, and maintain its relevance over time. By embracing this approach, regulators can foster a thriving DeFi ecosystem that benefits all stakeholders while safeguarding against systemic risks and ensuring the responsible growth of this transformative technology.

This is ultimately a legislative task. Agency guidance and case-by-case settlements are useful pilots, but they cannot reset the boundary of “securities” or supply a uniform rule across jurisdictions and administrations. A function-based safe harbor should be enacted by Congress so that its scope and safeguards are fixed in law, agencies are bound, discretion is cabined, and the result is durable, national clarity for innovation and consumer protection.⁴²⁵

⁴²⁵ Public-choice theory predicts agency expansion and jurisdictional entrenchment. See William A. Niskanen, BUREAUCRACY AND REPRESENTATIVE GOVERNMENT (1971); George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971); Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J.L. & ECON. 211 (1976); Jonathan R. Macey, *Administrative Agency Obsolescence and Interest Group Formation: A Case Study of the SEC at Sixty*, 15 CARDOZO L. REV. 909 (1994); Daniel P. Carpenter, REPUTATION AND POWER: ORGANIZATIONAL IMAGE AND PHARMACEUTICAL REGULATION AT THE FDA (2010). Courts, by contrast, are institutionally slow and incremental. See Neil K. Komesar, IMPERFECT ALTERNATIVES: CHOOSING INSTITUTIONS IN LAW, ECONOMICS, AND PUBLIC POLICY (1994); Cass R. Sunstein, ONE CASE AT A TIME: JUDICIAL MINIMALISM ON THE SUPREME COURT (1999); Alexander M. Bickel, THE LEAST DANGEROUS BRANCH (1962); Admin. Office of the U.S. Courts, *Federal Judicial Caseload Statistics*, Table C-5: U.S. District Courts—Median Time from Filing to Disposition of Civil Cases (Dec. 31, 2024; Mar. 31, 2025). Token litigation has borne this out. See, e.g., *SEC v. Kik Interactive Inc.*, 492 F. Supp. 3d 169 (S.D.N.Y. 2020); *SEC v. LBRY, Inc.*, No. 21-cv-260-PB, 2022 WL 16744741 (D.N.H. Nov. 7, 2022); *SEC v. Ripple Labs Inc.*, No. 20 Civ. 10832 (AT), 2023 WL 4507900 (S.D.N.Y. July 13, 2023). Meanwhile, the SEC can halt distribution early via injunctions under a public-interest standard. See *SEC v. Telegram Grp. Inc.*, 448 F. Supp. 3d 352 (S.D.N.Y. 2020); *SEC v. Unifund SAL*, 910 F.2d 1028, 1036–38 (2d Cir. 1990); *SEC v. Mgmt. Dynamics, Inc.*, 515 F.2d 801, 808–09 (2d Cir. 1975). And post-*Loper*

As the DeFi space continues to mature, future research and policy development will be critical in refining this framework, especially as new technologies and financial instruments emerge. Further studies on the real-world application of the safe harbor framework, as well as comparative international regulatory models, will provide valuable insights into how the framework can be enhanced and adapted to meet the evolving needs of the DeFi ecosystem. This iterative process will ensure that DeFi can thrive responsibly within a secure, transparent, and well-regulated environment, fostering innovation while safeguarding the integrity of the global financial ecosystem.

ACRONYMS

AML – Anti-Money Laundering: Laws and regulations designed to prevent criminals from disguising illegally obtained funds as legitimate income. Often used together with KYC requirements.

CBDC – Central Bank Digital Currency: A digital form of a country’s fiat currency issued and backed by its central bank, often designed to combine state backing with programmable transaction features.

CFTC – Commodity Futures Trading Commission: A U.S. federal agency regulating derivatives markets, including futures, swaps, and certain cryptocurrencies.

CDO – Collateralized Debt Obligation: A structured financial product backed by a pool of loans or other assets, with tranches that have varying risk and return profiles.

CeFi – Centralized Finance: Financial services for cryptocurrencies provided by centralized entities (e.g., exchanges, lenders) that retain custody of user assets.

