

MILLION DOLLAR BASH*: A NUANCED APPROACH FOR CALCULATING TAX LIABILITY FOR PARTICIPANTS IN DECENTRALIZED FINANCE

Ethan D. Trotz**

Cryptocurrencies and blockchain technology encompass a breakthrough technology enabling individuals around the world to permissionlessly communicate and transact in ways never previously contemplated. One application of blockchain is known as decentralized finance, or DeFi. Through DeFi, lenders and borrowers can transact with one another without a centralized intermediary or cumbersome paperwork and other approvals. But with great technological advancement comes unique regulatory issues. One such issue is how to determine tax liability for lenders and liquidity providers, or LPs, participating in DeFi. This issue arises due to the nature of yields earned through DeFi. In traditional financial systems, lenders gain interest in the U.S. Dollar. Through DeFi, lenders and LPs can earn yields through various capital assets, such as Bitcoin and Ether, which themselves can also gain or lose value over time. This Article proposes a simple solution. Under the “system in, system out” approach, a taxpayer would recognize a taxable event only after funds are removed from the applicable decentralized application, or DApp. In other words, a lender or LP could park his or her assets in a DApp for an indefinite amount of time without recognizing any taxable income or capital gain or loss. This approach will likely offer numerous, significant, benefits including easing the burden on taxpayers and the IRS, encouraging productive use of assets, incentivizing innovation, and encouraging participation in emerging technology.

I. INTRODUCTION	576
II. OVERVIEW OF BLOCKCHAIN AND CRYPTOCURRENCY	577
III. OVERVIEW OF DEFI	580
IV. REGULATORY ACTION	585
V. DEFI USE CASES	588

* Bob Dylan & The Band, Million Dollar Bash, on The Basement Tapes (Columbia Records 1975).

** J.D., with honors, The University of North Carolina School of Law; BSES, The University of Georgia. Any views set forth in this Article are the personal views of Mr. Trotz and not necessarily the views of his employer.

A. <i>Lending and Borrowing Using DeFi: MakerDAO as an Example</i>	588
B. <i>Decentralized Exchanges and Automated Market Makers</i>	589
C. <i>DeFi Automated Yield Aggregators Like Yearn</i>	592
VI. TRADITIONAL TAX PRINCIPLES AND IRS GUIDANCE ON CRYPTOCURRENCY	593

I. INTRODUCTION

Web 3.0 is the new iteration of the internet, based on blockchain technology, decentralization, and token-based economics.¹ Web 3.0 involves the use of public, permissionless blockchains such as Bitcoin and Ethereum (and the native cryptocurrencies to transact on those blockchains, Bitcoin (BTC) and Ether (ETH)).²

An emerging application of Web 3.0 and decentralization is decentralized finance (DeFi), in which users can, among other things, lend, borrow, and swap among various cryptocurrencies using smart contracts and decentralized applications (DApps).³ DeFi contains numerous features never seen before, which allow individuals to potentially gain significant returns on capital, but also poses significant uncertainties in numerous areas of the law, including tax.⁴ In a traditional lending system, the lender is paid interest in the U.S. Dollar, which is taxed as ordinary income.⁵ Further, the value of the U.S. Dollar does not change—it is always worth \$1. In DeFi, however, the lenders and liquidity providers (LPs) can be paid in a number of ways, including in additional BTC, ETH, stablecoins pegged to the U.S. Dollar, or governance tokens (which can be sold on secondary markets).⁶ Further, users in DeFi can re-deposit those amounts back into DApps to further increase

1. See Werner Vermaak, *What is Web 3.0?*, ALEXANDRIA: COINMARKETCAP, <https://coinmarketcap.com/alexandria/article/what-is-web-3-0> (last visited Feb. 15, 2022). Web 1.0 generally covers the time period from the early 1990s to around 2004, where most websites were static webpages, and the majority of those on the internet were consumers, not producers of content. *Id.* Web 2.0 was the next phase, encompassing the age of social media, blogs, networking services, and the like. *Id.*

2. See generally *What is Ethereum and How Does it Work?*, COINTELEGRAPH, <https://cointelegraph.com/ethereum-for-beginners/what-is-ethereum-a-beginners-guide-to-eth-cryptocurrency> (last visited Feb. 15, 2022). Throughout this Article, Bitcoin and Ethereum reference the blockchains, while BTC and ETH reference the cryptocurrencies. *Id.*

3. *What are DApps? Everything there is to know about decentralized applications*, COINTELEGRAPH, <https://cointelegraph.com/defi-101/what-are-dapps-everything-there-is-to-know-about-decentralized-applications> (last visited Feb. 15, 2022).

4. See generally Erie Hylton, *Legal Considerations in the Fight against Cryptocurrency Tax Fraud*, 135 J. TAX'N 7, 7 (2021).

5. See *DeFi: A Comprehensive Guide to Decentralized Finance*, COINTELEGRAPH, <https://cointelegraph.com/defi-101/defi-a-comprehensive-guide-to-decentralized-finance> (last visited Feb. 15, 2022).

6. See *id.*

earning potential.⁷ All the while, the various cryptocurrencies involved fluctuate in value, so the value of the yield generated changes by the minute.⁸

Tracking and computing taxable income via participation in DeFi is complex and uncertain. This Article poses a simple solution: a “system in, system out” approach whereby users recognize a taxable event only when they withdraw funds from a given DApp back into a personal crypto wallet. This will yield numerous benefits, including simplifying crypto-related tax reporting, encouraging the long-term productive use of assets, sparing taxpayers from accruing tax liability on assets that are not as liquid or usable in everyday life like many other capital assets, encouraging innovation, and recognizing that crypto assets are a different asset class requiring a nuanced regulatory approach.

This Article proceeds in seven parts. Part II provides a high-level overview of how cryptocurrencies and smart contracts work. Part III explains how DeFi works, including by providing several examples of DApps. Parts IV–V explain recent regulatory action in connection with DeFi. Part VI details current IRS guidance on cryptocurrency and possible tax treatment using traditional tax principles. Part VII proposes a system in, system out approach the IRS could take when calculating “income” from DeFi lending activity.

II. OVERVIEW OF BLOCKCHAIN AND CRYPTOCURRENCY

A general understanding of blockchain technology and cryptocurrency is necessary to understand some of the unique features of DeFi. This is intended to be a high-level illustration, as there are many particulars about which others have written in great detail.⁹ At a high level, a blockchain is a digital ledger of transactions in a given cryptocurrency.¹⁰ A public blockchain is decentralized, meaning no single person or entity controls it, and anyone with internet access may participate.¹¹ A blockchain is comprised of a number of “blocks,” each of which is a bundle of transactions.¹² Together, the blocks constitute the blockchain.¹³ For example, when one user sends BTC or ETH to another user, that transaction is recorded in one of the blocks on the Bitcoin or Ethereum blockchain.¹⁴

7. *Id.*

8. *Id.*

9. *See, e.g.,* Georgios Dimitropoulos, *The Law of Blockchain*, 95 WASH. L. REV. 1117, 1127–31 (2020).

10. Ethan D. Trotz, *Tangled Up in Blue: Adapting Securities Laws to Initial Coin Offerings*, 39 N. ILL. U. L. REV. 428, 432 (2019).

11. Dimitropoulos, *supra* note 9, at 1130.

12. *Id.* at 1127.

13. Trotz, *supra* note 10, at 432.

14. *See id.* at 432–33.

The two most popular consensus mechanisms for confirming transactions on the blockchain are proof-of-work (PoW) and proof-of-stake (PoS).¹⁵ Bitcoin and Ethereum (for now)¹⁶ are currently POW blockchains, meaning the network is supported (and transactions are confirmed) through a number of computers around the world solving computational problems.¹⁷ PoW requires computer equipment and intensive energy usage.¹⁸ In a PoS consensus mechanism, persons “stake” their cryptocurrency and computing power to validate transactions.¹⁹ This process creates new blocks on the blockchain, and as part of the creation of a new block, participants create new tokens which constitute rewards that go back to the stakers.²⁰

Participating on a public blockchain requires a digital wallet.²¹ There are two basic features of a wallet: a public address and private keys.²² A public address is essentially a public username comprised of random letters and numbers visible to all participants on the blockchain.²³ Private keys essentially constitute the password.²⁴ The only way to control a wallet is by entering the private keys, and each wallet has a different private key.²⁵ In a centralized exchange, like Coinbase, users entrust the exchange to maintain the private keys.²⁶ In a self-custody arrangement, like in DApps and DeFi, users maintain control over their private keys.²⁷ There is a common saying in crypto: “[n]ot your keys, not your coins.”²⁸

Cryptocurrencies such as BTC and ETH can be digitally traded and can also function “as a medium of exchange, unit of account, or store of value.”²⁹

15. Dimitropoulos, *supra* note 9, at 1128–29.

16. *Id.* at 1157. It is currently contemplated that Ethereum will eventually transition from PoW to PoS, although it is unclear when that change will occur. *Id.* Many believe it will occur in the fall of 2022.

17. *See generally id.* (providing a more detailed explanation of mining); *see also* Trevor Kiviat, *Beyond Bitcoin: Issues in Regulating Blockchain Transactions*, 65 DUKE L.J. 569, 577–80 (2015).

18. Dimitropoulos, *supra* note 9, at 1128–29.

19. ARVIND NARAYANAN ET AL., *BITCOIN AND CRYPTOCURRENCY TECHNOLOGIES* 233 (2016).

20. *Id.*

21. Dimitropoulos, *supra* note 9, at 1130. A wallet can be accessed directly by the user or through an intermediary, like an exchange. *Id.*

22. *Id.* at 1128.

23. Trotz, *supra* note 10, at 432.

24. Dimitropoulos, *supra* note 9, at 1128.

25. E. Napoletano & John Schmidt, *Decentralized Finance is Building a New Financial System*, FORBES (Apr. 2, 2021), <https://forbes.com/advisor/investing/defi-decentralized-finance/>.