CLARITY Act – Digital Asset Market Clarity Act of 2025: U.S. legislation passed by the House in July 2025 to clarify regulatory jurisdiction between the SEC and CFTC. It defines “digital commodities,” grants CFTC oversight for mature blockchain systems, creates preliminary registration categories for exchanges, brokers, and dealers, and streamlines the regulatory treatment of digital assets.

Bright, agency guidance is a potentially unstable vehicle for a durable national rule. See *Loper Bright Enters. v. Raimondo*, 144 S. Ct. 2244 (2024).

DAO – Decentralized Autonomous Organization: An organization governed by smart contracts on a blockchain, allowing members to vote on proposals without centralized control. Stylized here as ÐAO in the text.

dApps – Decentralized Applications: Applications built on blockchain technology that operate without a central authority, typically powered by smart contracts.

DeFi – Decentralized Finance: A financial system built on blockchain technology that operates without intermediaries like banks or financial institutions.

DEX – Decentralized Exchange: A peer-to-peer platform that allows users to trade cryptocurrencies without relying on a central authority.

ETH – Ethereum: A blockchain platform that supports smart contracts and decentralized applications. Also used to refer to the native cryptocurrency of the Ethereum blockchain, the second-largest cryptocurrency by market capitalization.

ETC – Ethereum Classic: A blockchain platform created as a result of a hard fork of Ethereum following the ÐAO hack. It maintains the original Ethereum blockchain without reversing the ÐAO exploit transactions.

FATF – Financial Action Task Force: An intergovernmental body that develops policies and sets standards to combat money laundering, terrorist financing, and other financial crimes.

FinCEN – Financial Crimes Enforcement Network: A U.S. bureau tasked with enforcing laws against money laundering and financial crimes.

GENIUS Act – Guiding and Establishing National Innovation for U.S. Stablecoins Act of 2025: U.S. federal law establishing a comprehensive framework for payment stablecoins. Requires 1:1 reserves in low-risk assets, mandates regular audits and disclosures, restricts issuance to permitted entities, and subjects issuers to federal oversight to ensure stability and consumer protection.

IOSCO – International Organization of Securities Commissions: An international body that sets global standards for securities regulation and promotes efficient markets.

KYC – Know Your Customer: Processes used by financial institutions and platforms to verify the identity of users, ensuring compliance with AML regulations.

MiCA – Markets in Crypto-Assets Regulation: An EU regulation providing a comprehensive framework for the regulation of cryptocurrencies and digital assets.

NFT – Non-Fungible Token: A unique digital asset that represents ownership of a specific item, artwork, or collectible on a blockchain.

P2P – Peer-to-Peer: A decentralized network structure in which two or more computers (peers) share resources and data directly, without going through a centralized server.

PoW / PoS – Proof-of-Work / Proof-of-Stake: Consensus mechanisms used by blockchains to validate transactions and secure the network. PoW requires computational work; PoS requires validators to stake tokens.

SEC – U.S. Securities and Exchange Commission: A federal agency responsible for enforcing securities laws and regulating securities markets in the United States.

Stablecoin – A type of cryptocurrency designed to maintain a stable value, typically pegged to a reference asset such as the U.S. dollar (fiat-backed stablecoins) or maintained through algorithmic mechanisms (algorithmic stablecoins). Used in trading, payments, and decentralized finance to reduce volatility.

USD – United States Dollar: The official currency of the United States, often used as a benchmark for stablecoins in the cryptocurrency ecosystem.

USDC – USD Coin: A fiat-backed stablecoin pegged to the U.S. dollar, issued by regulated financial institutions.

USDT – Tether: A fiat-backed stablecoin pegged to the U.S. dollar, widely used in the cryptocurrency market for liquidity and trading.

Wrapper – A legal entity, such as a limited liability company (LLC) or foundation, used to give a decentralized organization or blockchain-based

project a recognized legal form. Wrappers can provide limited liability, tax treatment, and regulatory compliance while the underlying governance remains decentralized.

UST – TerraUSD: An algorithmic stablecoin that lost its peg to the U.S. dollar and collapsed in 2022, resulting in significant losses and regulatory attention in the DeFi ecosystem.

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