26. *Id.*

27. *Id.*

28. David G.W. Birch, *Not Your Keys, Not Your Coins? Whatever*, FORBES (Oct. 15, 2021), <https://forbes.com/sites/davidbirch/2021/10/15/not-your-keys-not-your-coins-whatever/?sh=70dd505e4c1f>.

29. *Investor Bulletin: Initial Coin Offerings*, U.S. SEC. & EXCH. COMM’N (July 25, 2017), https://www.sec.gov/oiea/investor-alerts-and-bulletins/ib_coinofferings; *see also* Ethan D. Trotz, *The Times They are a Changin’: Surveying How the Howey Test Applies to Various Cryptocurrencies*, 11 ELON L. REV. 201 (2019); Kevin V. Tu & Michael W. Meredith, *Rethinking Virtual Currency Regulation in the Bitcoin Age*, 90 WASH. L. REV. 271, 279 (2015).

Market participants often use cryptocurrencies in transactions as a cash equivalent, similar to fiat currencies.³⁰ However, unlike fiat currencies, no central government or sovereign nation issues or guarantees the value of cryptocurrencies.³¹ Cryptocurrencies are transacted on a peer-to-peer basis without a centralized intermediary.³² There are no physical or tangible versions of cryptocurrencies; instead, cryptocurrencies are “encrypted, digital representation[s] of value.”³³

A unique feature of Ethereum, which is the building block for most of DeFi, is smart contracts, which automate many steps taken by central authorities on the traditional web.³⁴ Simply put, a smart contract is a “self-executing ‘contract,’ whereby the terms of the agreement between the two parties are directly written into code.”³⁵ Smart contracts can be explained as follows:

Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met. They typically are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary’s involvement or time loss. They can also automate a workflow, triggering the next action when conditions are met. . . . Smart contracts work by following simple “if/when. . . then. . .” statements that are written into code on a blockchain. A network of computers executes the actions when predetermined conditions have been met and verified. These actions could include releasing funds to the appropriate parties, registering a vehicle, sending notifications, or issuing a ticket. The blockchain is then updated when the transaction is completed. That means the transaction cannot be changed, and only parties who have been granted permission can see the results.³⁶

Another important feature of Ethereum to discuss is transaction fees and gas. Gas refers to the “unit that measures the amount of computational effort required to execute specific operations on the Ethereum [blockchain].”³⁷ Because each transaction in ETH requires computational resources to

30. Kristin N. Johnson, *Decentralized Finance: Regulating Cryptocurrency Exchanges*, 62 WM. & MARY L. REV. 1911, 1945 (2021).

31. *Id.* at 1946.

32. *Id.* at 1945.

33. Edward Mokhtarian & Alexander Lindgren, *Rise of the Crypto Hedge Fund: Operational Issues and Best Practices for an Emergent Investment Industry*, 23 STAN J.L. BUS. & FIN. 112, 119 (2018).

34. COINTELEGRAPH, *supra* note 2.

35. Dimitropoulos, *supra* note 9, at 1135.

36. *What are Smart Contracts on Blockchain?*, IBM, <https://www.ibm.com/topics/smart-contracts> (last visited Feb. 15, 2022).

37. *Gas and Fees*, ETHEREUM, <https://ethereum.org/en/developers/docs/gas/> (last visited Feb. 15, 2022).

execute, each transaction requires a fee.³⁸ Gas refers to that fee, which users pay in Ethereum's native cryptocurrency, ETH.³⁹ The gas fee for swapping a token using Ethereum is typically between .01 and .05 ETH, or around \$20 to \$100, depending on how much activity is being conducted on Ethereum at any given moment.⁴⁰

III. OVERVIEW OF DeFi

[DeFi] is an open and multi-faceted financial system facilitated by smart contracts and blockchain oracles, acting as an alternative to the traditional opaque system run by decades-old infrastructure and processes. It provides users permissionless and borderless access to various financial instruments without relinquishing control over assets to intermediaries such as brokerages or banks.⁴¹

DeFi has witnessed extraordinary recent growth. The total value locked (TVL) in DeFi protocols increased from \$1.6 billion to over \$100 billion in 2021.⁴²

One of the principal features of DeFi is that it eliminates intermediaries and enables businesses and individuals to conduct financial transactions through blockchain technology in a peer-to-peer system.⁴³ In this respect, assets are "censorship-resistant."⁴⁴ All one needs to participate in DeFi is an internet connection and a digital wallet.⁴⁵ One can participate in DeFi as a borrower or a lender/LP.⁴⁶ Borrowing using DeFi is done through a self-custody digital wallet and a DApp.⁴⁷ The most well-known and used DApps in DeFi are built on Ethereum.⁴⁸

38. *Id.*

39. *Id.*

40. *Ethereum Gas Tracker*, ETHERSCAN, <https://etherscan.io/gastracker> (last visited Feb. 15, 2022).

41. *2022 Digital Asset Outlook*, THE BLOCK 82 (Dec. 2022), https://www.tbstat.com/wp/uploads/2021/12/The-Block-Research-2022-Digital-Asset-Outlook.v2.pdf?utm_medium=email&_hsmi=196175669&_hsenc=p2ANqtz-weMC0QCLjEnuqfoM2J-mFHHp9xOhoDTVU-kQs5BSMzh0kW0NJD3ntEtRyz1I9U1mEuZAhE9Wohi2y1PtY6Sy4BNPXCQ&utm_content=196175669&utm_source=hs_automation.

42. *Id.*

43. *Id.* at 41.

44. *Censorship Resistance*, BINANCE, <https://academy.binance.com/en/glossary/censorship-resistance> (last visited Feb. 15, 2022).

45. John Detrixhe, *Everything You Need to Know About DeFi*, QUARTZ (Dec. 21, 2021), <https://qz.com/2065446/everything-you-need-to-know-about-decentralized-finance-defi/>.

46. *Id.*

47. Napoletano & Schmidt, *supra* note 25.

48. Detrixhe, *supra* note 45.

An important concept in DeFi is the decentralized autonomous organization, or DAO.⁴⁹ A DAO is “represented by rules encoded as a transparent computer program, controlled by the organization members, and not influenced by a central government. As the rules are embedded into the code, no managers are needed, thus removing any bureaucracy or hierarchy hurdles.”⁵⁰ Many DApps have DAOs, which in turn have governance tokens, which one must hold to participate or vote on any changes to a DAO’s rules.⁵¹

DeFi has particular appeal in developing nations, where greater portions of the population lack access to traditional banking services.⁵² According to a 2017 report from the World Bank, around 1.7 billion adults are “unbanked” or without an account at a financial institution or through a mobile money provider.⁵³ Virtually all of those unbanked live in the developing world.⁵⁴ Further, the unbanked are overwhelmingly likely to be low income.⁵⁵ Among the reasons the unbanked do not have bank accounts include cost, distance, and distrust in the financial system.⁵⁶

Stablecoins are critical to the DeFi ecosystem. Stablecoins are “digital assets that are designed to maintain a stable value relative to a national currency or other reference assets.”⁵⁷ According to a joint report on stablecoins from the President’s Working Group on Financial Markets, the Federal Deposit Insurance Commission, and the Office of the Comptroller of Currency (Stablecoin Report):

Stablecoins are generally created, or “minted,” in exchange for fiat currency that an issuer receives from a user or third-party. To maintain a stable value relative to fiat currency, many stablecoins offer a promise or expectation that the coin can be redeemed at par upon request. These stablecoins are often advertised as being supported or backed by a variety of “reserve assets.” However, there are no standards regarding the composition of stablecoin reserve assets, and the information made publicly available regarding the issuer’s reserve assets is not consistent across stablecoin arrangements as to either its content or the frequency of its release. Based

49. Cathy Hackl, *What are DAOs and Why You Should Pay Attention*, FORBES (June 1, 2021, 8:00 AM), <https://www.forbes.com/sites/cathyhackl/2021/06/01/what-are-daos-and-why-you-should-pay-attention/?sh=1e9fb6877305>.

50. *Id.*

51. *Id.*

52. ASLI DEMIRGÜÇ-KUNT ET AL., WORLD BANK GRP., *THE GLOBAL FINDEX DATABASE 2017: MEASURING FINANCIAL INCLUSION AND THE FINTECH REVOLUTION* 4 (2018), <https://globalfindex.worldbank.org/>.

53. *Id.*

54. *Id.*

55. *Id.*

56. *Id.* at 5.

57. PRESIDENT’S WORKING GROUP ON FINANCIAL MARKETS, FED. DEPOSIT INS. CORP., OFFICE OF THE COMPTROLLER OF THE CURRENCY, *REPORT ON STABLECOINS 1 (2021)* [hereinafter *STABLECOIN REPORT*], https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf.

on information available, stablecoins differ in the riskiness of their reserve assets, with some stablecoin arrangements reportedly holding virtually all reserve assets in deposits at insured depository institutions or in U.S. Treasury bills, and others reportedly holding riskier reserve assets, including commercial paper, corporate and municipal bonds, and other digital assets.⁵⁸

Stablecoins play a “central role in facilitating, trading, lending, and borrowing activity in DeFi.”⁵⁹ Stablecoins provide a digital asset “with more perceived stability to transfer across [DeFi] platforms without the use of national currencies and reducing the need for traditional financial institutions.”⁶⁰ Stablecoins also serve as a source of collateral against which DeFi participants can borrow or lend for yield.⁶¹ The Stablecoin Report continues, “[a]s evidence of the importance of stablecoins to the digital asset market, stablecoins are reportedly among the most highly traded assets as a percentage of total volume.”⁶²

DeFi can serve as an escape valve for inflationary currencies given the prevalence of stablecoins.⁶³ Xend Finance, a Nigerian startup, created the first ever DeFi platform for credit unions in November 2020.⁶⁴ Through Xend Finance, users make deposits in local fiat currencies, which Xend Finance converts to stablecoins pegged to other currencies (like the U.S. Dollar) and then deposits those stablecoins onto DeFi platforms to lend and to gain yield (as explained in greater detail below).⁶⁵ Xend Finance then auto-compounds the earnings on behalf of users.⁶⁶ As of August 2021, a total of over \$1 million was locked in the Xend Finance protocol.⁶⁷

BTC has also been an emerging feature of DeFi through centralized custodians, which “play a pivotal role in porting [BTC’s] value into DeFi.”⁶⁸ Wrapped Bitcoin (wBTC) is a popular version of BTC usable on Ethereum.⁶⁹ Users can exchange BTC for wBTC (which is pegged 1:1 to BTC), and then use wBTC on DeFi protocols much like one could use ETH or stablecoins.⁷⁰

58. *Id.* at 4.

59. *Id.* at 9.

60. *Id.* at 8.

61. *Id.*

62. *Id.*

63. Kevin Leu, *Xend Finance Announces \$1 Million in Total Savings Locked on Platform Across Africa*, MEDIUM (Aug. 19, 2021), <https://medium.com/xendfinance/xend-finance-announces-1-million-in-total-savings-locked-on-platform-across-africa-4d745a73cf7f>.

64. CryptoGuru, *Xend Finance, a Nigerian Startup, Announces the First-Ever DeFi Platform for Credit Unions*, BITKE (Nov. 4, 2020), <https://bitcoinke.io/2020/11/xend-finance/>.

65. *How it Works*, XEND FIN., <https://xend.finance/how-it-works.html> (last visited Feb. 15, 2022).

66. *Id.*

67. Leu, *supra* note 63.

68. THE BLOCK, *supra* note 41, at 94.

69. *Id.* Other examples include Huobi BTC and renBTC. *Id.*

70. *Id.* at 71.

Participating in DeFi is not without risk. According to the Securities and Exchange Commission (SEC), these risks include, among others:

- Unless required, there will be projects that do not invest in compliance or adequate internal controls;
- [w]hen the potential financial rewards are great enough, some individuals will victimize others, and the likelihood of this occurring tends to increase as the likelihood of getting caught and severity of potential sanctions decrease; and
- [a]bsent mandatory disclosure requirements, information asymmetries will likely advantage rich investors and insiders at the expense of the smallest investors and those with the least access to information.⁷¹

Further risks include promoters “rug pulling” investors by stealing funds and hackers exploiting bugs in smart contracts.⁷² In 2021, approximately \$2.2 billion in funds were stolen or hacked in the DeFi space.⁷³

The Stablecoin Report highlighted numerous risks particular to stablecoins. One of the primary concerns is whether stablecoins are actually backed by adequate fiat reserves.⁷⁴ This has been a particular issue with United States Dollar Tether (USDT), a stablecoin issued by Tether. While Tether has published two audits of their reserves in 2021, Tether previously settled with New York’s Attorney General and Commodity Futures Trading Commission (CFTC) over claims that U.S. Dollars did not fully back USDT.⁷⁵ Other risks cited in the Stablecoin Report include loss of value due

71. Caroline A. Crenshaw, *DeFi Risks, Regulations, and Opportunities* 1 INT’L J. BLOCKCHAIN L. 4, 6 (2021); see also *SEC Oversight Hearing Before the Subcomm. on Fin. Services and Gen. Gov’t*, 117th Cong. (May 26, 2021) (“Additionally, crypto lending platforms and so-called decentralized finance (‘DeFi’) platforms raise a number of challenges for investors and the SEC staff trying to protect them.”).

72. Shaurya Malwa, *DeFi ‘Rug Pull’ Scams Pulled in \$2.8B This Year: Chainalysis*, COINDESK (Dec. 17, 2021, 1:59 AM), <https://www.coindesk.com/markets/2021/12/17/defi-rug-pull-scams-pulled-in-28b-this-year-chainalysis/>.

73. Chainalysis Team, *Crypto Crime Trends for 2022: Illicit Transaction Activity Reaches All-Time High in Value, All-Time Low in Share of All Cryptocurrency Activity*, CHAINALYSIS (Jan. 6, 2022), <https://blog.chainalysis.com/reports/2022-crypto-crime-report-introduction/>.

74. STABLECOIN REPORT, *supra* note 57, at 12.

75. See MESSARI, *CRYPTO THESES FOR 2022*, at 116–18 (2021), <https://messari.io/pdf/messari-report-crypto-theses-for-2022.pdf> (last visited Feb. 15, 2022); see also CFTC Orders Tether and Bitfinex to Pay Fines Totaling \$42.5 Million, CFTC No. 8450-21, 2021 WL 4810726 (Oct. 15, 2021); *NY AG’s \$850M Probe of Bitfinex, Tether Ends in an \$18.5M Settlement*, COINDESK (Feb. 23, 2021), <https://www.coindesk.com/markets/2021/02/23/ny-ags-850m-probe-of-bitfinex-tether-ends-in-an-185m-settlement/>.

to stablecoin runs, payment system risks, risks of scale due to concentration of economic power, and regulatory gaps.⁷⁶

Decentralized stablecoins were created in an attempt to address some of these problems.⁷⁷ No single entity controls decentralized stablecoins.⁷⁸ Instead, decentralized stablecoins are issued or “minted” when a corresponding amount of collateral is deposited on a given protocol.⁷⁹ However, according to the Stablecoin Report, this still poses issues for DeFi participants, particularly in connection with potential bugs in code or smart contracts.⁸⁰ For example, if a decentralized stablecoin is issued only by one DApp, and that DApp gets hacked, then that entire stablecoin could be at risk of being without any reserves, whether in fiat currency or cryptocurrency.⁸¹

A recent controversy in DeFi arose in January 2022, which supported the SEC’s and CFTC’s warnings regarding DeFi. A report indicated that one of the founders of a DeFi project called Wonderland—Michael Patryn, or oxSifu, as others call him—was also involved in the notorious Canadian crypto exchange QuadrigaCX.⁸² The Ontario Securities Commission labeled QuadrigaCX a Ponzi scheme due to the founders faking trading volume and using new investors’ deposits to fund withdrawals.⁸³ Ultimately, one of the exchange’s cofounders allegedly died (but many believe he fled and remains alive) and investors lost approximately \$163 million.⁸⁴ Wonderland’s native token is TIME, which offered an astounding 87,000% annual percentage

76. STABLECOIN REPORT, *supra* note 57, at 12–14. The most prominent example of a run on a stablecoin occurred in May 2022 involving the algorithmic stablecoin TerraUSD (UST). Ryan Browne, *\$3 Billion in Bitcoin Was Sold in a Last-ditch Attempt to Save UST Stablecoin from Collapse*, CNBC (May 16, 2022), <https://www.cnbc.com/2022/05/16/what-happened-to-the-bitcoin-reserve-behind-terras-ust-stablecoin.html>. Unlike USDT, which is allegedly backed by fiat reserves, UST “relied on a complex set of code, coupled with a floating token called luna, to balance supply and demand.” *Id.* UST was only partially backed by collateral, and de-pegged to be worth at one point only \$0.01 per 1 UST. *Id.* In total, holders lost tens of billions of dollars during the collapse and subsequent run. *Id.*

77. *See* STABLECOIN REPORT, *supra* note 57, at 1.

78. *Id.* at 13.

79. *Id.* at 4.

80. *Id.* at 10.

81. *Id.*

82. Liam Kelly & Scott Chipolina, *CFO of DeFi Project Wonderland Outed as Co-Founder of QuadrigaCX: Report*, DECRYPT (Jan. 27, 2022), <https://decrypt.co/91354/cfo-defi-project-wonderland-ousted-co-founder-quadrigacx-report>. Patryn has had several criminal convictions. Yogita Khatri, *DeFi protocol Wonderland is allegedly run by QuadrigaCX co-founder*, THE BLOCK (Jan. 27, 2022), <https://www.theblockcrypto.com/post/131931/avalanche-defi-wonderland-time-oxsifu-quadrigacx-patryn>. Prior to co-founding QuadrigaCX in 2013, he was sentenced to eighteen months for involvement in an identity theft relating to bank and credit card fraud. *Id.* He also pled guilty to operating a now-defunct online marketplace that trafficked stolen credit card and bank card numbers. *Id.* He has separate criminal cases for burglary and computer fraud. *Id.*

83. Kelly & Chipolina, *supra* note 82.

84. Doug Alexander, *After Losing \$163 Million in Cryptocurrency, Investors Call to Exhume Quadriga CEO’s Body*, THE ECON. TIMES (Dec. 14, 2019), <https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/after-losing-163-million-in-cryptocurrency-investors-call-to-exhume-quadriga-ceos-body/articleshow/72585412.cms?from=mdr>.

yield.⁸⁵ The price of TIME once approached \$10,000, but as of June 2022 is around \$50.⁸⁶

There are numerous potential applications of DeFi. There is even a popular DeFi game: DeFi Kingdoms.⁸⁷ DeFi Kingdoms aims to be “a whole ecosystem” with features including the native token JEWEL, a decentralized exchange (DEX), and built-in Non-fungible tokens, or NFTs.⁸⁸ Players can use JEWEL to purchase valuable items and skills in the game, to vote in the DAO, and even use as liquidity mining.⁸⁹ There is even a built-in DEX where players can swap different cryptocurrencies built on Ethereum.⁹⁰ Players can deposit JEWEL into the game’s “Bank,” and receive a portion of trading fees in return.⁹¹ DeFi Kingdoms is one example of a “play to earn” game.⁹²

IV. REGULATORY ACTION

The SEC and CFTC have begun placing particular emphasis on DeFi.⁹³ The SEC has recognized that “[m]any DeFi offerings and products closely resemble products and functions in the traditional financial marketplace.”⁹⁴ Further, “DeFi presents a panoply of opportunities” with projects that are “evolving incredibly fast with new and interesting potential.”⁹⁵ However, the SEC believes the current “buyer beware” approach to DeFi is “not an adequate foundation.”⁹⁶ The SEC’s position is that the SEC has a variety of tools to regulate DeFi activity, including rulemaking authority, exemptive or no action relief, and enforcement actions.⁹⁷ The SEC desires to balance investor protection without restricting investor access to fair and appropriate opportunities.⁹⁸

85. Lukas Moore, *Turning \$500 to \$530,000 with TIME Wonderland*, COINMONKS (Dec. 18, 2021), <https://medium.com/coinmonks/turning-500-to-530-000-with-time-wonderland-fe347044f5#:~:text=What%20is%20Time%20Wonderland,is%20the%20annual%20percentage%20yield.>

86. *Wonderland (TIME) Price Chart*, COIN GECKO, <https://www.coingecko.com/en/coins/wonderland> (last visited June 8, 2022).

87. *See DeFi Kingdoms*, DEF1 KINGDOMS, <https://defikingdoms.com/> (last visited Feb. 15, 2022).

88. *How DeFi Kingdoms Works*, DEF1 KINGDOMS DOCS, <https://docs.defikingdoms.com/how-defi-kingdoms-works> (last visited Feb. 15, 2022).

89. *Id.*

90. *Id.*

91. *Id.*

92. *JEWEL Token*, DEF1 KINGDOMS DOCS, <https://docs.defikingdoms.com/how-defi-kingdoms-works/jewel-token> (last visited Feb. 15, 2022).

93. *See* Crenshaw, *supra* note 71.

94. *Id.* at 5.

95. *Id.*

96. *Id.* at 6.

97. *Id.* at 7.

98. *Id.* at 8.

In August 2021, the SEC brought its first enforcement action involving unregistered securities using DeFi.⁹⁹ The SEC charged two individuals and their Cayman Islands company for unregistered sales of more than \$30 million of securities using smart contracts and DeFi.¹⁰⁰ According to the SEC's order:

Gregory Keough, Derek Acree, and their company Blockchain Credit Partners offered and sold securities in unregistered offerings through DeFi Money Market from February 2020 to February 2021. The order finds that they used smart contracts to sell two types of digital tokens: mTokens that could be purchased using specified digital assets and that paid 6.25 percent interest, and DMG "governance tokens" that purportedly gave holders certain voting rights, a share of excess profits, and the ability to profit from DMG governance token resales in the secondary market.

According to the order, in offering and selling mTokens and DMG governance tokens, the respondents stated that DeFi Money Market could pay the interest and profits because it would use investor assets to buy "real world" assets that generated income, like car loans. However, the order finds that after publicly unveiling DMM, the respondents realized that DeFi Money Market could not operate as promised because the price volatility of the digital assets used to purchase the tokens created risk that the income generated through income-generating assets would be insufficient to cover appreciation of investors' principal. The order finds that rather than notifying investors of this roadblock, the respondents misrepresented how the company was operating, including by falsely claiming that DeFi Money Market had bought car loans that they displayed on DeFi Money Market's website. While the respondents controlled another company that owned car loans, DeFi Money Market never acquired an ownership interest in any of those loans. Instead, the order finds that the respondents used personal funds and funds from the other company they controlled to make principal and interest payments for mToken redemptions.¹⁰¹

The CFTC has also begun to enter the conversation. In June 2021, then-CFTC Commissioner Dan Berkovitz appeared to call for sweeping regulation of DeFi in connection with derivative instruments, stating:

Not only do I think that unlicensed DeFi markets for derivative instruments are a bad idea, I also do not see how they are legal under the CEA. The CEA requires futures contracts to be traded on a designated contract market

99. Blockchain Credit Partners, Exchange Act Release No. 92588, 2021 WL 3470599 (Aug. 6, 2021); *see also* Press Release, U.S. Sec. & Exch. Comm'n, SEC Charges Decentralized Finance Leader and Top Executives for Raising \$30 Million Through Fraudulent Offerings (Aug. 6, 2021), <https://www.sec.gov/news/press-release/2021-145>.

100. Blockchain Credit Partners, Exchange Act Release No. 92588, 2021 WL 3470599, at *2 (Aug. 6, 2021).

101. Press Release, U.S. Sec. & Exch. Comm'n, *supra* note 99. *Cyber Enforcement Actions*, SEC, <https://www.sec.gov/spotlight/cybersecurity-enforcement-actions> (last visited Feb. 15, 2022).

(DCM) licensed and regulated by the CFTC. The CEA also provides that it is unlawful for any person other than an eligible contract participant to enter into a swap unless the swap is entered into on, or subject to, the rules of a DCM. The CEA requires any facility that provides for the trading or processing of swaps to be registered as a DCM or a swap execution facility (SEF). DeFi markets, platforms, or websites are not registered as DCMs or SEFs. The CEA does not contain any exception from registration for digital currencies, blockchains, or “smart contracts.”

Apart from the legality issue, in my view it is untenable to allow an unregulated, unlicensed derivatives market to compete, side-by-side, with a fully regulated and licensed derivatives market. In addition to the absence of market safeguards and customer protections in the unregulated market, it is unfair to impose the obligations, restrictions, and costs of regulation upon some market participants while permitting their unregulated competitors to operate wholly free of such obligations, restrictions, and costs. Experience with the development of the “shadow banking” system shows that competition between regulated and unregulated entities in the same market can result in the regulated entities assuming either more risks in order to generate the higher yields necessary to compete with the unregulated competition, or seeking less regulation for themselves to level the playing field. Either of these reactions can introduce significant risks into the financial system. For all these reasons, we should not permit DeFi to become an unregulated shadow financial market in direct competition with regulated markets. The CFTC, together with other regulators, need to focus more attention to this growing area of concern and address regulatory violations appropriately.¹⁰²

The CFTC has taken one enforcement action to date in connection with DeFi.¹⁰³ On January 3, 2022, the CFTC imposed a \$1.4 million penalty against Blockratize, Inc. d/b/a Polymarket for “operating an illegal unregistered or non-designated facility for event-based binary options through online trading contracts, known as ‘event markets.’”¹⁰⁴ Polymarket offered customers the opportunity to buy and sell binary options contracts relating to whether a certain event would occur in a yes or no.¹⁰⁵ These event market contracts constituted “swaps” under the CFTC’s jurisdiction while Polymarket was not registered with the CFTC.¹⁰⁶

102. Dan M. Berkowitz, Commissioner, Climate Change and Decentralized Finance: New Challenges for the CFTC, Keynote Address before the FIA and SIFMA-AMG, Asset Management Derivatives Forum 2021, in *COMMODITY FUTURES TRADING COMMISSION: PUBLIC STATEMENTS & REMARKS* (June 8, 2021).

103. *CFTC Orders Event-Based Binary Options Markets Operator to Pay \$1.4 Million Penalty*, CFTC (Jan. 3, 2022), <https://www.cftc.gov/PressRoom/PressReleases/8478-22>.

104. *Id.*

105. *Id.*

106. *Id.*

V. DEFI USE CASES

A. Lending and Borrowing Using DeFi: MakerDAO as an Example

Lending is one of the “main pillars” in DeFi.¹⁰⁷ The TVL in lending protocols increased from \$7 billion to \$46 billion in 2021.¹⁰⁸ A common feature among DeFi lending protocols is that issued loans are over-collateralized.¹⁰⁹ Collateral can be forcefully liquidated to cover outstanding debt if a position is deemed “at risk,” which is usually when the position falls below a certain minimum collateral ratio.¹¹⁰ This allows loans to be taken out anonymously while mitigating against the protocol becoming insolvent.¹¹¹

In one of the simpler examples, MakerDAO, one of the largest DeFi protocol with a TVL of around \$10 billion as of May 2022, is a DApp that enables users to borrow and lend cryptocurrency using DAI, the native stablecoin pegged to the value of the U.S. Dollar.¹¹² Taking out a loan on MakerDAO takes just a few moments.¹¹³ If a borrower wants to borrow using MakerDAO, the borrower must first deposit collateral (for example, ETH) into a Maker smart contract.¹¹⁴ The smart contract creates a collateralized debt position (CDP) and locks the collateral for the time being.¹¹⁵ By locking ETH in MakerDAO, MakerDAO creates/issues a certain amount of DAI; the more ETH that is locked, the more DAI is created.¹¹⁶ In this respect, MakerDAO aims to ensure that DAI is always fully backed. When a borrower wants to unlock the collateral, the borrower must repay the loan along with any interest and fees.¹¹⁷

Meanwhile, lenders or LPs receive a split of the interest and fees that borrowers pay.¹¹⁸ The CDP remains open as long as the collateral posted is

107. THE BLOCK, *supra* note 41, at 84.

108. *Id.* at 82.

109. *Id.* at 85.

110. *Id.*

111. *Id.*

112. *MakerDAO MCD FAQs*, MAKERDAO, <https://makerdao.world/en/faqs/> (last visited Feb. 15, 2022); Owen Fernau, *MakerDAO Regains Top Spot on TVL Leaderboard*, THE DEFIANT (May 24, 2022), <https://thedefiant.io/makerdao-tops-tvl-charts/>.

113. See Brian Curran, *How to Take Out a Loan with Maker DAI: Complete Guide*, BLOCKONOMI (Sept. 24, 2019), <https://blockonomi.com/how-to-take-out-a-loan-with-maker-dai/>.

114. *Explained: What are DAI and MakerDAO*, BYBIT LEARN (June 30, 2021), [https://learn.bybit.com/defi/what-are-dai-and-makerdao/#:~:text=Simply%20speaking%2C%20MakerDAO%20is%20a,Collateralized%20Debt%20Position%20\(CDP\)](https://learn.bybit.com/defi/what-are-dai-and-makerdao/#:~:text=Simply%20speaking%2C%20MakerDAO%20is%20a,Collateralized%20Debt%20Position%20(CDP).).

115. *Id.*

116. Ki Chong Tran, *What is MakerDAO*, DECRYPT (Apr. 2, 2020), <https://decrypt.co/resources/makerdao-guide-learn-explained-decrypt-3-minutes>.

117. *Id.*

118. Frank Gogol, *What is Crypto Lending*, STILT, <https://www.stilt.com/blog/2021/08/what-is-crypto-lending/>.

sufficient to cover the amount borrowed plus fees and interest, calculated via a “minimum collateral ratio.”¹¹⁹ If the collateral falls below the minimum collateral ratio, the collateral is subject to liquidation.¹²⁰ This is all accomplished without credit checks, bank approval processes, and other cumbersome and time-consuming paperwork.¹²¹ Because of the permissionless nature of DApps, one can borrow as long as one has sufficient collateral.¹²² In this respect, DeFi is an open and transparent financial system.

B. Decentralized Exchanges and Automated Market Makers

Besides lending protocols, DEXs/automated market makers (AMMs) are able to take advantage of market participants eager to deploy otherwise idle assets for yields.¹²³ Curve Finance (Curve) is one of the largest DEX/AMM by TVL at approximately \$8.65 billion as of June 2022.¹²⁴ Curve allows users to swap various cryptocurrencies, such as BTC, ETH, and stablecoins, through the use of liquidity pools to which LPs contribute.¹²⁵ Liquidity pools are complicated in the details, but at a high level, they are essentially a shared pot of tokens that sit in smart contracts.¹²⁶ Using the liquidity pool, a user could, for example, swap one stablecoin, such as USD Coin (USDC), DAI, and USDT, for another stablecoin with low slippage.¹²⁷ Users can also swap among other cryptocurrencies, including wBTC and ETH.¹²⁸

One must contribute to a liquidity pool to become an LP on Curve.¹²⁹ One of the more popular pools is known as the Y Pool, which includes four different stablecoins.¹³⁰ A participant can become an LP by depositing any of the four stablecoins.¹³¹ In exchange for depositing a stablecoin, the LP

119. *Liquidation*, MAKERDAO, <https://makerdao.world/en/learn/vaults/liquidation/> (last visited Feb. 15, 2022).

120. Tran, *supra* note 116.

121. *Id.*

122. See Marco Quiroz-Gutierrez, *Someone Got a \$1.25 Million Loan by Using NFTs as Collateral. Here's How You May be Able to do the Same Thing*, FORTUNE (Feb. 7, 2022, 7:00 PM), <https://fortune.com/2022/02/07/nft-collateral-for-million-dollar-loans/>.

123. THE BLOCK, *supra* note 41, at 85. The DEX to centralized exchange spot volume ratio remained under 10% throughout 2021. *Id.*

124. *Curve*, CURVE FIN., <https://curve.fi/> (last visited Feb. 15, 2022); DEFI LLAMA, <https://defillama.com/protocol/curve> (last visited June 8, 2022).

125. Michael Egorov, *Curve (CRV): How it Works*, CRYPTOPEDIA (Oct. 21, 2021), <https://www.gemini.com/cryptopedia/curve-finance-liquidity-provider-dao#section-how-automatic-market-makers-work>.

126. *Curve FAQ*, CURVE FIN., [https://curve.fi/rootfaq#:~:text=power%20of%20Curve.-,Fees,\(members%20of%20the%20DAO\)](https://curve.fi/rootfaq#:~:text=power%20of%20Curve.-,Fees,(members%20of%20the%20DAO)) (last visited Feb. 15, 2022).

127. Egorov, *supra* note 125.

128. *Curve Pools*, CURVE FIN., <https://curve.fi/pools> (last visited Feb. 15, 2022).

129. See CURVE FIN., *supra* note 126.

130. CURVE FIN., *supra* note 128.

131. *Id.*

receives cryptocurrency representing the LP's proportionate share of the Y Pool.¹³² This represents a token swap, and the tokens received should be roughly equal in fair market value to the stablecoins deposited into the Y Pool.¹³³ Depositing into the Y Pool incurs a gas fee to conduct a token swap on Ethereum.¹³⁴ After depositing into a pool, the LP will begin to generate yield.¹³⁵

An important concept to Curve is voting escrow CRV (veCRV). Holders of CRV, the governance token for Curve, can lock their CRV tokens in Curve for fixed periods of time between one week and four years.¹³⁶ The longer one locks his CRV, the more veCRV the user receives in return.¹³⁷ Holding veCRV also gives users voting rights in the Curve DAO, a portion of fifty percent of Curve's trading revenues, and up to 2.5x increased CRV awards for providing liquidity.¹³⁸

Users who make a swap on Curve pay a fee to the platform in addition to gas fees for a token swap on Ethereum.¹³⁹ As of this writing, the Curve fee is .04%, half of which goes to Curve LPs, while the other half goes to holders of ,veCRV.¹⁴⁰ In other words, Curve LPs earn two separate fees: (1) platform fees via revenue sharing, and (2) CRV.¹⁴¹ Curve LPs can then claim those rewards, re-deposit the rewards back into the pool, and/or lock the CRV in exchange for veCRV.¹⁴²

There are numerous liquidity pools with varying and dynamic yields for Curve LPs. For example, one pool contains CRV and ETH, which has a base annual yield of around three percent and a "rewards APR" of anywhere from eight to twenty percent paid out in CRV (depending on the amount of veCRV one holds and the current rewards rate which changes every two weeks).¹⁴³ There are numerous pools with different asset combinations, which enables

132. Egorov, *supra* note 125.

133. *Id.*

134. *Id.*

135. *Id.*

136. Edward Oosterbaan, *How Yield Farming on Curve is Quietly Conquering DeFi*, COINDESK (Nov. 3, 2021, 4:20 PM), <https://www.coindesk.com/markets/2021/11/03/a-look-into-curves-ecosystem-defis-centerpiece/>.

137. *Guide to Convex Finance—Boosted Curve yields*, MEDIUM (July 21, 2021), [https://medium.com/stakingbits/guide-to-convex-finance-91253329e51b#:~:text=Convex%20pays%20liquidity%20provider%20on,pooled%20from%20other%20CRV%20stakers.You can vote lock 1,000 CRV for a year to have a 250 veCRV weight. See id.](https://medium.com/stakingbits/guide-to-convex-finance-91253329e51b#:~:text=Convex%20pays%20liquidity%20provider%20on,pooled%20from%20other%20CRV%20stakers.You%20can%20vote%20lock%201,000%20CRV%20for%20a%20year%20to%20have%20a%20250%20veCRV%20weight.) Each CRV locked for four years is equal to 1 veCRV. *Vote Locking*, CURVE FIN., <https://resources.curve.fi/faq/vote-locking-boost> (last visited Feb. 15, 2022).

138. MEDIUM, *supra* note 137. To vote in the Curve DAO, one must possess veCRV. *Curve DAO: Vote-Escrowed CRV*, CURVE FIN., <https://curve.readthedocs.io/dao-vecrv.html> (last visited Feb. 15, 2022). One CRV locked for four years (the maximum) provides an initial balance of 1 veCRV. *Id.*

139. CURVE FIN., *supra* note 126.

140. *Id.*

141. Egorov, *supra* note 125.

142. *Id.*

143. CURVE FIN., *supra* note 124.

LPs to deposit different cryptocurrencies based on their goals.¹⁴⁴ If an LP wants to hold ETH, Curve LPs can contribute to a pool containing ETH.¹⁴⁵ If a user prefers less volatility, Curve LPs can contribute liquidity to a pool consisting only of stablecoins pegged to the U.S. Dollar.¹⁴⁶

Those who wish to earn yield by providing liquidity on Curve but do not want to lock their Curve for an extended period of time in exchange for veCRV can utilize certain other DApps, including Convex Finance (Convex).¹⁴⁷ Convex is a yield optimizer built on top of Curve to help Curve LPs and holders of veCRV earn higher returns without having to lock up CRV for a lengthy period of time and subsequently claim and redeposit rewards.¹⁴⁸ CRV holders can deposit their CRV into Convex, which Convex then locks up into Curve in exchange for veCRV.¹⁴⁹ Those who deposit CRV into Convex receive cvxCRV in exchange, which represents each CRV holder's share of the CRV that Convex deposits into Curve.¹⁵⁰ Instead of receiving veCRV, which must be locked for several years, Convex users receive cvxCRV, which is more liquid and can be traded on other DApps.¹⁵¹ cvxCRV holders, by depositing CRV into Convex, receive higher rewards because Convex locks the CRV for the maximum period of time, which generates higher rewards.¹⁵² CRV holders who deposit into Convex receive three tokens as rewards/yield: CRV, CVX (the native cryptocurrency for Convex), and 3CRV (a reward pegged to the U.S. Dollar).¹⁵³ Convex is just one example of how different DApps can be built on top of one another to enhance user returns and liquidity, a process often referred to as “[y]ield [f]arming.”¹⁵⁴

An interesting development in the Curve ecosystem is known as the “Curve Wars.”¹⁵⁵ Recall that one purpose of holding veCRV is to participate

144. *Id.*

145. CURVE FIN., *supra* note 128. To be clear, if Curve LPs contribute ETH to a pool, Curve LPs no longer own ETH; rather, Curve LPs own a share of the pool containing ETH, and must later withdraw a share of that pool, which is akin to a token swap requiring gas fees to transact on Ethereum. *See id.*

146. *Id.*

147. MEDIUM, *supra* note 137.

148. *Id.* Convex currently has a TVL of \$11 billion. THE BLOCK, *supra* note 41, at 89.

149. MEDIUM, *supra* note 137.

150. *Id.*

151. *Id.* Holders of cvxCRV can swap cvxCRV on the SushiSwap DApp for other tokens built on Ethereum. *See* SUSHI, <https://app.sushi.com/swap> (last visited Feb. 25, 2022).

152. MEDIUM, *supra* note 137.

153. *Understanding cvxCRV*, CONVEXFIN., <https://docs.convexfinance.com/convexfinance/general-information/understanding-cvxcrv> (last visited Feb. 15, 2022).

154. *Curve CRV Yield Farming/Triple Dipping Strategy with Convex*, MEDIUM (Oct. 25, 2021), <https://medium.com/stakingbits/curve-crv-yield-farming-triple-dipping-strategy-with-convex-d81e51fe670a>.

155. Omkar Godbole, *CRV Extends Rally as “Curve Wars” Intensify*, COINDESK (Jan. 4, 2022), <https://www.coindesk.com/markets/2022/01/04/crv-extends-rally-as-curve-wars-intensify/>.

in the Curve DAO and vote on governance.¹⁵⁶ One of the major powers given to veCRV holders is the ability to vote to impact the amount of CRV rewards given to each liquidity pool on Curve.¹⁵⁷ Various DeFi protocols, including Convex, are attempting to woo CRV holders to lock their CRV with them so they can use the veCRV to vote for higher rewards on their preferred liquidity pools on Curve.¹⁵⁸ For example, one of the liquidity pools on Curve contains ETH and CVX.¹⁵⁹ Convex wants to acquire as much veCRV as possible to vote in the Curve DAO to increase the rewards given to that liquidity pool containing CVX.¹⁶⁰ To do this, Convex bribes holders of CRV to deposit their CRV with Convex by promising higher yields on their CRV.¹⁶¹ As of this writing, the annual percentage yield on locking CRV with Convex is around twenty-five percent.¹⁶²

C. DeFi Automated Yield Aggregators Like Yearn

Another example of a DeFi protocol is Yearn Finance (Yearn).¹⁶³ Yearn is a DeFi automated yield aggregator platform that auto-compounds users' rewards for them.¹⁶⁴ Recall that in Curve and Convex, an LP must claim and stake/redeposit rewards again, leading to distinct transactions and related gas fees which consume part of the yield generated.¹⁶⁵ Yearn, however, automatically claims and stakes the yield again so the LP need not incur gas fees until the LP withdraws from Yearn.¹⁶⁶ Yearn takes advantage of one gas fee for the entire pool to efficiently claim and stake/redeposit the rewards again, so the entire pool pays for one gas fee at a time.¹⁶⁷ Yearn will also search various DApps to earn the highest yield on a given cryptocurrency.¹⁶⁸ This is all accomplished through smart contracts on Ethereum.

Depositing funds into Yearn is relatively straightforward. Yearn contains numerous "vaults," each of which contains a different

156. *Id.*

157. *Id.*

158. *Curve Wars: The Future of DeFi Dependent on a Windows 98 Application*, MEDIUM (Nov. 10, 2021), <https://medium.com/momentum6/the-great-curve-war-is-heating-up-dont-miss-the-alpha-9b70d99cf694#:~:text=The%20Curve%20war%20can%20be,increased%20buying%20pressure%20for%20%24CRV>.

159. MEDIUM, *supra* note 154.

160. MEDIUM, *supra* note 158.

161. *Id.*

162. *See* Godbole, *supra* note 155.

163. YEARN FIN., <https://yearn.finance/> (last visited Feb. 15, 2022).

164. *Yearn.Finance – What Are Yearn Vaults?*, MORALIS ACAD. (Oct. 15, 2020), <https://academy.moralis.io/blog/yearn-finance-what-are-yearn-vaults>.

165. *See supra* notes 129–154 and accompanying text (explaining how an LP must operate in Curve and Convex).

166. MORALIS ACAD., *supra* note 164.

167. *Id.*

168. *Id.*

cryptocurrency.¹⁶⁹ For example, there are vaults for USDT, DAI, and ETH, among many others.¹⁷⁰ A user deposits a given cryptocurrency into a vault, and receives a token representing that user's share of the vault.¹⁷¹ So if a user deposits ETH into a Yearn vault, the user receives yvETH in return (the "yv" stands for yearn vault).¹⁷² As an example, if a user deposits 1 ETH into a Yearn vault, the user receives 1 yvETH in exchange and begins to earn yield on the 1 ETH in the vault.¹⁷³ As interest accrues, the user receives a tiny fraction of ETH every period.¹⁷⁴ If the interest on a Yearn ETH vault is 1.03 percent annual percentage yield, a 1 ETH deposit into a Yearn vault would yield .000198 ETH after one week.¹⁷⁵

VI. TRADITIONAL TAX PRINCIPLES AND IRS GUIDANCE ON CRYPTOCURRENCY

Taking a simplified approach to analyzing DeFi issues, two concepts of tax law are relevant for this Article: income and capital gains. Not surprisingly, the IRS uses a broad definition of income.¹⁷⁶ Section 61 of the Tax Code broadly defines "income" to include "all income from whatever source derived. . ." including, among numerous other things, interest, rents, royalties, dividends, compensation for services, and gains derived from dealings in property.¹⁷⁷ The Supreme Court has held that income must involve a "coming in,"¹⁷⁸ and later characterized income as "undeniable accessions to wealth, clearly realized, and over which the taxpayers have complete dominion."¹⁷⁹ Nothing in Section 61 or Supreme Court interpretation explicitly states that new property—that is created by the taxpayer—is income.¹⁸⁰

According to the IRS, "[a]lmost everything you own and use for personal or investment purposes is a capital asset."¹⁸¹ When you sell a capital asset, the difference between the adjusted basis (i.e., the purchase price or

169. *Id.*

170. *Id.*

171. *Id.*

172. *See id.*

173. *See id.*

174. *See id.*

175. *See Vaults*, YEARN, <https://yearn.finance/vaults> (last visited Feb. 15, 2022) (For a list of currency vaults and APYs). Many vaults have significantly higher APYs. *Id.* The vaults for stablecoins such as USDT can be as high as 8-10%. *Id.*

176. 26 U.S.C. § 61.

177. *Id.* § 61(a).

178. *Eisner v. Macomber*, 252 U.S. 189, 207 (1920).

179. *Comm'r v. Glenshaw Glass Co.*, 348 U.S. 426, 431 (1955).

180. *See* 26 U.S.C. § 61(a).

181. *Topic No. 409 Capital Gains and Losses*, I.R.S., <https://www.irs.gov/taxtopics/tc409> (last visited Feb. 15, 2022); *see* 26 U.S.C. § 1221.

fair market value at the time of acquisition, assuming no deductions or depreciation) and the amount you realized from the sale is a capital gain or capital loss.¹⁸² “You have a capital gain if you sell the asset for more than your adjusted basis. You have a capital loss if you sell the asset for less than your adjusted basis.”¹⁸³ If you hold an asset for more than one year, the capital gain or loss is long term and subject to a lower tax rate as a long-term capital gain or loss.¹⁸⁴ If you hold the asset for less than one year, the capital gain or loss is short term and subject to taxation as ordinary income.¹⁸⁵

Guidance from the IRS on cryptocurrency is sparse to date. The first guidance came via *Notice 2014-21*, wherein the IRS stated that cryptocurrencies are property for federal tax purposes.¹⁸⁶ A taxpayer will recognize capital gain or loss on the sale of a cryptocurrency based on the fair market value of the cryptocurrency on the date of receipt and sale.¹⁸⁷ A taxpayer also recognizes gain or loss upon the exchange of virtual currency for other property, including other virtual currency.¹⁸⁸

In October 2019, via *Revenue Ruling 2019-24*, the IRS issued guidance regarding the tax consequences of airdrops and “hard fork[s]” of cryptocurrency.¹⁸⁹ At a high level, an airdrop is when cryptocurrency is distributed to the public addresses of various individuals, while a hard fork is when one blockchain undergoes a protocol change and essentially turns into a new blockchain.¹⁹⁰ While airdrops and hard forks occur in DeFi, neither are the subject of this Article. However, the takeaway is that the IRS considers the fair market value of additional tokens received as income subject to taxation, even if the taxpayer is unaware of the airdrop or hard fork and even

182. 26 U.S.C. § 1222; I.R.S., *supra* note 181.

183. I.R.S., *supra* note 181.

184. 26 U.S.C. § 1222; I.R.S., *supra* note 181.

185. 26 U.S.C. § 1222; I.R.S., *supra* note 181. Many compare DeFi yield with dividends generated from stock ownership. I.R.S., *supra* note 181. Dividends from stocks are taxed as ordinary income, while the IRS considers appreciation in the value of a stock gain or loss on a capital asset. *See id.*

186. I.R.S. Notice 2014-21, 2014-16 I.R.B. 938.

187. *Id.*

188. *Id.*

189. Rev. Rul. 2019-24, 2019-44 I.R.B. 1004.

190. *See id.* According to the IRS:

A hard fork is unique to distributed ledger technology and occurs when a cryptocurrency on a distributed ledger undergoes a protocol change resulting in a permanent diversion from the legacy or existing distributed ledger. A hard fork may result in the creation of a new cryptocurrency on a new distributed ledger in addition to the legacy cryptocurrency on the legacy distributed ledger. Following a hard fork, transactions involving the new cryptocurrency are recorded on the new distributed ledger and transactions involving the legacy cryptocurrency continue to be recorded on the legacy distributed ledger.

Id. at 2. Meanwhile, “[a]n airdrop is a means of distributing units of a cryptocurrency to the distributed ledger addresses of multiple taxpayers.” *Id.*

if the taxpayer has to take some affirmative step to claim the airdrop or hard fork.¹⁹¹

In December 2019, eight members of Congress penned a letter to the IRS taking issue with *Revenue Ruling 2019-24*.¹⁹² The letter noted several issues with *Revenue Ruling 2019-24*, including that the guidance failed to “contemplate the vast variety of products offered in the cryptocurrency market,” and that the IRS should “provide guidance to taxpayers as to how income related to all crypto transactions will be treated for tax purposes.”¹⁹³ Three congressmen who penned the letter lamented that unclear IRS guidance “unfairly targets taxpayers who may not have the ability to understand the positions the IRS has taken . . . but who have taken a reasonable position.”¹⁹⁴ The letter took particular issue with the IRS adopting a “dominion and control” standard to determine when a taxable event occurs, even when a taxpayer must take some affirmative action to claim the airdrop or hard fork.¹⁹⁵

In June 2021, the IRS provided further guidance on whether token swaps are taxable events or whether § 1031 of the Internal Revenue Code (IRC), known as a “like-kind exchange,” may apply.¹⁹⁶ Section 1031 provides that a taxpayer is not required to recognize a gain or loss on real property used for business or held as an investment exchanged solely for other business or investment property that is the same type or like-kind.¹⁹⁷ “The nonrecognition of gain or loss under § 1031 is intended to apply to transactions where the taxpayer's economic situation following the exchange is essentially the same as it had been before the transaction.”¹⁹⁸ Under the Tax Cuts and Jobs Act, § 1031 applies only to exchanges of real property as of January 1, 2018 moving forward, and not to exchanges of personal or intangible property.¹⁹⁹ The IRS ruled that, if completed prior to January 1, 2018, an exchange of BTC for ETH did not qualify as a like-kind exchange under § 1031.²⁰⁰ In doing so, they viewed BTC and ETH as fundamentally different assets:

191. *See id.*

192. Letter from Members of Cong. to Charles P. Rettig, Comm’r (Dec. 20, 2019), <https://www.coincenter.org/app/uploads/2020/05/letter-to-irs-dec-20.pdf>.

193. *Id.*

194. *Id.*

195. *Id.*

196. I.R.S. Gen. Couns. Mem. 202124008 (June 18, 2021).

197. 26 U.S.C. § 1031; *see also Like-Kind Exchanges – Real Estate Tax Tips*, I.R.S., <https://www.irs.gov/businesses/small-businesses-self-employed/like-kind-exchanges-real-estate-tax-tips> (last visited Feb. 15, 2022).

198. I.R.S. Gen. Couns. Mem. 202124008 (June 18, 2021); *see* H. Rep. No. 73-704, Oct. 2 (1934), 1939-1 C.B. (Part 2) 554, 564.

199. *Like-kind Exchanges Now Limited to Real Property*, I.R.S., (Nov. 19, 2018), <https://www.irs.gov/newsroom/like-kind-exchanges-now-limited-to-real-property>.

200. I.R.S. Gen. Couns. Mem. 202124008 (June 18, 2021).

[W]hile [BTC and ETH] share similar qualities and uses, they are also fundamentally different from each other because of the difference in overall design, intended use, and actual use. The Bitcoin network is designed to act as a payment network for which Bitcoin acts as the unit of payment. The Ethereum blockchain, on the other hand, was intended to act as a payment network and as a platform for operating smart contracts and other applications, with Ether working as the “fuel” for these features. Thus, although Ether and Bitcoin may both be used to make payments, Ether’s additional functionality differentiates Ether from Bitcoin in both nature and character. Therefore, Bitcoin and Ether do not qualify as like-kind property under section 1031.²⁰¹

However, the IRS caveated this guidance by noting it is limited to exchanges involving BTC, ETH, and Litecoin (another cryptocurrency), and “no inferences should be made based on this . . . advice that are not explicitly set forth in this advice.”²⁰² The IRS also said this memorandum should not be cited or used as precedent.²⁰³

In February 2022, the IRS revealed its potential intent not to tax cryptocurrency received as rewards in connection with staking. In May 2021, Joshua and Jessica Jarrett (the Jarretts) sued the federal government, arguing that cryptocurrency received as rewards for staking constitutes “new property” created by a taxpayer that should not be considered “income” until those rewards are ultimately sold.²⁰⁴ The IRS ultimately approved a full refund of taxes paid on account of the value of cryptocurrency received through staking that the Jarretts had not sold.²⁰⁵

Current IRS guidance does not explicitly reference DeFi, so many taxpayers attempt to apply general tax principles.²⁰⁶ Many lenders and LPs have taken the position that the yield earned, whether claimed or unclaimed, is taxed as ordinary income like a dividend on a stock, and the cryptocurrency is measured in fair market value based on U.S. Dollars at the time of receipt.²⁰⁷ However, there is uncertainty given the lack of clear IRS guidance, and applying traditional tax methods could generate significant tax liability

201. *Id.* at 3.

202. *Id.* at 3–4.

203. *Id.* at 4.

204. Complaint at 2, *Jarrett v. United States*, No: 21-CV-00419 (M.D. Tenn. May 26, 2021).

205. Kamran Rosen, *In Huge Precedent, IRS Says It Will Not Tax Unsold, Staked Crypto*, FORBES (Feb. 2, 2022, 9:29 PM), <https://www.forbes.com/sites/kamranrosen/2022/02/02/in-huge-precedent-irs-says-it-will-not-tax-unsold-staked-crypto/?sh=4ff8c8a3464c>.

206. See Zac McClure, *DeFi Crypto Tax Guide: Yield Farming, Lending & More*, TOKEN TAX, <https://tokentax.co/guides/defi-crypto-tax/> (last visited Feb. 15, 2022).

207. See Andrew Perlin, *How is Cryptocurrency Taxed?*, TOKEN TAX, <https://tokentax.co/guides/do-you-need-to-file-crypto-taxes/> (last visited Feb. 15, 2022).

that eliminates much of the financial benefits of participating in DeFi as a lender or LP given the high gas fees to transact on Ethereum.²⁰⁸

Applying traditional tax principles to DeFi is confusing for consumers and tax professionals alike. As an example, take an LP on Curve (let us call him Taxpayer One). Using traditional tax principles and a risk-averse approach to tax treatment, Taxpayer One could take the position that rewards received through providing liquidity (like CRV tokens) would be treated as ordinary income via a direct payment for the service of providing liquidity.²⁰⁹ Subsequently selling the CRV tokens (or other rewards received) would be treated as capital gains or losses, with the basis being the value of the CRV tokens upon initial receipt.²¹⁰ For example, say Taxpayer One deposited 1 CRV on Curve. Over the course of one year, Taxpayer One received CRV worth \$0.50 as a reward for providing liquidity.²¹¹ Taxpayer One would then owe taxes on the \$0.50 in CRV as ordinary income, assuming Taxpayer One did not sell, swap, or otherwise exchange the CRV rewards.²¹²

This example is about as simple as it can get. Complications increase if we change the facts such that the LP redeposits his funds back into Curve. As another example, let us say Taxpayer One receives \$100 in CRV rewards throughout the year. Taxpayer One then claims and redeposits all rewards received back into Curve in exchange for an increased share of the liquidity pool.²¹³ Under traditional tax principles, Taxpayer One likely owes taxes on the \$100 received as ordinary income via the value of the rewards received throughout the year.²¹⁴ Taxpayer One would also have to track every single CRV reward received (which basically occurs in real time) to see how much each CRV token increased between the time of receipt and redeposit. This analysis is even more complicated if an LP deposits CRV into Convex, which generates rewards for LPs in the form of CRV, CVX, and 3CRV.²¹⁵ Under that scenario, Taxpayer One must track his basis in three cryptocurrencies, also basically in real time.

It is uncertain whether the typical participant in DeFi has the capacity to engage in such an accounting exercise accurately without advanced software, a tax professional, or both. Further, the software developed to date is relatively new, and it is uncertain whether the IRS will question the accuracy of the software.²¹⁶ Finally, given the uncertainty even among tax

208. See generally McClure, *supra* note 206.

209. *Id.*

210. *Id.*

211. See *id.*

212. See *id.*

213. See *supra* notes 129–135 and accompanying text (explaining how to use Curve).

214. See McClure, *supra* note 206.

215. See *Convex for CRV Stakers*, COVEXFIN., <https://docs.convexfinance.com/convexfinance/general-information/convex-for-crv-stakers> (last visited Feb. 15, 2022).

216. See *supra* Part III (explaining the new DeFi technology).

professionals, it is unclear if relying on such professionals will provide comfort to the taxpayer, who is subject to penalties and fines if the taxpayer incorrectly calculates his tax liability.²¹⁷

To simplify matters and encourage innovation and participation in DeFi, the IRS should take a simple approach: the system in, system out approach. The IRS should take the position that unless and until the LP or lender removes a cryptocurrency or tokenized share of ownership of a liquidity pool from the system, or DApp, the IRS will not recognize any fluctuation as income, capital gains, or both. This approach is simpler, will enable participants to easily and accurately quantify tax liability, and encourages consumers and investors to participate in cutting-edge technologies like DeFi.

A system in, system out approach is consistent with how the IRS gave the Jarretts a refund when the Jarretts argued that cryptocurrency received as staking rewards that remain unsold are not subject to tax liability.²¹⁸ The IRS could simply expand this to all DeFi, as rewards received could be considered newly created property. This would especially be the case in an AMM or DEX.²¹⁹

On the front end, the IRS and/or Congress should address whether certain token swaps are taxable events. A conservative view would indicate that a swap from BTC to wBTC, or depositing wBTC into a liquidity pool containing wBTC, is a taxable event because the LP has exchanged one cryptocurrency for another.²²⁰ This could subject the user to significant capital gains liability depending on when the BTC/wBTC was originally purchased.²²¹ A different stance is that the exchange is merely a deposit with the LP token representing the original deposit ratio, and the economic realities reflect that the LP's economic situation overall remains unchanged in substance.²²² Further, the LP does not intend to benefit financially *directly* as a result of the swap because the LP holds a new cryptocurrency that is, in substance, substantially similar to the previous cryptocurrency the LP held.²²³

This would include, for example, swapping BTC for wBTC, where the taxpayer's economic situation is substantively the same before and after the swap.²²⁴ The taxpayer still owns or holds the right to one BTC, the same cryptocurrency.²²⁵ wBTC is merely a different form of BTC, but the U.S.

217. See *Accuracy-Related Penalty*, I.R.S., <https://www.irs.gov/payments/accuracy-related-penalty> (last visited Feb. 15, 2022).

218. See Rosen, *supra* note 205.

219. THE BLOCK, *supra* note 41.

220. McClure, *supra* note 206.

221. *Id.*

222. *Id.*

223. See *id.*

224. See *id.*

225. *Id.*

Dollar value of BTC and wBTC should be nearly identical because they are presumably pegged 1:1.²²⁶

Another example is when an LP deposits cryptocurrency into a liquidity pool and receives a tokenized version of its share of the pool.²²⁷ Recall that an LP on Curve can deposit CRV in exchange for veCRV that is locked for up to four years.²²⁸ Section 1031 should include such swaps as well.²²⁹ If anything, the taxpayer is actually worse off economically because the veCRV is locked, whereas the taxpayer could freely trade the CRV.²³⁰ In other words, the taxpayer cannot liquidate veCRV to pay taxes as they could CRV.²³¹

A simple way to resolve this would be to amend § 1031 to include token swaps where the U.S. Dollar is the same before and after the exchange because of a 1:1 peg.²³² This would accomplish the intent and purpose underlying § 1031.²³³ Imposing tax liability when a taxpayer's economic realities are unchanged unfairly imposes tax liability and discourages the taxpayer from putting his assets to productive use.²³⁴ Further, the cryptocurrency held before and after the swap are both held as, or used for, investment purposes. Taxing users who swap CRV to veCRV or BTC to wBTC would elevate form over substance. Protecting token swaps with assets that are pegged 1:1, like BTC and wBTC, or deposits into DeFi protocols provides initial comfort to taxpayers when transferring crypto assets to participate in DeFi.²³⁵ While that would solve the front end, back end tax uncertainty remains.

Now let us run through an example of how a system in, system out approach could work in practice, which essentially asks two basic questions: (1) what is the fair market value in U.S. Dollars of the cryptocurrency deposited into the DeFi platform? And (2) what is the fair market value in U.S. Dollars of the cryptocurrency withdrawn from the DeFi platform?

Taxpayer One could continue to participate in DeFi and incur tax liability only when Taxpayer One pulls the rewards entirely from a DeFi

226. See McClure, *supra* note 206.

227. See MEDIUM, *supra* note 137.

228. See *supra* note 151 and accompanying text (explaining that veCRV must be locked up for several years); MEDIUM, *supra* note 137.

229. See, e.g., *supra* notes 196–201 and accompanying text (detailing the application of § 1031 to like-kind exchanges).

230. MEDIUM, *supra* note 137.

231. See *id.*

232. See *supra* notes 196–205 and accompanying text (providing background on the IRS's guidance on the applicability of § 1031 to token swaps).

233. See *supra* note 198 and accompanying text (noting § 1031's purpose is to apply to situations where the taxpayer's economic situation does not change).

234. See Letter from Members of Cong. to Charles P. Rettig, *supra* note 192.

235. See *supra* notes 192–195 and accompanying text (describing the uncertainty and unfairness of the IRS ruling).

protocol, such as Curve.²³⁶ Taxpayer One can continue claiming and redepositing rewards into Curve at will without facing any tax liability.²³⁷ When Taxpayer One is ready to withdraw his funds from Curve, all Taxpayer One needs to do is determine the fair market value when they deposited and withdrew from the DApp (for example, the fair market value of 1 ETH at the time of deposit and 1 ETH at the time of withdrawal; this could be applied to other cryptocurrencies and amounts as appropriate).²³⁸

The system in, system out approach has several benefits. First, it is simpler for a taxpayer to track and ultimately report income and capital gain or loss.²³⁹ The IRS should provide clarity where possible, as increased clarity would also reduce the burden on IRS personnel tracking cryptocurrency-related income.²⁴⁰ For example, the IRS could easily provide guidance on whether certain token swaps constitute taxable events. Taxpayers should not be left to guess whether swapping one BTC for one wBTC could generate significant tax consequences when, at the end of the day, the taxpayer still owns the rights to one BTC before and after the swap.²⁴¹

The system in, system out approach also encourages long-term productive use of assets, which is in line with other IRS policies, like a § 1031 like-kind exchange or a lower tax rate on long-term capital gains.²⁴² Rather than face constant uncertainty over tax liability, and possible future amendments and penalties, taxpayers can leave their funds in the DeFi system with greater clarity.²⁴³ This will also encourage individuals to participate in DeFi, crypto, and other emerging technologies, knowing that tax issues are less likely to pose significant uncertainty and exposure.²⁴⁴ The IRS should help incentivize cryptocurrency adoption and technological development by providing clear, concise guidance where possible.

Another benefit is that the IRS could clarify how its dominion and control test will be applied in the context of airdrops and hard forks, which

236. *See e.g.*, *Eisner v. Macomber*, 252 U.S. 189, 207 (1920); *Comm'r v. Glenshaw Glass Co.*, 348 U.S. 426, 431 (1955) (explaining that taxable income is only taxable if it is clearly realized).

237. *See e.g.*, 26 U.S.C. § 1222 (providing that gains from a sale are generally taxed).

238. *See id.*

239. *See supra* notes 215–217 and accompanying text (discussing the benefit of the system in, system out approach).

240. *See supra* notes 213–215 and accompanying text (discussing the types of income that must be tracked).

241. *See supra* notes 68–70 and accompanying text (discussing how wBTC is a version of BTC usable on Ethereum and is pegged 1:1 to BTC).

242. *See* 26 U.S.C. § 1031.

243. *See supra* notes 43–47, 68–70, 176–186 and accompanying text (discussing how DeFi participants can be lenders, swapping BTC for wBTC, and IRS tax practices for long term investments and gains).

244. *See supra* notes 40–42, 188–208 and accompanying text (discussing how DeFi has witnessed high recent growth, and how unclear the tax guidance is for DeFi).

has long been an issue.²⁴⁵ Often, a user must take the affirmative step of claiming rewards, as is the case with Curve and Convex.²⁴⁶ The question arises of whether a taxpayer has dominion or control even though the taxpayer has not claimed any rewards. With a system in, system out approach, the IRS could effectively declare that there is no functional dominion and control unless and until the users removes crypto assets from a DApp/platform entirely, as opposed to taxing rewards to which the DeFi participant does not technically have access until the participant claims those rewards.²⁴⁷ This has the added benefit of not taxing participants on yields that may be more costly to claim because of gas fees than the rewards are actually worth, unlike stock dividends, which are free to exchange for fiat currency and subsequently use to pay taxes.²⁴⁸ The purpose here is to reflect DeFi participants' economic realities.

Further, this approach spares taxpayers from accruing tax liabilities in assets that are not as liquid or usable in everyday life as compared to shares of publicly traded stocks or other common investments.²⁴⁹ The comparison to stocks that many like to use may not be completely appropriate. Stocks are highly liquid and less volatile, and most stockbrokers and exchanges track the tax consequences for taxpayers.²⁵⁰ Taxpayers generally do not incur costs to sell stocks, given many exchanges now offer free commissions.²⁵¹ Put another way, taxpayers can sell stocks to pay tax liability without a transaction fee.²⁵²

Cryptocurrencies like CRV and CVX are less liquid, highly volatile, and are not widely accepted by merchants and vendors.²⁵³ Exchanging a cryptocurrency like CRV or CVX into a stablecoin will incur a transaction fee on Ethereum which often costs as much as \$100 worth of ETH.²⁵⁴ It is often not economical for an LP to even claim rewards (i.e., the gas fees to use Ethereum may exceed the value of the rewards or consume a significant percentage of those rewards), yet the LP must pay taxes on the rewards as if

245. See *supra* notes 191–97 and accompanying text (discussing the issues of the IRS's ruling regarding airdrops and hard forks).

246. See *supra* notes 139–142 and accompanying text (discussing fees earned by Curve LPs and how they claim those rewards).

247. See *supra* notes 139–142 and accompanying text (discussing fees earned by Curve LPs and how they must claim those rewards).

248. See *supra* notes 37–40 and accompanying text (discussing gas fees for swapping tokens).

249. See *supra* notes 136–138 and accompanying text (discussing how crypto currencies such as CRV can be locked in for fixed periods).

250. See *Save on Taxes: Know Your Cost Basis*, CHARLES SCHWAB (Oct. 19, 2021), <https://www.schwab.com/resource-center/insights/content/save-on-taxes-know-your-cost-basis>.

251. Alicia Adamczyk, *Schwab is Now Offering Commission-Free Stock Trades—Here's What That Means for You*, CNBC (Oct. 2, 2019, 10:42 A.M.), <https://www.cnbc.com/2019/10/02/what-commission-free-stock-trades-mean-for-you.html>.

252. See *id.*

253. See MEDIUM, *supra* note 137.

254. ETHERSCAN, *supra* note 40.

they are as liquid as receiving dividends on stocks.²⁵⁵ Tax laws must be structured to account for the economic realities underlying DeFi.

This approach also advances the IRS's goal of ensuring taxpayers pay their fair share.²⁵⁶ If a taxpayer depends on DeFi yield as passive income and routinely withdraws rewards from DApps, then the taxpayer will pay gains as ordinary income given the period of withdrawals.²⁵⁷ But if the taxpayer has a long-term outlook and keeps those funds locked in DeFi protocols, the yield should not be treated as ordinary income because that is more akin to a long-term investment.²⁵⁸ DeFi is not a one size fits all approach. The IRS should structure the rules, so the intent of taxpayers is fairly reflected in tax liability.

255. *See supra* notes 37–40, 176–190 and accompanying text (discussing Ethereum gas fees and IRS tax practices regarding crypto currencies).

256. *See supra* notes 176–187 and accompanying text (discussing United States tax law and IRS practices).

257. *See supra* notes 176–187 and accompanying text (discussing IRS practices and what is taxed as ordinary income).

258. *See supra* notes 176–187 and accompanying text (discussing IRS practices and taxes on long term investments).